

Contents

Part A: Outputs, reports, metrics, activities, impact

1. Publications
 - 1.1. Full publication
 - 1.2. Published resources
 - 1.3. Web pages
 - 1.4. Blogs
 - 1.5. Conferences and Seminars
2. Reports about the Manchester Fly Facility and its work
 - 2.1. External
 - 2.2. Local
3. Metrics
4. Activities
 - 4.1. Science fairs
 - 4.2. School activities
 - 4.3. Teacher training
 - 4.4. Tours of the Fly Facility
5. Student placements
6. Impact
 - 6.1. Awards
 - 6.2. Proof that resources are being used
 - 6.2.1. Use of advocacy and outreach materials
 - 6.2.2. Use of training package
 - 6.2.3. Use of school resources
 - 6.3. Impact of school resources on teachers', pupil's and researchers' choices
 - 6.4. Impact on other activities
 - 6.5. Invitations

Part B: Comments demonstrating quality of resources & activities

7. School Visits, droso4schools, Teacher Seminars & Conferences (teacher comments)
8. School Visits (pupil comments)
 - 8.1. Extracurricular school visits
 - 8.2. Within droso4school project
 - 8.3. School Visits (Pupil reports and drawings)
9. Online Resources (Teacher comments)
10. Online resources (comments from other researchers)
11. Training Package
12. Comments by students
 - 12.1. Student participants in outreach work
 - 12.2. droso4schools placement students
 - 12.3. Work experience students at the Fly Facility
 - 12.4. Other pupil comments
13. Faculty Events
14. External visitors
15. Brain Box
16. Resource provision (flies and/or food)

Part C: Evaluation

- ManFlyFacility-SchoolEvaluations.xls [\[LINK\]](#)

- Scarisbrick-Evaluation.pdf [\[LINK\]](#)

Part A: Outputs, reports, metrics, activities

1. Publications

1.1. Full publications

- Illingworth, S., Prokop, A. (2017). Science communication in the field of fundamental biomedical research (editorial). *Semin Cell Dev Biol* **70**, 1-9 -- [\[LINK\]](#)
- Patel, S., Prokop, A. (2017). The Manchester Fly Facility: Implementing an objective-driven long-term science communication initiative. *Semin Cell Dev Biol* **70**, 38-48 -- [\[LINK\]](#)
- Patel, S., DeMaine, S., Heafield, J., Bianchi, L., Prokop, A. (2017). The drososchools project: long-term scientist-teacher collaborations to promote science communication and education in schools. *Semin Cell Dev Biol* **70**, 73-84 -- [\[LINK\]](#)
- Roote, J., Prokop, A. (2013). How to design a genetic mating scheme: a basic training package for *Drosophila* genetics. *G3 (Bethesda)* **3**, 353-8 -- [\[LINK\]](#)
- Fostier, M., Patel, S., Clarke, S., Prokop, A. (2015). A novel electronic assessment strategy to support applied *Drosophila* genetics training on university courses. *G3 (Bethesda)* **5**, 689-98 -- [\[LINK\]](#)
- Prokop, A. (2016). Fruit flies in biological research. *Biological Sciences Review* **28**, 10-14 -- [\[LINK\]](#)
- Harbottle, J., Strangward, P., Alnuamaani, C., Lawes, S., Patel, S., Prokop, A. (2016). Making research fly in schools: *Drosophila* as a powerful modern tool for teaching Biology. *School Science Review* **97**, 19-23 -- [\[LINK\]](#)

1.2. Published resources

- Prokop, A., Patel, S. (2016). Resources for communicating *Drosophila* research in schools and on science fairs. *figshare*, 10.6084/m9.figshare.4262921 -- [\[LINK\]](#)
- Prokop, A., Patel, S. (2015). Biology lessons for schools using the fruit fly *Drosophila*. *figshare*, m9.figshare.1352064 -- [\[LINK\]](#)
- Prokop, A. (2013). A rough guide to *Drosophila* mating schemes. *figshare*, m9.figshare.106631 -- [\[LINK\]](#)
- Prokop, A. (2013). 2nd year *Drosophila* developmental genetics practical. *figshare*, m9.figshare.156395 -- [\[LINK\]](#)
- Manchester-Fly-Facility (2013) For the public: Outreach resources -- [\[LINK\]](#)
- ManFly (2015). Manchester Fly Facility Resources. *figshare*, 10.6084/m9.figshare.1328031 -- [\[LINK\]](#)
- Small fly: Big Impact, Part 1 Why the fly (educational YouTube video in English, Spanish, Indonesian, Arabic, under development: Portuguese) -- [\[LINK\]](#)
- Small fly: Big Impact, Part 2 Making Research Fly (educational YouTube video) -- [\[LINK\]](#)



- Fly vs. Mite (online Scratch computer game) -- [\[LINK\]](#)
- drososchools: bringing *Drosophila* back into classrooms (YouTube video about the project) -- [\[LINK\]](#)
- Further short films on the Manchester Fly Facility YouTube channel -- [\[LINK\]](#)

1.3. Webpages:



- **Manchester Fly Facility** / For the public (worldwide only resource page for *Drosophila* science communication, listing also all activities by the Manchester Fly Facility) -- [\[LINK\]](#)
- **droso4schools** (site accompanying the droso4schools project) -- [\[LINK\]](#)
- **droso4public** (collating useful links and information to support you during *Drosophila* advocacy and public outreach) -- [\[LINK\]](#)
- **Fly Indonesia** (official website supporting the collaboration between Firzan Nainu and the Manchester Fly Facility aiming to establish *Drosophila* research as an efficient and cost-effective model in Indonesia) -- [\[LINK\]](#)
- **droso4Nigeria** (promoting *Drosophila* in Nigerian universities and schools) -- [\[LINK\]](#)
- **Brain Box** (website accompanying the Brain Box science fair in June 2016 with >5K visitors; A. Prokop as key organiser) -- [\[LINK\]](#)

1.4. Blogs, non-peer-reviewed publications

- Patel, S., Prokop, A. (2019). How your science communication can turn multi-lingual! Blog post in "PLOS | BLOGS" -- [\[LINK\]](#)
- Patel, S., Prokop, A. (2019). Why fruit flies belong in primary and secondary schools. Blog post in "Genes to Genomes" -- [\[LINK\]](#)
- Prokop, A. (2018). Why funding fruit fly research is important for the biomedical sciences. Open Access Government 20, 198-201 -- [\[LINK\]](#) and as [GSA blog](#)
- Prokop, A. (2018). A novel engaging approach to teaching life cycle and evolution in KS2 classrooms (primary schools). Blog post in "Gedankenexperimente" -- [\[LINK\]](#)
- Patel, S., Prokop, A. (2018). An objective-driven long-term initiative to communicate fundamental science to various target audiences – a *Drosophila* case study. Blog post in "Open Research Forum" — [\[LINK\]](#) – mirrored in "PLOS | BLOGS" (ed. J. Organ) -- [\[LINK\]](#)
- Prokop, A. (2018). How to communicate basic research in schools - a case study using *Drosophila*. Blog post in "PLOS | BLOGS" -- [\[LINK\]](#)
- Prokop, A. (2017). Communicating basic science: what goes wrong, why we must do it, and how we can do it better. In "PLOS | BLOGS" (J. Organ, Ed.). PLoS -- [\[LINK\]](#)
- Prokop, A. (2017). Science communication in the biomedical science: challenges, opportunities and new approaches. NCCPE blog -- [\[LINK\]](#)
- Prokop, A. (2015) "Why do we have to learn this stuff?"- Establishing *Drosophila* as a modern teaching tool in schools - Guest blog for "Fly on the wall" (2 Feb) -- [\[LINK\]](#)
- Prokop, A. (2015) Bringing life into biology lessons: using the fruit fly *Drosophila* as a powerful modern teaching tool - Guest blog for "Pedagoo.org" (20 Aug; no longer available); mirrored and regularly updated on "Gedankenexperimente" -- [\[LINK\]](#)
- Prokop, A. (2015) Maintaining a strong *Drosophila* community - starting with students - Guest blog for "Genes to Genomes (Genetics Society of America)" (3 March; this blog is currently being used as the key advocacy resource on flybase.org) -- [\[LINK\]](#); mirrored on "Gedankenexperimente" -- [\[LINK\]](#)
- Patel, S., Prokop, A. (2015). How to develop objective-driven comprehensive science outreach initiatives aiming at multiple audiences. *bioRxiv* 10.1101/023838 -- [\[LINK\]](#)

1.5. Conferences and Seminars

- Prokop, A. (2018) Using *Drosophila* to study the roles and regulation of cytoskeleton during

- neuronal maintenance and degeneration. NC3Rs 2019 Funding Highlight Notice Launch (Org.: NC3Rs), London (04 Sept)
- Prokop, A. (organiser), Pulver, S., Steiger, R. (2018). Advocating *Drosophila* through using it as an efficient teaching tool (workshop organised by A. Prokop). In "59th Annual *Drosophila* Research Conference" (T. T. Su, G. Bosco, P. Geyer, N. K. Whiteman, Eds.). Genetics Society of America, Philadelphia. -- available on F1000Research 7, 465 (slides) — [\[PPT\]](#)
 - Prokop, A. (2017) *Drosophila* as an efficient and cost-effective replacement strategy for discovery processes in the biomedical sciences. The University of Manchester 3Rs Symposium, Manchester (30 Oct) -- [\[LINK\]](#)
 - Prokop, A. (2016) Why and how to communicate fly research. Resources for the *Drosophila* Community (Org.: D. Bilder), Janelia Farm (Feb) -- [\[LINK\]](#)
 - Prokop, A. (2015) A comprehensive strategy to communicate *Drosophila* research to the public [F1000Research 4, 820; slide presentation; v1; not peer reviewed]. 24th Europ *Drosophila* Res Conference (Org.: B. Edgar, I. Lohmann, A. Teleman, A. Ephrussi, E. Furlong, M. Leptin, M. Boutros), Heidelberg (09-12 Sept) -- [\[LINK\]](#)
 - Prokop, A. (2016) "Communicating science communication example: Manchester Fly Facility outreach initiative", Engagement@Manchester (16 Jan)
 - Prokop, A. (2014) A concept for objective-driven science outreach: promoting *Drosophila* research through multifaceted, audience-specific strategies. Manchester Fly Club Seminar Series (Oct) -- [\[LINK\]](#)
 - Patel, S. (2014) Why fruit flies belong in primary and secondary schools, Rijeka, Croatia (19 Nov)
 - Prokop, A. (2015) "A comprehensive strategy to communicate *Drosophila* research to the public" (Chicago, American *Drosophila* Research Conference, March) -- [\[LINK\]](#)

2. Reports about the Manchester Fly Facility and its work

2.1. External

- Luck-Baker, A. (2018). Do Insects Feel Pain? Discovery, Killing Insects: The Rights and Wrongs (episode 2 of 2). 27 min broadcast in "BBC World Service Discovery" -- [\[LINK\]](#)
- Blackburn, C. (2017). A fly on the wall account of scicomm in action. *Blog post* in "The Node" -- [\[LINK\]](#)
- Blackburn, C. (2018). A droso4school CPD event for teachers. *Blog post* in "The Node" -- [\[LINK\]](#)
- Get to Know Neuroscience at The University of Manchester (Makassar Tribun; 29/06/17) [\[LINK\]](#)
- The birth of nerves (BBSRC Blog) -- [no longer online]
- Research unravels nerve-wiring process (BBSRC Blog) -- [no longer online]
- The portrait of a fly (Part 1) (Wellcome Trust Blog) -- [\[LINK\]](#)
- The portrait of a fly (Part 2) (Wellcome Trust Blog) -- [\[LINK\]](#)
- A Research Update from the University of Manchester (Epilepsy research UK) -- [\[LINK\]](#)
- A how-to manual for fruit fly research has been created (Cambridge University News) -- [\[LINK\]](#)
- Struggling with your fly? Why not try reading the manual? (Science Omega) -- [no longer online]
- The scholarly kitchen: Small Fly, Big Impact: A History of *Drosophila* Research (and Why It Matters) -- [\[LINK\]](#)

2.2. Local

- Sharpe, J. (2018). Science Outreach: A Fruitful Endeavour? *Blog post in "Research Hive"* -- [\[LINK\]](#)
- Why use flies (FLS Internal_Bulletin; July 2012)
- Public engagement and the fruit fly (FLS Internal_Bulletin; Nov 2013)
- Fly Outreach Activity (FLS Newsletter; Issue 30 /Spring 2014)
- The Manchester Fly Facility: supporting and promoting *Drosophila* as a modern research and teaching tool (FLS Internal_Bulletin; Nov 2014)
- World first for Fly Research (UniLife) -- [\[LINK\]](#)
- Flies can make a buzz in schools (UoM page) -- [\[LINK\]](#)
- AGGS newsletter: Fly Lab -- [\[LINK\]](#)

3. Metrics

metrics from 28/06/2020				
site (launch date)	views	visitors	Downloads	Altmetric
droso4schools (04/15 - LINK)	~99.5K	~54.1K	n.a.	n.a.
Manchester Fly Facility (~Feb 2013 - LINK)	~67.6K	~24.8K	n.a.	n.a.
Figshare: Biology lessons (24/03/15 - LINK)	~7.3K	n.a.	~2.2K	40
Figshare: Mating scheme (16/01/13 - LINK) * main article in G3 [LINK]	~32.1K *~50K	n.a.	~17K *9.8K	67 *54
Figshare: 2nd Yr practical (10/02/13 - LINK)	~18.1K	n.a.	~14.6K	36
Figshare: Outreach (27/11/16 - LINK)	~4.6K	n.a.	~423	101
Figshare: Man Fly resources (07/03/15 - LINK)	~10K	n.a.	~14.3K	n.a.
YouTube film 1 (20/12/14 - LINK)	>23.5K	n.a.	n.a.	n.a.
YouTube film 2 (01/04/15 - LINK)	~12.6K	n.a.	n.a.	n.a.

4. Activities

4.1. Science fairs [\[LINK\]](#)

1. Bollington Scibar, Bollington, 14 Oct 2019
2. [British Science Week](#), 11-15 March 2019

3. Science Spectacular, Manchester Museum, 20 Oct 2018
4. Science Uncovered Manchester, Manchester Museum, 28 Sept 2018
5. [Didsbury SciBar](#), 23 April 2018
6. [British Science Week](#), 12-16 March 2018
7. [SciBar, Park](#) Tavern, Macclesfield, 22 Jan 2018 — [\[LINK\]](#)
8. University of Manchester 3Rs Symposium, 30 Oct 2017 — [\[LINK\]](#)
9. Manchester Science Festival, Manchester Museum, 21 Oct 2017
10. Science Uncovered / European Researchers Night, Manchester Museum, 29th Sept 2017
11. Celebration of Philanthropy Showcase, University of Manchester, 6 April 2017
12. Manchester Science Festival, Manchester Museum, 21 Oct 2017
13. Body Experience, Manchester Museum, 18 March 2017
14. National Student Conference, University Place, Manchester, 11 Feb 2017
15. Behind the scenes of Manchester, Faculty of Life Science, 27 July 2016
16. [Brain Box](#), European City of Science event on Manchester Day, Manchester Town Hall, 19 June 2016
17. Body Experience, Manchester Museum, 19 March 2016
18. Community Open Day, Faculty of Life Sciences, University of Manchester, 9 May, 2015
19. Manchester Science Festival, Manchester Museum, 25 Oct 2014
20. Community Open Day, Faculty of Life Sciences, University of Manchester, 28 June 2014
21. Wellcome Trust Brain Collection exhibition, [MOSI](#), 2 Nov 2013
22. Community Open Day, Faculty of Life Sciences, University of Manchester, 6 July 2013
23. Body Experience, Manchester Museum, 16 March 2013
24. Manchester Science Festival, Manchester Museum, 27 Oct 2012
25. Community Open Day, Faculty of Life Sciences, University of Manchester, 30 June 2012
26. Body Experience, Manchester Museum, 17 March 2012
27. Manchester Science Festival, Manchester Museum, 29 Oct 2011
28. Community Open Day, Faculty of Life Sciences, University of Manchester, 4 July 2011

4.2. School visits [\[LINK\]](#)

1. Scarisbrick Hall School, 4 July 2019
2. Animal Research Day, FBMH, Manchester University – 17 July 2019
3. Animal Research Day, FBMH, Manchester University – 20 March 2019
4. [British Science Week](#), University of Manchester -11 to 15 March 2018
5. Animal Research Day, FBMH, Manchester University – 12 Dec 2018
6. Scarisbrick Hall School, 14 Nov 2018
7. St John's RC Primary School, 17 Oct 2018 — [\[blog\]](#)
8. Discover Life Sciences Event, FBMH, University of Manchester – 17/18 July 2018
9. Manchester University/ Lancashire Schools collaboration
10. Scarisbrick Hall School -4 July 2018 — [\[blog; Evaluation\]](#)
11. Y10 Work Experience Programme – 28 June 2018
12. Manchester Grammar School – 27 June 2018
13. Brookburn Primary, Manchester – 06 June 2018
14. Animal Research Day, FBMH, Manchester University – 29 March 2018
15. British Science Week, University of Manchester -13 to 16 March 2018
16. Animal Research Day, FBMH, Manchester University – 7 Dec 2017

17. Discover Life Sciences Event, FBMH, University of Manchester – 28/29 Jun 2017
18. Loreto sixth form college – 19 May 2017
19. Manchester Grammar – 16 May 2017
20. Trinity School, Manchester – 8 May 2017
21. Animal Research Day, FBMH, Manchester University – 29 March 2017
22. Withington Primary School – 23 March 2017
23. Loreto sixth form college – 27 March 2017
24. Manchester Grammar – 21 March 2017
25. Loreto sixth form college, Manchester – 13 March 2017
26. [British Science Week](#), University of Manchester -14 to 17 March 2017
27. Loreto sixth form college, Manchester – 19 Jan 2017
28. Trinity School, Manchester – 16 Dec 2016
29. Audiolab Project, Manchester- 1 Nov 2016
30. Altrincham Grammar School – 11 Oct 2016
31. Loreto Sixth Form College - 6 Oct 2016
32. 9 month collaboration with Trinity CoE High School and Loreto Sixth Form College within the [droso4schools project](#) – Aug 2016 to June 2017
33. Y12 Mini Summer School, Faculty of Life Sciences – 25 July 2016
34. Y10 Work Experience Programme – 18 July 2016
35. Discover Life Sciences Event, Faculty of Life Sciences, University of Manchester – 12 July 2016
36. Visit of school pupils from Denmark, Faculty of Life Science – 27 April 16
37. Ryburn Valley High, Fly Facility, 15 April 2016
38. St John's RC Primary School, 05 April 2016
39. Ormiston Bolingbroke Academy, Fly Facility – 22 March 2016
40. [British Science Week](#), University of Manchester -11 to 20 March 2016
41. Acacias Community Primary School – 27 Jan 2015
42. Discover Life Sciences Event, Faculty of Life Sciences, University of Manchester – 1 Dec 2015
43. Kings' School, Chester, Genetics Roadshow – 19 Nov 2015
44. St Peter's High School, Manchester – 19 Nov 2015
45. Aquinas College, Stockport- 02 Nov 2015
46. Cardinal Newman College, Lancashire, Collaboration – Nov 2015
47. Nelson & Colne College, Nelson – 06 Oct 2015
48. Year 12 Mini Summer School, Faculty of Life Sciences – 03 Aug 2015
49. Year 10 Work Experience Programme, Faculty of Life Sciences, Manchester University – 13 July 2015
50. Brookburn Primary School, Manchester – 6 June 2015
51. Animal Research Day, Faculty of Life Sciences, Manchester University – 25 March 2015
52. Ashton Sixth Form College, Manchester- 11 March 2015
53. Trinity School, Manchester – 10 March 2015
54. Xavarian Sixth Form College, Manchester- 4 March 2015
55. Cambridge HE+ program, Loreto College, Manchester- 25 Feb 2015
56. St Peter's High School, Manchester – 11 Feb 2015
57. Manchester Grammar School – 02 Feb 2015

58. St Christopher's CE High School, Lancashire – 28 Jan 2015
59. Visit of school pupils from Norway, Faculty of Life Science – 22 Sept 14
60. Trinity School, Manchester, Careers Day – Nov 2014
61. Cardinal Newman College, Lancashire, Collaboration – 25 Sept 2014
62. 3 month collaboration with Trinity CoE High School and Loreto Sixth Form College within the [drosophila schools project](#) – Sept-Dec 2014
63. Cheadle Hulme High School, Cheadle – 11 July 2014
64. Bolton Muslim Girls' School – 27 June 2014 Aquinas College, Manchester – TBC
65. Connell Sixth Form College, Manchester Fly Facility – 23 June 2014
66. Manchester Communication Academy, Manchester – 20 June 2014
67. Animal Research Day, Faculty of Life Sciences, Manchester University – 2 April 2014
68. Bolton School Girls Division, Bolton – 13 Feb 2014
69. St Christopher's CE High School, Lancashire – 28 Nov 2013
70. St Mary's CE Primary School, Reddish – 18 Oct 2013
71. Animal Research Day, Faculty of Life Sciences, Manchester University – 17 Oct 2013
72. Bolton School Girls Division, Bolton – 9 Oct 2013
73. Sacred Heart Catholic Primary School, Warrington – 13 June 2013
74. Bramhall High School, Stockport – 16 Nov 2012
75. The King's School, Chester – 15 Nov 2012

4.3. Teacher training [\[LINK\]](#)

1. [CPD teacher training event](#), Fly Facility, Manchester University – 25 Jan 2018
2. School-University Partnership, Networking Event, Manchester University – 23 Nov 2017
3. STEM Learning RCUK cutting edge programme – 13 July 2017
4. Royal Society Science event – 15 March 2017
5. MANCEP Teacher's conference at Manchester Metropolitan University – 17 Feb 2017
6. Teacher's Summer School, Faculty of Life Sciences, Manchester University – 11 July 2016
7. ASE Annual Conference, Birmingham – 8 Jan 2016
8. School-University Partnership, Networking Event, Manchester University – 21 Oct 2014
9. Teacher's Summer School, Faculty of Life Sciences, Manchester University – 27 July 2015
10. Bringing Cutting Edge Science – CPD teacher event, Fly Facility, Manchester University 23 March 2015
11. MANCEP Teacher's conference at Manchester Metropolitan University – 13 Feb 2015
12. School-University Partnership, Networking Event, Manchester University – 15th Oct 2014
13. Teacher's Summer School, Faculty of Life Sciences, Manchester University – 30 July 2014
14. Maths and Sciences Teachers Conference, Manchester University – 25 June 2014
15. Teachers' Visit, Faculty of Life Science, Manchester University – 4 Feb 2014
16. School-University Partnership, Networking Event, Manchester University – 20th Nov 2013

4.4. Tours of the Fly Facility:

- Technician Apprentices (June 18)
- Members of TEaM (Nov 17)
- HR department (Nov 14, Jan 15)

- Members of HERA (April 15)
- University fundraisers (Nov 14)
- Investors to the University (July 14, Aug 14, April 15)
- Costa Rican ambassador (Jan 16)
- Society of Biology Panel (May 15)
- Chinese delegation (Life Sciences of Shan Dong University) (Oct 13)
- Teachers (Feb 14)
- Board of Governors (Feb 12)
- Alumni (March & Nov 12)

5. Student placements:

- Charlotte Blackburn (Univ. Edinburgh) - droso4schools, Nov. 17
- Sophie DeMaine (Univ. Manchester) - droso4schools placement, Aug 16- Jun 17
- Joshua Heafield (Univ. Manchester) - droso4schools placement, Aug 16- Jun 17
- Jennifer Harbottle (Univ. Aberdeen) - droso4schools placement, Jan-March 15
- Patrick Stangward (Univ. Manchester) - droso4schools placement, Jan-March 15
- 44 Summer placements of A-level students (up to Aug 18)


6. Impact:


6.1. Awards

- The droso4schools project was highly commended for the "Making a Difference Award" for social responsibility by the University of Manchester (May 2016) -- [\[LINK\]](#)
- The Genetics Training package was awarded a "Special Commendation for Training *Drosophila* Biologists" by the Genetics Society of America at the 55th Annual *Drosophila* Research Conference (San Diego; 03/14) -- [\[LINK\]](#)


6.2. Proof that resources are being used

6.2.1. Use of advocacy and outreach materials

-  [Andy Arsham @AndyArsham Feb 26](#): RTing and bookmarking this--i am supposed to talk about flies to my kid's 1st grade class later this spring! Also, check out [@Poppi62](#) 's <https://droso4schools.wordpress.com> --- in response to: [M Ninova @begem0t](#): hey fly community! I would love some help with putting together a fun kid-friendly talk on #drosophila research: what is your favorite fact about the flies? #scicomm #drososfun
- Fly Facility at NCBS (04 February 2020): Fly Facility at NCBS is getting more and more involved in our outreach initiatives. We have invited school kids and gone to different schools for *Drosophila* workshops. Your resources have always come in handy for the same. So far, we have done our outreach in English. We are excited to go to a village school this time with Kannada as their main language. We would like to use some of your images (especially the one that shows similarity between human and fly organ systems) and translate them to Kannada for our presentations. Also, I am writing an article in the magazine "iwonder" <https://azimpremjiuniversity.edu.in/SitePages/resources-iwonder.aspx> about using model organisms. Could I please use your image (<https://droso4schools.wordpress.com/organs/>) for this article? Please let me know what should I put on the footnotes as an acknowledgement for the image. On another note, our Africa plan that was lying dormant is again taking up some shape. Hopefully, we will be able to do something in Africa in collaboration with Drosafrika. Will keep you updated.

- Masters student at Technical Univ. Munich, Germany (06 February 2020): Thank you so much for your amazing and informative webpage: <https://droso4schools.wordpress.com/l3-neurons>. Could I please use the following pictures for my master's thesis, and if so, how should I cite your images? I would like to use this picture <https://droso4schools.files.wordpress.com/2015/10/decisionmaking.jpg> and this <https://droso4schools.files.wordpress.com/2015/10/fundamentalwiring.gif> media file. I would edit the gif to this image:
- PI at University of Bergen, Norway (29 January 2020): I have worked in Scandinavia with *Drosophila* for quite many years, since 99/00, but we have never met. I am in the process of establishing a *Drosophila* lab in Bergen and will soon start teaching developmental genetics. On the one hand I wanted to ask permission to use a figure of yours on my website (its a work in progress, I can't even use pictures unless it's through attached pdf, awful, but that is what is on offer through the Uni.). I lifted the figure directly even with your name still on, so I guess I am not taking credit for that. It's the one showing conservation of body organisation and organs. I also include links to some outreach you tube vids that i thought were really good. Long term I will invest time in outreach when other things are in place. I plan to adapt your developmental genetics lab course into the developmental course i will give (it currently has no practicals, which i feel is a missed opportunity). There's really a wealth of information and material coming out of your lab (even an induction protocol for budding *Drosophilists*! I will probably use that when I actually get people!) and this is why I am really writing, to say thanks for all of that! It is a great resource for establishing labs with an interest/obligation to teach. How could I not acknowledge you directly! If I get more options from the web team (like a useful links option) I ll try direct traffick to your resources by way of further acknowledgment. If there is more I can do just let know.
-  Alexandre Dijane @adjiane 22 Jan 2020: Quinquennial review in sight. Preparing for the classic question: why the fly? #Drosophila Thank you so much Andreas Prokop @Poppi62 --- <https://droso4schools.wordpress.com/why-fly/>
- PI at Université Clermont Auvergne (12 February 2020): First of all I would like to congratulate you for the amazing website you have created. I have a group of research at the GReD institut (<https://www.gred-clermont.fr/directory/team/fr/equipe-04-instabilites-genetiques-et-controle-par-le-genome-hote>). We are going to organise a manifestation named « les nuées Ardentes » in Clermont-Ferrand (<https://lesnuéesardentes.uca.fr/>). One of the objective of this manifestation is to explain to a large public and children the importance to use animal organisms for research. I was wondering if I can use the pictures and drawings that we can find on your web site. Thank you in advance for your answer.
- Masters student at the University of Kansas (04 November 2019) I was contacted by an Arab graduate student in Paris, France regarding the fly movie. She is organizing a science outreach workshop and would like to use the Arabic version of the movie for that. She asked me if I can send her the original file of the movie so that she'd be able to add it to her PowerPoint without using a Youtube link. I am sending this email to take your permission for sharing the movie with her. Thank you
- PI at University of Warwick (September 2019): I am a fly biologist who joined Warwick Medical school last year and I work on hemocyte migration during embryonic stages. I was looking for some material for students for outreach activities and came across the droso4schools page and it is incredibly well explained and constructed really well. Could I use some of the movies for some of our outreach activities? And would it be possible to get some of the learning resources for the lesson 7, rules of inheritance ?
- Post doc at the Pasteur Institut in Lille, France (28 August 2019): I am working in the Pasteur Institut in Lille (France) on neurodegeneration with *Drosophila*. I just want to congratulate and thank you and your team for all the resources about *Drosophila* you put

online (droso4schools, A rough guide to *Drosophila* mating schemes, ...). Illustrations are nice and it is very useful to present *Drosophila* to trainee. I also appreciate your research work like your work on Tau and spectraplakins (Voelzmann A et al 2016) or reviews like the one on synapses (Prokop A et al 2006 Seminars in Cell & Developmental Biology).

- PhD Candidate at the Forestry and Agricultural Biotechnology Institute, University Pretoria, South Africa (14 July 2019): I am currently preparing a special seminar on vision in insects for a general audience. I was doing some research on internet to find figures for my talk, and ended up on your website droso4school (<https://droso4schools.wordpress.com/l5-vision/>). This webpage is really well written, organised, and the figures are stunning. I would like to ask your authorisation to use some of the figures during my presentation. I will obviously give credit to you and your team for allowing me to use them.
- Master's student at Clark University, Worcester, Massachusetts (03 May 2019): I'm contacting you in regards to your website/blog droso4schools, and some of the figures that you have. I'm currently conducting research on *Drosophila* transcription factors (specifically Kruppel and Fushi Tarazu), their binding strength and specificity to DNA I came across your excellent figure depicting the relatedness of *Drosophila* and human HOX genes. I wanted to ask your permission, to use this figure in my thesis and defense presentation on June 13th, 2019 to explain why *Drosophila* is an important organism to study and how they relate to humans. Thanks so much for your time, and I look forward to hearing from you soon!
- Master student at the University of Düsseldorf, Germany (23 April 2019): Hello, I just found your website whilst looking for images for the introduction of my phd thesis. I think they are really great and make for a very good comparison of the human and fly digestive system. Could I use that image of the digestive system for my introduction with the "normal" citing or do I need special permission for copyright? It would also be modified to contain german descriptions of the organs etc. Thanks for your help.
-  Drosophila Lab, UI. @DrosLabUI (30 May 2019): Today, @DrosLabUI is delighted to host a primary 5 student from The Olives International School, Ibadan Nigeria via the program A Day out of School. Many Thanks to all the facilitators. @ManFlyFacility @Poppi62 - Many thanks to The Olives International School for the opportunity to host Honour in our @DrosLabUI today. Our @DrosLabUI school outreach program will soon commence. @Poppi62



- PhD student at the University of Trento, Italy (02 Sept 2019): I am a former Ph.D. student currently working as a Postdoc in Italy. I will soon participate in the European Research Night here in Italy and I would like to take advantage of this event to share awareness about the power of *Drosophila* research. I found the content of droso4public extremely useful and helpful and I was wondering if I could use some of the images/contents available on the website to make a poster to show during the event. Many thanks for your kind help.
- Prof. at the University of Arizona (28 October 2019): I just wanted to send a note of appreciation for the site you developed to publicize fly research. I find it particularly helpful when preparing outreach lectures; the cartoons are really helpful to convey why flies are such an awesome system. Thank you!
- Post Doc at the University of Edinburgh:
 - 16 March 2018: We are putting some things together for a display at the Edinburgh Science Festival and wondered if you have the temperature and bang sensitive flies, and whether you would be able to send us these?
 - 18 June 2019: We (Three labs) incorporated your resources into a stand we ran last year at the Edinburgh International Science Festival. If I remember correctly Sanjai sent us the bang and temperature sensitive flies and we also printed some of the posters from the Manchester Fly Facility website. These were particularly useful as this was the first year we had done an event along these lines. This year we again ran a stall at the Science Festival. We changed this quite a lot from the year before, we pared down what we were doing as there were only two of us on the stall at any time, and tailored it more around our own work (eg. One lab set up a climbing assay using mutant flies with impaired chordotonal organs). We didn't directly use your resources for this but the ideas which we used last year obviously informed how we did things this year.
- PI at the University of Sheffield (8 June 2019): We use your poster about "why *Drosophila*," and your protocol for demonstrating shibire[ts] and bang-senseless flies for illustrating neurobiology ideas, for ~4 h long public engagement events where interested members of the public visit the university, 1-2x each year since 2016. The other fly PIs in Sheffield also know about the Manchester resource (I think they were the ones who told me about it). Our fly facility manager, runs the public engagement events and perhaps she can say more about what resources we use from Manchester. Our experiences have been very positive. According to Kath's write-up from last year: A successful fly outreach event was run on Discovery Night as part of Science Week. Over 300 visitors attended and the feedback found that 93% of visitors who responded had a greater understanding of how flies could be used to study biological processes. The event included a giant model fly; making felt flies; making fly aeroplanes to score points in the flying zone; a genotype to phenotype matching game; using fruit flies to understand our sense of smell; a fly quiz; diet and ageing in fruit flies; using flies to study blood cell function; a fly wing polarity game and a game to find the flies with tumours. Thanks to everyone who helped to make this such a fantastic evening.
- Our page is the key resource for science communication linked out under the "PUBLIC, TEACHERS, STUDENTS" tab on [FlyBase](#)
- Prof. at Glasgow University (11 March 2019): I'm currently writing a review on renal function in *Drosophila*, and I came across your excellent image. May I use this, with the



credit "Image reproduced with permission of of A. Prokop."?



- [Megha @meghaphd \(16 Nov 2018\)](#): Hasan Lab [@NCBS_Bangalore](#) open day. Having a blast sharing our enthusiasm for fly biology. Thanks [@Poppi62](#) for all the lovely online tools --- Our very own [@DeeptiTripathi](#) with the [@NCBS_Bangalore](#) fly facility. [@Poppi62](#) using your stuff here. Thanks.



- [Deepti Trivedi \(Facebook\)](#): Open day NCBS where fly facility showcased how cool the fruit flies are. [Andreas Prokop](#), we used your slides (see the background) to explain how similar they are to us. It was a wonderful outreach by the campus. A lot of fun as well. [#bangalorefly](#) [#ncbs](#) [#Drosophila](#)



- [PI at a Portuguese Univeristy \(21 November 2018\)](#): First of all, let me tell you about a fantastic experience I had a couple of weeks ago in Portugal, at the Portuguese, [Spanish and French Developmental Biology joint meeting](#). Together with the organizers of the meeting we decided it would be a great idea to open the doors of the meeting to the general Oporto citizens. We did so in the shape of a short talk (by me) where we introduced Developmental Biology and why it is important to study it. It was followed by about 45 min of speed dating with scientist (Ph.D. students and postdocs that had volunteered). Overall, it was a nice experience for both the scientists and the public. And I really believe we should make this a current activity in all science meetings. Anyway, all this to say that I have to thank you for all the available tools online (both at the BSDB and Droso4schools), which I was able to use.
- [Research Fellow at Cardiff Univ \(28 February 2019\)](#): I am participating in a public engagement event in Cardiff, and we are preparing a poster to showcase how *Drosophila* has been beneficial for research in many different fields of biology. As we are not great artists we would like to 'borrow' from existing artwork. I wonder whether you would mind us using or adapting some of the images from droso4schools site (in particular the organ relationships). With attribution in the terms that you would prefer, of course. Let me know what you think.



- [Guilherme Barbosa @GuiSciLab \(10 Aug 2018; replying to @Poppi62 @NC3Rs\)](#): This slide should be PinPointed... I love come after it many times!



- Associate Professor of Philosophy at the University of Cincinnati (16 Nov 17): I'm co-authoring a general education textbook on scientific reasoning from a philosophical perspective, which will be called Recipes for Science. My coauthors and I would like to use the attached image, from your website, as a figure in the book. I couldn't locate any information on the website regarding whether the figure is public domain, creative commons licensed, or requires permission for use. Could you advise me on whether we can use this figure in our textbook, and if so, if you would like attribution in the figure caption (and in what form)?
- PI at the University College Dublin: I have been asked to submit a 'layman's summary' of my recent publication to Atlas of Science (<http://atlasofscience.org>). As I would like to highlight the relevance of fly models of neurodegenerative disease it would be nice if I could include an image comparing the nervous system of flies and humans. I was therefore wondering if it would be possible to use your 'comparison of spinal cord and ventral nerve cord' figure (<http://www.prokop.co.uk/Research/Drosi-Info/nerve-cords.html>)? I would of course reference you as the source of the image and any copyright items that would require referencing (e.g. a publication reference?). I have only recently set up my independent research lab and the paper I'd be discussing is my first senior author manuscript so I am keen to draw as much attention to it as possible. However, I understand if you do not want to give permission to use this image
- PI at the Universidad de la República, Montevideo, Uruguay (12 March 2018): Some of my students in Montevideo dedicate some hours several days per year to do scientific divulgation. Normally they organize visits for children from primary or secondary school during which they give a brief oral introduction to scientific research based on flies and then let the children do some fly work under the microscope, like sex identification, find "the mutant" (white) and the like. They told me they will love to show your video "Small flies, BIG impact" but replacing the English voice by a Spanish one. Will that be possible from a legal point of view?---, That's wonderful news, I'll forward your message to everybody in my laboratory. That's a wonderful job you are doing and we are very thankful for that.
- Student at the Clark University in Worcester, Massachusetts (01 February 2018): I am a graduate student at Clark University in Worcester, Massachusetts, and I was hoping to get your permission to use one of your figures that I found online (<http://blogs.brandeis.edu/flyonthewall/why-do-we-have-to-learn-this-stuff-establishing-Drosophila-as-a-modern-teaching-tool-in-schools/>) in my Master's thesis. I really like the figure that you've made showing why we use *Drosophila* as a model system for humans. The research I've been working on uses *Drosophila* proteins to gain knowledge about transcription factor binding, and that figure would work perfectly within my introduction when I discuss the importance/relevance of using *Drosophila* in research. Please let me know if you will allow me to use that figure in my thesis and how you would like me to cite it.
- PhD student at Clark University, Worcester: I'm a current master's student at Clark University in Worcester, Massachusetts. I'm contacting you in regards to your website/blog drososchools, and some of the figures that you have within the plethora of knowledge found there. I'm currently conducting research on *Drosophila* homeodomain

transcription factors (specifically Antennapedia and Ultrabithorax), their binding specificity to DNA and completing more biophysical studies on HD-TFs. As I was perusing your website (which I rather enjoyed, I think that bringing *Drosophila* into schools is an important part of understanding much of human biology and your program seems great), I came across a figure that equated human genes to *Drosophila*. I was wondering if I could use, with your permission, this figure in my written thesis and defense presentation (to occur around June of 2019) to assist in my explanation as to why *Drosophila* are an important organism to study, their impact, etc. Thank you for your time, and I look forward to hearing from you soon!

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- [Manish Jaiswal @Manishj29 \(15 Jun 2018; Replying to @Poppi62 @UDNconnect @mfwangler\)](#): Thanks for sharing the article. It's a great resource for our outreach activity [@TIFRH_buzz](#) where we try to reach school kids and teachers of Hyderabad [@HiHyderabad](#)
- [Ruchi Jhonsa @JhonsaRuchi 5 Jul 2018 \(replying to @Poppi62 @ManFlyFacility\)](#): I also do science outreach and would want to learn if you have new ideas for that.
- [Graduate Student at the University of Oregon](#): I was visiting a while back, and I noticed your wonderful outreach poster when you first enter the fly room. We are holding a free public screening of The Fly Room and would like to have a similar one up while we perform various optogenetic and thermogenetic experiments. Later we'd also like to hang it in the entrance of our fly room and use it for outreach in the community. I recently saw the attached outreach talk. Would you happen to have suggestions or files we might use to make a similar poster (like on page 13)? Thank you for your time and all of the wonderful and inspiring outreach work you do! p.s. I use the genetics training package whenever I have a new student in the lab. It is fantastic!
- [PI at the University of Cambridge \(03 Febuary, 2016\)](#): I am a Drosophilist at the University of Cambridge. We are organizing an activity at the Genetics department about Genes and Heredity. We will run an activity very similar to your climbing assay lesson. After the activity we want to provide a sticker for children and we were wondering if we could use one of the images uploaded on the droso4schools blog. We especially like the rainbow one you used to explain the segmental anatomy. I attached an image of our first draft. As we need to adhere guidelines on copyright compliance we need that you agree that we use it to print it out for stickers. Thank you very much in advance
- [PI at Concordia University, Quebec, Canada \(16 July 2018\)](#): Having taken an evolutionary perspective to developmental biology, I am a big fan of your website on *Drosophila* wonders. I wonder if there is a good resolution source for the tiny drawings depicting fly models (fly in space, drug screening etc.) that I could use. Those sketches are super-cute and capture audiences immediately, however, they have very low resolution, which results in blurry slides. Needless to say, the source will be properly acknowledged. I hope you can help me. Thank you very much.

08 August 2018: The mighty fly was featured in a research talk in Barcelona and in a lecture for nephrology residents in Italy and blew the latter's minds (as intended). Once again thanks for sharing the materials and here is the excerpt of my introductory slides on *Drosophila* wonders.

09 August 2018: I have used the droso4school material and referred students to it, yet lost in the whirl of starting a new lab and searching for funding, I missed your other articles. I will catch up.

- [PI in Kassel, Germany \(27. April 2018\)](#): I have known Andreas Prokop for many years. Andreas did an absolutely fantastic job with Droso4schools and all of its teaching programs.

A former PhD student of mine just took part in a *Drosophila* course with Andreas and was very impressed. I also frequently use material from Andreas in popular science lectures. In short - I am very open and happy to provide active support!



- [Jon Humphries @JDHL18 \(19 May 2018\)](#): I wrote this [@preLights](#) commentary about the recent [@biorxivpreprint](#) manuscript from the always excellent [@nickbrownlab](#) (<https://www.biorxiv.org/content/early/2018/04/06/296699>): prelights.biologists.com/highlights/novel-functions-integrin-associated-proteins-revealed-myofibril-attachment-Drosophila ... Importantly it also draws attention to the hard work and fabulous resources available from [@ManFlyFacility](#) [@Poppi62](#) -- The [@ManFlyFacility](#) (<http://www.flyfacility.manchester.ac.uk/>) is well worth checking out for outreach programmes with schools and public. About [droso4schools](#): <https://droso4schools.wordpress.com/> [@figshare](#) hosted resources: figshare.com/articles/Resources_for_communicating_Drosophila_research_in_schools_and_on_science_fairs/4262921 -- I particularly like the 'Why fly?' videos and have used them with school children <https://droso4schools.wordpress.com/why-fly/> <https://youtu.be/qDbJnFLI3kU>

Comment in [PreLights](#): ... from a very personal perspective, colleagues of mine at The University of Manchester have established a valuable resource for the use of *Drosophila* as tools for outreach activities in schools (<https://droso4schools.wordpress.com/>). Since I have personally found these resources to be useful with school outreach activities I am keen to promote the immense value fruit fly research has provided to the study of biology in general.



- [Jon Humphries @JDHL18 Jun 6 2018](#)
A pleasure to visit [@BrookburnP](#) this afternoon. A really enthusiastic group used microscopes to look at fruit flies from [@ManFlyFacility](#) thanks year 3.
- [Research for a mental health editorial project \(27 June 2018\)](#): Hi there, I am doing a bit of research for a mental health editorial project I'm working on, and I found a page of your site (<https://droso4schools.wordpress.com/l2-climbing-assay/nd-in-fly/>) that mentioned Alzheimers. 2 quick questions: 1) Would you be OK if I possibly link to and/or mention your website from this mental health project? Simply put, the project is focused on providing free online content to people about mental health/illness and related topics. - 2) This project I'm working on is with a leader in the mental health space, and I know they're always looking to work with sites like yours; often contributing funds to organizations and website owners to list the free resource in related content and/or providing unique content to be published online.
- [Drosophila neurogeneticist at the Champalimaud Neuroscience Programme](#): Big thanks to [@Poppi62](#) for great [#Drosophila](#) [droso4schools](#) resource - used it to explain impact of flies to physicians working on [#diabetes](#)
- [PI at the University in Arizona](#): I would love to use the cartoon shown below for talks and grants. Do I have your permission to do so? I don't like to use figures that I have not generated in my talks and especially grants without getting consent from the creators. I absolutely love this cartoon! I look forward to hearing from you.
- [Mediac student at the University of Freiburg, Germany \(12 January 2017\)](#): For my medical thesis I would like to use one of the images of nephrocyte populations in *Drosophila melanogaster* from the site droso4schools.wordpress.com. Is it possible that you grant me that permission? Thank you in advance and kind regards,



- [Laura Leay @Dr Leay](#) Replying to [@Poppi62](#) [@UoMEngage](#) [@sheencr](#) 24 Jun 2018: Thanks for sharing so many useful resources. I suspect a lot of it could also be translated to different branches of science.
- [Librarian at Memorial Sloan Kettering Cancer Center's Medical Library \(29 January 2015\)](#): I am a librarian at Memorial Sloan Kettering Cancer Center's Medical Library where we write a blog on new and interesting tidbits in the scientific community. I saw your lab's 'Small Fly: Big Impact' video and am hoping we can use it on our blog to highlight some of the interesting research being done. Could I have your permission to share it on our blog? (You would be credited as the creator of course.)
- [PI @ Texas Tech](#): I tried to get onto your website today. <http://www.lab.ls.manchester.ac.uk/flyfacility/> AND <http://www.flyfacility.manchester.ac.ukforthepublic/whythefly/> But I could not connect to your server. I want to give these URLs to students.



- [Thomas Merritt @tjsmerritt](#) 27 June 2017: Great talk from [@EstherVerheyen](#) on the importance of science outreach and advocacy. Fantastic slides from [@Poppi62](#) CanFly 2017 – at The Banff Centre




- [Thomas Merritt @tjsmerritt](#) - 4 Sep 2017: [@Poppi62](#) I'm going to Tweet about Fly Outreach and Education resources - what links would you like me to include?
- [SeYeon Chung @seyeon_chung](#) (Louisiana State Univ) Sept 18: Great educational movies by [@ManFlyFacility](#)! Used them to explain to my new undergrads why we study *Drosophila*
- [Researcher at the Cornell University \(09 October 2014\)](#): I was wondering if you knew the genotype for the flies we were using for open days event, the ones that faint if you bang them and the temperature sensitive ones. Do you know if they are available on Bloomington? If not, do you think it would be possible to send them to me? We may have to do some open day event here at Cornell as well, and my new boss liked the idea about these flies.
- [Showing advocacy presentation at the 2017 JEDI meeting in Italy - PI at Milan Univ \(02 November 2017\)](#): The session went well. As usual, lots of passion/participation. About half of the people in the audience knew you/your page. We went into a discussion also of necessity of EU lobbying by people with power.
- [Showing advocacy material at the Drosophila Neurobiology Conference at CSHL](#):
 - [PI at Max Planck, Dresden \(05 October 2017\)](#): *in response to a request to show an advocacy slide at the CSHL Drosophila Neurobiology conference*:
Andreas Prokop is one of the most vocal advocates for fly research that is in many places under siege. He has been fighting the fight often alone (at least in Europe). I think that meetings like this one are a great forum to raise the awareness of the issue and highlight the resources that are being assembled to promote our favorite model

organism. I am attaching a slide prepared by Andreas. Would you be willing to include it in the slide roll shown on the screens between sessions? We think this would be a great service to the *Drosophila* community and could potentially boost Andreas efforts. Andreas can add more about his motivation.

- PI at MIT (05 October 2017) : Would it be possible to add this slide to the 3-4 slides that cycle on the projector before and between the talks. Pavel and Andreas bring up a nice point on advocating for the fly model. Thanks so much.
- PI at NCBS, Bangalore, India (05 October 2017): in response to requesting advocacy at the *Drosophila* Crete meeting:

First, what you are doing is fantastic. Please don't give up, Second, I am not surprised at the poor traction though. That's the way people are, most are caught up in their day, few have the ability or drive to manage their science and do something for the public good that you are doing. That said, even a few people can make a big difference. So, I would talk at Crete and at fly meetings but have a low bar for expectations. What we need is a communications team (funded by philanthropy?) that drives a global communication campaign. The Simons Foundation is someone one could approach. The head of Biology there and as a former yeast geneticist, she may well be sympathetic. Lest push them and sent up a structure that is a mini David Attenborough show about what the fly does for humanity. Happy to help.

-  [Ines @zwickauhex Sep 23](#): Jordan Raff encourages us to advocate *Drosophila* - check out [@ManFlyFacility](#) for great arguments [#EDRC2017](#)






-  [Sonia Sen @soniaqsen - 26 Jul 2017](#) - Replying to [@Poppi62](#): We use your material all the time! You do phenomenal work, and 'wasted time' is as far from what you do as is possible!

- UPMC "Fête de la science" (26 June 2015): I am writing to ask if you would accept that I use one of your pictures to put on the UPMC "Fête de la science" web site. "Fête de la science" is a special event in Paris in the fall to inform about Science and, in my case, about *Drosophila* research. I have translated the legends and I join the modified picture. I have to say that I like very much your pictures and movies and that I will probably be inspired of them for my presentation. Thank you by advance for your answer.




18 June 2019: I used your resources each year in October for a conference that I give for the "Fête de la Science" at Sorbonne University. You can find my presentation (in french) following this link: XXX. Please don't hesitate to contact me whether you have any other questions. I like very much your resources and I would be very happy to help for the project.

- PI at the University of Leipzig (05 May 2017): I have been using parts of your *Drosophila* presentations (available from figshare) to introduce students to flies as laboratory animals for some time. At this point, thank you very much for putting these materials online. I am currently working on a publication and would like, as far as possible, to integrate one of your wild-type *Drosophila* scheme drawings (see appendix) into my own scheme. You would save me a lot of time and effort if I could use your illustration.
- Postdoc at the Fred Hutchinson Cancer Research Center, Seattle (23 Oct. 2017): I'm also currently a Science Communication Fellow at our local Science Center, and am developing a *Drosophila*-based activity that works for both kids and adults. With that in mind, I was wondering you would be willing to share your classical genetics lesson mentioned in your blog. I would also like to check if it's ok to use the outreach resources in the Manchester Fly Facility website, with appropriate attribution.
- PI at the University of California St. Barbara (13 September 2017): I am writing to ask permission to use a graphic from your Dros4schools website in a Genetics Flybook article. Would this use be allowable? Thanks very much and best wishes.


6.2.2. Use of the Training Package

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 - [TReND in Africa @TReNDinAfrica 19 Nov 2019](#): Our students doing the genetic exercises from [@Poppi62](#) manual today in Ghana at [#TReNDNeuro19](#)
- 
 - [Nathan Woodling @NathanWoodling 19 Jun 2020](#): Fly folk: has anyone found/developed good tools for training students in lab techniques using virtual platforms? I'm imagining some sort of virtual fly-pushing station, building on the great tools already out there from [@Poppi62](#)
- [Independent researcher \(06 October 2019\)](#): Whilst doing the (excellent) training with Sanjai on Friday, I promised you some feedback on FlyGeneticsIntroStudentsv52, and here it is. I found the course material very good, but there were a few broken links which you may wish to address in future versions.
 - [Student at the Southern Connecticut State University \(19 October 2019\)](#): I found your amazing paper today. You are so right about how the very basic training for *Drosophila* lab is somewhat lacking. Because I have been looking for something really basic for myself, and finally found something like this. The most basic I have found before was fly pushing, it is good but even then it is still sometimes confusing for me, and as you mentioned, it doesn't answer many trivial questions a student might ask. The reason I reach out to you is that in that paper, you cannot access the File S1. Is there a way I can obtain that? I look at different links but it doesn't work. The other links work fine.
[21 December 2019](#): I was wondering if you have the solutions for the crossing tasks that are in supplement material 4? In that supplemental source, there are several mating scheme questions.
 - [Fly Facility manager at the NCBS, India \(14 June 2019\)](#): We have used the resources generated by you many times. Firstly, whoever comes to us for the first time asking to be introduced to flies, we immediately hand over to them reading material generate by you (Roote and Prokop articles). After they have read these, then only we do any practical training. In addition, I have shown video generated by you (Climbing assay, inebriated flies) and also the slide of human and *Drosophila* having the same body plan and organ system is always part of my presentation I make in schools and colleges. So far, we do these kind of outreach about 2-3 times a year, but hope to do it more often. The resources generated by Manchester Fly Facility are highly valuable to us. In addition, I also read most of the articles written by you for science communication and Why Fly.
- Used as a standard training element at Hasannuddin University, Indonesia (see 6.4.)
- Used as a standard training element on TReND in Africa courses:
 - 
 - [TReND in Africa @TReNDinAfrica \(19 Nov 19\)](#): Our students doing the genetic exercises from [@Poppi62](#) manual today in Ghana at [#TReNDNeuro19](#)
 - 
 - [Steven Russell @sr120 \(Nov 19 2019\)](#) Yet another utilisation of the superb training tools from [@Poppi62](#) and John Roote <https://g3journal.org/content/3/2/353>
 - 
 - [Tom Baden @NeuroFishh \(19 Nov 19\)](#): Genetics lectures in the board room with huge leather chairs. #TReNDNeuro19 learning experience in style! /w [@sr120](#) [@TReNDinAfrica](#)



- PI at the University of Cambridge (November, 2016): Just a note to let you know that I used your training package (the powerpoint and the exercise) for teaching fly genetics during the TReND course in Tanzania a couple of weeks ago (<http://trendinafrica.org/blog-posts/2016-neuroscience-school-in-full-swing/>). It is excellent, I had read the paper and looked over the material before but it was not until I used it to teach that I appreciate how very good it is. Fantastic job. Thanks
-  Steven Russell @sr120 Nov 10: Used Prokop & Roote training package <http://www.g3journal.org/content/3/2/353.full> ... during #trendneuro16 excellent & highly recommended for intro to Fly pushing
-  Steven Russell @sr120, 14 Nov 2017: The fly genetics training from Prokop & Roote is fantastic, students at #trendneuro17 doing a great job in getting to grips with it. Thanks @Poppi62
-  Steven Russell @sr120, 15 Nov 2017: Some fly crosses #trendneuro17




-  TReND in Africa @TReNDinAfrica, 14 Nov 2017: Students of the #trendneuro17 this morning before breakfast going over the #Drosophila #genetics explained yesterday by @sr120 using exercises from @Poppi62 in #Nigeria




- Cambridge Fly Facility: <https://www.flyfacility.gen.cam.ac.uk/resources/flytraining>
- PI at the Waksman Institute, Rutgers University, US: I would like to use images generated by Genotype Builder Photoshop file S5 for a figure in a paper I am writing. How should I cite it? Should I cite "Genotype Builder Photoshop file S5" or your G3 paper "Scheme: A Basic Training Package for *Drosophila* Genetics" or both?
 - Thank you. It's a really great program for creating figures for fly crosses!

- PI at the:University of Chester (03 August 2016): I am a new lecturer at the fledgling institute of medicine at the University of Chester and find myself module lead on undergraduate genetics and evolution modules. I was hoping to do some engaging practicals with our undergraduates and I think they will revel with a *Drosophila* practical. I used *Drosophila* in my own degree (some 20 years ago now) and have lasting memories of the experience and hope to give our undergrads a similar experience. Having said that, that experience was the only experience I have had with *Drosophila* since. I notice on your website that you offer some training courses and wondered if you thought that any of these courses will be suitable to help me feel more confident to run some basic practicals for 1st and second year undergraduates? And if so, do you have any plans to run any of these courses in the near future?

04 August 2016: Thank you for this, I read up on the links you sent yesterday and they are such an excellent and positive resource. Sanjai has contacted me also this morning, so hopefully I will be able to get something organised with him. Thank you so much for your help, With many thanks

-  [Anne-Claire Jacomin @acjacomin](#) Retweeted Andreas Prokop [10 Jul 2018](#): The "Rough guide for *#Drosophila* mating schemes" and the whole training package are great tools for whoever starts working with flies. I wish I had it when I started working on flies... <https://t.co/HzKKsge9rc>

-  [Drosophilosopher @HammedBadmos](#) Retweeted Andreas Prokop, [11 Jul 2018](#): A must read for all fresh [#DrosoResearchers](#). Learnt a lot from the guide as a beginner. Thanks for the brilliant resources.
- PI at the the IBioBA-MPSP, Buenos Aires, Argentina: thanks for the "How to set up a genetic cross" material, I've been giving it to every new student in the lab, and they all have found it very useful!
- PI at the Freie Universität Berlin (21 May 2015): I am very enthusiastic about the manual: "How to design a genetic mating scheme: a basic training package for *Drosophila* genetics". The only problem I have is that unfortunately we don't all have the stocks mentioned here with us for the practical part. My search at Bloomington was only partially successful. If maybe you could send me the used stocks? That would be super nice and would make my work a lot easier. Thank you very much and a "PLEASE CONTINUE" :-)
- PI at the Radboud University, the Netherlands (03 July 2013): I wanted to compliment you to your *Drosophila* teaching guide! It is appreciated a lot in my lab and I already recommended it to other labs!
- PI at the University of Leicester: Brilliant chapter by the way...where will it be published as I'd like to have it for the lab?
- Prof at the Simon Fraser University, Canada (25 September 2014): I discovered your G3 article describing *Drosophila* mating schemes and I wanted to thank you for putting together such an amazingly comprehensive, accessible and well-written manual. The "rough guide to *Drosophila* mating schemes" in particular has become required reading for all new members of my lab. I have not previously come across something which does such an excellent job of explaining the fundamentals of how we work with flies. Your hard work is VERY appreciated!
- PI at the Icahn Shool of Med, Mount Sinai (13 August 2013): I wanted to tell you how useful I found your intro guide to *Drosophila*! Around the time I had a high school student working with me this summer, I saw the link to your guide on the flybase homepage. I gave her the information to read before she came and then the diagrams for scoring phenotypes when she arrived and she picked everything up perfectly! It saved me time and I am sure she learned everything more thoroughly than if I had had to teach her all that myself, so thank

you!

- MPI for Immunobiology and Epigenetics, Freiburg (06 July 2013): Yes, it is fantastic, already used it selectively in the annual introduction I give to the new wave of PhD students here and have recommended it to everyone who has shown desire to start working with flies. The feedback from people who have used it for learning here so far is also great. A very good job indeed! Thanks to both you and John.



- Kavitha Kannan @kavkannan 28 Feb 2017: I learnt to design crosses using the genetics training package. It is a great resource to learn basics of *Drosophila* genetics!
- Student @ harvard.edu:
 - Thank you for preparing materials to make *Drosophila* genetics accessible to beginners. I have recently started working on *Drosophila*, and found your materials to be extremely helpful. Especially, I benefited from clearly explained figure and figure captions, and lots of references and links on "A rough guide to *Drosophila* mating scheme."
 - Thank you for letting me know the updates. I think it looks great! These sets of documents are wonderful contributions to the field, and being a beginner in fly genetics myself, I benefited a lot from them.

6.2.3. Use of school resources

- Teacher at Mallaig High School, Mallaig (19 May 2020):
1) How did teachers and pupils think about the activities? We purchased the flies required for the 'Vision' lesson and adapted the lesson for a pupil-run project. The lesson gave the pupil a basis on which to create an independent project. This gave her the opportunity to learn more about genetics, vision, action potentials, animal behaviour and fly care. It also allowed her to: apply her knowledge to a new situation; process and analyse data created by herself; and critically evaluate her experimental procedure. *2) How many children from how many schools have been influenced by us?* Only 1 teacher and one pupil were involved in the activity. *3) What are the novel aspects that are particularly attractive and what new opportunities arise from them?* Using flies in our school was novel for us as we had never used them before. They are great for producing reliable results in experiments. Using the flies was a new opportunity as no advanced higher biology student had used them for a project before. *4) Did our teaching positively impact on understanding - if so can you give a few examples?* As mentioned above, my pupil's understanding of genetics, vision, action potentials, animal behaviour and fly care were increased. *5) Are you aware of any cases where teachers have changed ways of their teaching or even applied examples from our lessons?* In our case, it was adapted to a pupil-run project for Advanced Higher Biology. *6) Are you aware of any cases where pupils were influenced in their choices?* As this was done at Advanced Higher level, my pupil made the majority of choices in how to adapt the lesson to a project of appropriate complexity. *7) Where do you see future potential?* I can see me using flies for younger year groups and larger classes but purchasing flies and fly food would be restrictive for our school. We would need to apply for outside funding to make this possible.

11 December 2019: I can say that I was very happy with the flies and food you sent. The experiment worked perfectly (very simple to follow) and I would love to try out others that you have on offer or use them with whole classes.



- Karla Kaun @karlakaun, May 9, 2020: Wow! I hadn't seen this lesson and it is AMAZING. It will be new required reading for all new people in my lab. And integrated into the new fly neurogenetics lab course I'm trying to develop. Thank-you!! -- I love the droso4public resources. Thank you so much for all of these amazing efforts

- Education Co-ordinator, La Trobe University, Melbourne, Australia (14 June 2020): As educators in the Science Outreach Program, we offer a workshop on *Heredity and Patterns of Inheritance* to Biology students, here in Victoria, Australia. We have a research lab here that offers us some support in breeding up flies, fly vials, beds etc for use in our workshop. The workshop activities include students getting to know the fly, then analyzing an autosomal and a sex linked cross from pre-done crosses. In the early stages of development of this workshop, we came across your incredible resources on drosophila for schools <https://droso4schools.wordpress.com/>. They are of such high quality and perfectly pitched for students, it would be foolish to re-invent or even begin to create our own. In the past we have used your 'Why the fly' video with appropriate acknowledgements during the introduction to the workshop. However, due to the Covid crisis, we are redesigning our activities for virtual and online delivery and some of these will likely be hosted on our Moodle. For this we would like to use some your images, resources and videos from droso4schools. I wish to ensure we have the right permissions from the producers and original authors. I hope that you will be able to advise us in this matter. Looking forward to hearing from you. cc: my colleague in Science Outreach and I are working together on this project. --- This is terrific. Thank you for responding so quickly- it is a great help! We are looking into making it publicly available and if this occurs, we will definitely update you. If you would prefer us to use specific wording for the acknowledgement, kindly email it through. Thank you once again.
- PI at the Roskilde Universitet, Denmark (13 January 2020): I have a question regarding one of the experiments that you provide at droso4schools, which I hope you can help me with. I am planning an experiment for visiting high-school students, where they will do experiments on alcohol tolerance. In this regard I am looking for a Adhn1 mutant line, but do you have any suggestions on where to get it? Are you able to provide it? I am also looking for a ALDH mutant. Many thanks, and thank you for a very valuable and important Drosophila resource (droso4schools), I find it very helpful for new students when they need an introduction to the flyworld.
- PI at the Universität Kassel, Germany (17. June 2019): So far we have tried "Geotaxis vs Phototaxis" with WT-Drosophila and the sevenless mutant at the Herderschule in Kassel. The idea for this comes from the Droso4School video. We also took a lot of material from the site for the accompanying ppt: "LESSON 5 - Vision: Understanding light perception" (<https://droso4schools.wordpress.com/l5-vision/>). Simply because it's really, really well worked out! The teachers are very interested. Because this is a short attempt that fits into a double period. In addition, there is probably little "experimental material" on the subject. But maybe Nora can tell you more about that, I've got her in the cc. set. Next we would like to do the "Lesson 2 - From gene to enzyme - using alcohol metabolism to illustrate fundamental concepts of biology" (<https://droso4schools.wordpress.com/alcohol/>). We already have the flies. There is just a lack of time and man power Personally, I am definitely enthusiastic about the offer. As I said, there is actually a lack of time for that.
- Facility manager at CABD, Sevilla (17 June 2019): So far I have made use of the ones I already translated and sent back to you. I am using them for workshops for High School Teachers. I know you have new resources and I was planning to take a look and maybe translate what I am missing. Usually I tell the teachers where to find material, but most of the time, if they are not in Spanish they won't use them, that's why I am translating them. My intention now is to create an Outreach committee here at my institute so we can organise more activities, and probably we will make use of the great resources you have already made. As I have already told you, I find your material really useful, and in fact, I would love to have something similar for zebrafish too :)
- PhD student at the University of Kansas (16 June 2019): Of course. I have not been involved in outreach activities lately as I am focusing on my PhD thesis, but I used the color blindness experiment (as a take home activity) for the model organisms module, one hour/session of two sessions total, as a part of Girl Scouts STEM Expo in Kansas. I also

referred participants to your website for more details on how flies are useful for biomedical research as I find the content on your website accessible to the public and informative. I hope this information is helpful.

- Teacher at Junction City High School, Kansas:

19 June 2019: Below is a list of what resources I have used/duration of use/etc. Please let me know if you need any further clarification.

Annually, I use both of the “Why the Fly?” Part I & II in my Advanced Placement (AP) Biology class (x5 years.) I have also recommended this to fellow AP Biology teachers at a NMSI conference (National Math and Science Initiative-[Grant program]) I attended last summer. I also know that my former student teacher is using the “Why the Fly?” video in her Biology classes at another Kansas high school. I also posted the link to your video to our national AP Biology teacher Facebook page today.

I have used your Understanding behavior (fly cinema) movies and the Fly climbing assay activity in class. (x3 years)

I have used portions of your “genetics training for university students and researchers” manual to educate my students about crosses/balancing stock, etc. (x3 years). From it I have written my own workbook for students to use for classical genetic crosses.

“Organs” link that contrasts human and fly organs was included in my lesson on cell differentiation in my Human Anatomy & Physiology class. (x2 years)

This next school year I plan to incorporate some of the nervous system resources in my Human A&P class. I need to contrast motor nerves and sensory nerves and the relationship to sensory organs/senses. I also want to relate this to action potential. I will likely look to some of your alcohol and fly resources.

I hope this helps you justify your work. It is so valuable to me and I hope that others will explore your resources here in the U.S. If you need anything else, please don’t hesitate to ask.

21 September 2020: I have taught roughly 500 students here in the state of Kansas, USA. Please let me know if there is anything else I can assist you with on this project.

21 September 2020: Actually, that would be over about a 6 year period.

- PI at Massey University, New Zealand; (19 June 2019): We run a program called Bio10 in semester two each year, in which groups of year 10 (age ~14-15) high school students come for a day and do activities in our science labs. I do the Climbing Assay lab with them, which is just fantastic. It’s fun, age appropriate and all the learning resources are ready to go and we complete the lab in our one hour time slot without rushing. I started the lab in 2017, and we had 3 student groups and in 2018 we had 8 and this year I am expecting 8-10 and plan to continue this program in the years to come.

In addition, we also host a day when students aged ~12-16 who won prizes at the local science fair get to spend a day in the science dept and I do the same lab with them, tailoring it depending on their age. The students appear to be engaged, they ask intelligent and interesting questions and I also get positive feedback from the teachers too. The Why the Fly? video is particularly useful as it is appropriate for all ages and gives a quick, concise and entertaining introduction to *Drosophila* genetics and the reason it’s such a great model. I think the lab helps the students to appreciate the similarities between flies and humans and to understand the value of model organisms in human disease research. My aim is to engage them and hopefully to inspire them to continue studying biology in high school and beyond. I also talk a little about my research and how in my research lab I do similar experiments to those they just did in the lab and that I went to a local high school too - if I could do it, so can they. At the end of the lab they now have enough basic understanding that I can tell them about eyeless and Pax6 and lead up to showing them

the images of the flies with eyes on their antennae and legs and how this is not a crazy experiment but serves a real purpose for understanding gene function. "wow, that's cool!" is a comment response, from the students and the teachers! In addition to this, new graduate students in my lab often have limited knowledge of *Drosophila* genetics and no hands on experience. I direct them to the Manchester Fly Facility website to browse the educational resources, in particular this paper is very helpful: Roote J, Prokop A. (2013) How to design a genetic mating scheme: a basic training package for *Drosophila* genetics. G3 (Bethesda) 3, 353-8. Please let me know if there is any way I can be of further help

- Teacher in the US (10 Feb 2019): I am a middle school science teacher (Grade 7) in the US. I am currently working with a professor from North Carolina to obtain some fly stocks. I wondered if I could access your lesson plans for using fruit flies to teach classical genetics (traits and punnett squares, etc.)? Can you help me? Thanks!
- PhD student at Ahmadu Bello University, Nigeria (15 June 2019): Manchester Fly Facility has and still doing a great job in developing relevant resources for scicomm. using *Drosophila* at different levels of education. These resources are not only relevant to the UK curriculum but also for the Nigerian curriculum mostly for our final year high school students and undergraduates. The fly facility resources which are already available and in line with the objectives stated in the Nigerian Biology curriculum are:
 - (1) nervous coordination
 - (2) sense organs (smell, sight, pigmentation)
 - (3) reproductive behaviours (courtship, life cycles)
 - (4) biology of heredity (inheritance and genetics) the genetic code and protein synthesis which was in the gene to enzyme to evolution material will be here.
 - (5) variation and evolution (from genes to enzymes to evolution, evolution resources)

The above resources are those I intend to use in training those who have volunteered to be part of the fly outreach activities and the high school teachers who will be invited for a 3-day workshop. A resource of which we have written an undergraduate proposal, is the climbing assay to evaluate the effect of honey-diet on the geotaxis of *Drosophila* Harwich strain. The student has defended her proposal and had the highest score (scoring sheath attached). I also made recommendations of the resources and links to the teachers during the last outreach and to several volunteers.

- Teacher at Cardinal Newman College

16 November, 2015: Just to let know that everything went extremely well last night. Everything worked and the students thoroughly enjoyed the session. A great success. Thank you so much for all your hard work. Everything went really well, if anything better than last time I explained it better and the flies did as they were supposed to. We managed fine with the number of flies, despite the problems you had at your end. Our biology technician was off ill but another stepped in to help make the flies drunk! The students have been really enjoying it and it seems to go down well! Thanks so much for your support, it is really appreciated.

10 March 2016: Thank you for the flies, we had plenty of the flies and larvae and it went really well. The students seem to really enjoy it and it is great that it is at the right level for their exam specification, yet there is plenty of application and extension related to the practical and uses of *Drosophila*. Please let me know if there are any further issue on the payment side. I appreciate that it has been a lot of effort on your part and I do want to say how professional and helpful your support has been, you have been wonderful! I'm not sure whether this is something you regularly do for schools or colleges and am therefore not sure whether it is something you would be prepared to repeat next year, or if we could do anything to make less work for you? I fully understand if you would rather not be involved,

but just wanted to see how you would feel about doing it again so that I can plan for the sessions next year. Thanks again

10 January 2017: Our college runs 5 additional sessions to year 12 A level Biology students from numerous Lancashire Sixth form colleges, who have been identified as being high achievers and have shown an interest in pursuing an undergraduate course in a Biology/Science. One of these sessions has been based on the dros4schools KS4 alcohol session. This has allowed students to gain an understanding of how genetics has been studied using *Drosophila*. It has helped students appreciate how genetic mutations in *Drosophila* can affect how they metabolise alcohol and that using *Drosophila* as a model has given us an understanding as to why there are differences in humans as well. The session not only provides material that is useful for extension but also has direct links to the A2 specification on genetics, mutations, variation and natural selection. Students have been made aware that the fruit fly is currently used as a model to study human diseases including the neurodegenerative disorders Parkinson's, Huntington's, spinocerebellar ataxia and Alzheimer's disease as well as being used to study mechanisms underlying aging and oxidative stress, immunity, diabetes, and cancer, as well as drug abuse. Dros4schools have provided an excellent service. They have provided the relevant *Drosophila*, vials and reagents that we have required, they have provided advice and have been an excellent support and have been willing to make any adaptations that we have needed. Students have not only found the sessions, interesting and relevant but have found the extension activities have given them an insight into the type of work that is being carried at university and possible research links involved in such activities. We encourage the students at the end of each session to go away and research the area further. Hopefully the sessions will inspire them to want to take their Science education further. Students on the programme complete a handbook of all of the sessions and the majority of them will refer to the programme in their UCAS personal statements to show their interest for the subject area when trying to secure places at university and would be able to discuss the sessions if asked for interview.

14 June 2019: We had used the resources on the Adh null fruit flies for several years with 6th form students from our own college and with others in the local area that had come to our college to attend additional session as part of a HE* programme that we ran for able science students on several Wednesdays throughout the year. It was really successful and the students thoroughly enjoyed the sessions. It linked well with the A level programme but was also an extension of what they learnt on mutations, enzymes and natural selection. We had additional funding to pay for the sessions as it was part of the HE* programme that was run in conjunction with Cambridge University. Unfortunately I have not run the sessions this year as I have become part time as i am now a Grandma to twins and am helping my daughter, so no longer working on the days the session run. It may be that we will run the sessions again in the future , but another teacher would have to take it over. Thank you for all your support in the past and please pass on my regards to the team.

- Second teacher at Cardinal Newman College

25 September 2014: I am currently teaching A level biology at Cardinal Newman college in Preston Lancashire. This year I attended the summer school held at Manchester University and was inspired by your work and outreach programme. This year our college has been designated as a HE hub. This basically means that we will be charged with providing "experiences" akin to those that may be obtained from visits to university, to other local college/high school students that are gifted and talented and expected to go to university (some of whom will be first generation in their family to attend HE). So I am emailing to see how feasible it would be to set up some fly experiments to do with these students. The "lesson" I will need to provide only lasts 1h and I would really like to focus discussion on neuroscience, ion channels and using "models" to understand how the basic infrastructure of the nervous system can be studied in non human models and how the findings are still relevant to humans, even though the models appear to be very much "not human". I would

really love to "borrow" some *Drosophilas*., possibly with the same traits as those we were provided with in the summer school lesson. I would be able to come to Manchester to collect any materials, and would like very much to collaborate with you to get ideas on how best to structure the session to really pass on the enthusiasm that I experienced on my own visit. Initially I just wanted to touch base to see if this is something that would be possible? And also to thank you again for the great experience at the summer school. --- I have taught 100 students using the flies provided by Manchester fly facility. Each of the these students experienced handling and working with flies directly. The sessions were run as special 2h work shops after college during the same academic year from 2015 – 2016. The students were year 12 students. The opportunities provided by these sessions helped students to understand Meiosis and how new combinations of alleles arise through crossing over and how information regarding frequency of incidence of a particular phenotype can help to determine the arrangement of genes on the chromosome. This does not include the students that continue to benefit indirectly from the information and resources made as part of these sessions. Students that experience these workshops and ongoing discussions demonstrate an improved understanding of the genetics topic, but more significantly often change from wanting to study medicine to wanting to go into research. In those years that we ran the sessions and since, I have experienced an increase in the number of students wanting to study neuroscience and genetics, rather than just biology or biochemistry, and students have made statements explaining how initially they had only considered studying medicine as the gold standard for anyone that excels in science, but following the teaching using resources such as these, they start to look at alternatives and appreciate that being a scientist is such an important career too. Also, for your information, I recently received an email from Julia Stanworth, my colleague that also used your resources to teach students. Here is the data from the lessons that she provided: The numbers that were involved in her workshops: They ran from 2015-2019 and in total about 300 students would have benefited from the sessions.

- 14 June 2019: Thank you for your email. I can confirm that we at Cardinal Newman college continued to use your resources up until the last academic year. It has only been the current academic year that we have struggled to get enough time and organise the sessions. We may restart this coming September if we can.

11 December 2020: Students (and sometimes teachers) are afraid when it comes to learning about neurobiology, there appears to be a lot of chemistry and physics and understanding of changes in charge (potential difference and how a situation of just positive ions can generate a negative potential difference) is often too abstract and complex to be able to teach well, or in a relevant context. However, with the resources provided by the Manchester group, this topic can be made interesting and allows concepts about ion channels to be demonstrated in an intact physiological system which exemplifies how the change in the structure and function of an ion channel has a big effect on behaviour in whole organisms. By introducing students to this topic in first year when they have just learnt about channel proteins they can start to lay the foundation for understanding action potentials in the second year. They can appreciate that changing shapes of proteins can impact on movement of ions and then they can observe model organisms and realise the importance of our nervous system in the control of behaviour and understand the inter-relationship between genetics and neurobiology. The fact that the team at Manchester are on hand to explain the neurobiology behind the ion channels involved in the fruit fly is so important. Teachers that have no background in neurobiology are able to feel confident that they don't just know a topic but understand it, which is vital to ensuring that neurobiology is taught clearly and competently. The examination system steers clear of questions on neurobiology because of its complexity and that students often perform poorly because they haven't had the benefit of being taught by teachers that feel confident in this area. The experience with the fly resources has really helped build confidence, develop a greater understanding of the many different types of ion channel

involved in action potential generation and how different channels are sensitive to different stimuli and how this impacts on movement of ions and thus ultimately on behaviour and physiology. I would highly recommend any schools involvement with the fly resources team and their research as it provides lots of useful relevant videos and explanations that can easily be toned down for school level learning, but most essentially without losing any of the correctness needed for neurobiology. This is a hazard of using search engines, since in the hands of those without background understanding there is a risk of introducing misconceptions and these are often difficult to remove once ingrained. The team are happy to educate and explain and share resources that are just not available on the internet, there is a lot of what appears correct information, but when you drill down you feel it lacks the detail needed to correctly explain what is happening during action potentials and synaptic transmission. It is really important that we fire up our students and teachers in neurobiology as I have seen so many of my own students embrace this area of biology following the sharing of the fly resources. This enthusiasm for neurobiology can be so easily achieved through contact with the Manchester team. And if a team of willing neuroscientists can be given contact and time with teachers that want to make their neurobiology lessons relevant to current research and something that can be built on to help inspire an EPQ project (which it has in many cases) or even just encourage more students to consider a neurobiology based degree course, then as a teacher speaking on behalf of my enthusiastic neuroscientist wannabe students, it is vital that we do everything we can do to support this connection.

- Researcher at the Crick; 16 June 2019: I used your very helpful material for inspiration and organization of an outreach activity in 2015. Specifically, I assisted a high school in London (Nower Hill High School) to use flies in the class room for teaching genetics over several weeks. Material used:

- slides for introduction into *Drosophila* genetics
- the fly climbing wall assay to test the motor skills of ageing flies

Type of activity: The class involved a series of fly demos and genetic crosses to learn about Mendelian inheritance, and took about three months. My role was to help with the design and providing the material and flies.

Feedback received: I think the class at the time was well received, as you can see below, from the feedback from a teacher from Nower Hill High School. Because I did not teach the students myself, I am not sure how it went exactly. It seems there was an idea to repeat the activities the following year, so the material stayed with the school (but I don't know whether they found a new supplier for flies). I still have my active folder "*Drosophila* in Schools" with all the material, you shared with me, and I definitely plan to use it in a new environment should outreach opportunities arise. I will move with my lab to France, and in this case this could perhaps add an international impact to your activities. I hope this helps as support for your very important initiative.

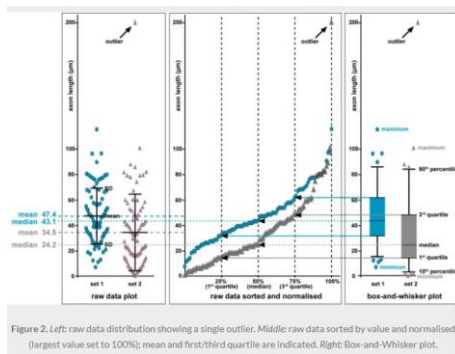
Comment from a teacher who took activities up: We have now completed our experiments with your fruit flies with the F2 results as follows

Big Wings	Big eyes	140
Small Wings	Big eyes	36
Big Wings	Small eyes	10
Small Wings	Small eyes	4

Which although not great were not terrible either. The students on the whole enjoyed the experience, apart from a few who found it a bit scary! Some students came back at lunch time to try the old vs young experiment but the results were inconclusive. Thank you for all your time and effort in developing this project and I am sure we would like to repeat it next year. I wonder if you could find out how much it would cost to purchase two fly pads and a

Gas gun as it would be useful to show the younger children fruit flies at science club and so on. Thank you again

- Teacher at El Puente High School, California (09 Dec 2019): Which software (or data presentation) package was used to prepare the following figure?. -- I am interested in how to present data in the most professional way possible without needing thousands of dollars in software. Since I have not seen much vertical presentation of data (as in Fig. 2) in a side-by-side manner, my curiosity was piqued. Thank you for your very prompt reply.



- Response to a tweet about our neuro resource:
[Thomas Kidd @Thomashkidd](#) Replying to [@Poppi62](#) (Oct 4, 2019): I made parts of it required reading for my introductory neuroscience class this year. Great resource. And a lot better value than a \$150 textbook..
[Dr Leoni e Quinn @Quinn_Lab](#) (Oct 5, 2019) Thanks for sharing this is fabulous
- PhD student from Manchester undertaking a school placement:

11 September 2019: I am a PhD student from the University who is on a PIPS placement at Altrincham Girls Grammar School. One of my projects is to organise events for Biology Week which falls 7th-11th October. I understand that the fly facility visited in 2016 and the event was popular with the students. The teachers here think that it would be great for you to visit again, especially for those in 6th form that are learning in-depth about genetics, ecology, evolution etc. Would your team be available to visit the school during Biology Week? (7-11th Oct).

17 September 2019: Thanks for sending me all that. I've had a chat with the biology department and they're happy to go ahead with me performing the workshop here! I think we're keen on doing the Genetics + Evolution session you sent me. Would you be able to send me the full version of the slides? You mentioned me coming into University for a demonstration of the practicals. Is that still possible? Would it also be possible to bring one of the technicians here from the school? They will be aiding me in running the session and would really help us out. Also I assume I'll need to come and collect the flies and reagents. How long before we run the session is it best to do this?

10 October 2019: My experience with the fly facility was extremely positive. I am a PhD student on placement in a school to gain teaching experience, and doing the genetics workshop with the students was my first time performing a prolonged piece of teaching to the students. I found the resources that the fly facility provided very useful and the slides were interactive and helped me to engage the students. The videos on the slides were great and the students enjoyed watching these. There was a good variety of experiments that were easy to follow and they went very smoothly. Everything was provided to us by the facility in perfect working order. Sanjai was happy to help with any questions we had and went above and beyond in helping us prepare for the workshop. The students really

enjoyed the workshop and were quick to get involved. They enjoyed getting hands on with the experiments and the content linked well with the specification. It was pitched at the right level for A-level students and extended their learning without being too challenging. While the experiments were being performed there was a buzz around the room and a high level of engagement. Overall, I would highly recommend making use of the fly facility to anyone. I have very little teaching experience but was able to lead a lesson with 4 quick experiments in a room of 30 A-level students. This was largely due to the quality of the resources and advice I received from Sanjai and the team.

- PhD student at Heidelberg, Germany (13 December 2018): I am a PhD student at EMBL passionate about both transcriptional regulation and scientific outreach and a newcomer to the *Drosophila* field. I have used several of your materials (with appropriate citation) for school visits at EMBL, they are such a great tool. I was choosing some youtube videos to show to a school tomorrow and realized you have some translated videos. If only text and voice recording would be necessary to produce videos translated to Portuguese I would like to volunteer to help (PhD life is very busy but I would be able to within certain time constraints). Also, do you plan to visit Heidelberg anytime soon? I would really like to know more about the educational work of the fly facility, the ups, and downs of organizing all that, since I am very curious about that and have not yet decided what I would like to do post-PhD. Thank you very much.
- Senior Lecturer at Massey University, New Zealand (25 October 2018): I teach genetics and biochemistry at Massey University in New Zealand and I'm involved in a programme called Bio10, in which year 10 (age ~15) students from high schools around our local region spend the day visiting our Institute. They do a physics, chemistry, maths/stats and biology activity, each of which is approximately one hour long. I took over the biology lesson recently. I thought the activity that had been previously taught was a bit boring, not that that engaging for the kids, and as a *Drosophila* neurogeneticist, I obviously wanted to use flies! I am a bit limited in what I can do, as I'm not able to bring genetically modified flies in the teaching labs and I have little technical support, so it ideally wouldn't be a lab that took a lot of preparation time. I came across your learning resources online and I thought the climbing assay lesson would be ideal. By year 10, the students have been introduced to genes, that they can code for proteins, and a bit about the relationship between genotype and phenotype, but not much more than that. The online resources and powerpoint were extremely helpful, including the "why the fly?" video. It's fantastic. I have done the lesson three times now and my impression is that the kids were engaged, the content is at the right level for them and they had fun! I got positive feedback from their teachers. I think the students ended up with an appreciation of the relevance of *Drosophila* research to human development and disease as well as the importance of sample size and statistical analysis. Thank you for all your hard work in developing your droso4schools programme and for providing these resources online. They've been very valuable to me, and I hope that they're inspiring the year 10 students to continue to study biology - maybe I will teach them genetics and biochemistry one day!
- High school teacher at Daniel Hand High School, Madison, US:
10 October 2018: I am a high school biology teacher in the US starting a Biotech course this year. We just completed the fruit fly chromatography lab, and I must say that your website was a remarkable help! Everything is so well explained and my students totally grasped the metabolic pathways involved. I was just hoping you could help with a logistical problem. It was difficult capturing the colors on the chromatogram with a phone camera. Do you have any advice for how to photograph these? Are there UV filters out there that I should be using? Thanks so much,
21 October 2018: Thanks for helping me troubleshoot the camera issue. I asked my students what they thought of your website and information for the fly chromatography lab and they were very complimentary about it. They felt that the diagrams were easy to read

and understand, the metabolic pathways were clearly conveyed, and the overall feedback was positive. The only thing that was somewhat unclear to them was regarding the mutations (white, brown, scarlet) that affected the transport proteins for the precursors into the cell. They didn't fully understand from the diagram that the transport protein was mutated.

21 October 2018 (in response to the question: "do you have any ideas as to what information could be added?"): Maybe just putting that part in the explanation. I am a little unclear myself- it is a protein transporter that is affected by these mutations? How does the mutation affect one side of the transporter? Is it affecting one of two polypeptide chains or is the mutation changing the tertiary structure of the protein on one side only, affecting its ability to function?

27 February, 2020: I am writing to express my support for the Manchester Fly Facility /droso4schools initiative. I am a biology teacher at Daniel Hand High School in Madison, Connecticut, USA. Last year I piloted a new Biotechnology course and was planning on doing a lab on fly eye pigment chromatography. I am always striving for students to understand the molecular mechanisms underlying the concepts learned in class, and in this case was hoping to incorporate the Central Dogma of molecular biology into this fly lab background. Unfortunately, the teacher resources that came with the fly chromatography kit that I purchased did not help me to understand the complex metabolic pathways that contribute to eye color in wild type and mutant flies. After giving up on these confusing instructions, I went online to see if I could get a better understanding of the processes involved. It wasn't long before I stumbled across the Droso4schools website. The exact information I was looking for was very clearly explained, complete with clear, descriptive diagrams. I pieced together parts of the Droso4schools information/diagrams to create a pre-lab for my students, complete with questions to check their understanding (see attached document). In this manner, students had the opportunity to learn the details about the metabolic pathways involved before doing the chromatography lab. This gave them a better idea of the context for the lab, and allowed them to do a comprehensive analysis of their data by connecting the Droso4schools information to the chromatography data results. I also included the same Droso4schools visuals in the test I gave students at the end of the unit (see attached document). They used the diagrams, and the lab data, to construct answers as to how the data confirms the metabolic pathways information. In all of my online research, I did not come across any other visual display of the metabolic pathways involved in fruit fly eye pigment development that came anywhere close to the caliber seen in the resources on Droso4schools. For anyone who is a visual learner, and certainly most of my high school students are, the diagrams in Droso4schools were highly effective at communicating complex information. In fact, when I asked my students what they thought of the website and information for the fly chromatography lab, they were very complimentary about it. They felt that the diagrams were easy to read and understand, the metabolic pathways were clearly conveyed, and the overall feedback was positive. Since the fall of 2018, when I first used Droso4 schools, our Biotechnology course has run 4 times in total, and has included approximately 80 students in total. My colleague helped develop and teach the course, and was fully supportive of incorporating the Droso4schools information into our Biotechnology curriculum. Thank you again for creating such a valuable resource!

- Two school exams have been designed with droso4school images and concepts are available upon request.
- School pupil: Good morning, today I was looking for some informations about the possible mutations of *Drosophila* and I saw it briefly treated on lesson 6 of the site, which is not available online yet. I'd like to know when will it be available, because it would be very useful for a school research.Thank you!
- Prof at college in New Hampshire in the USA, (04 March 2019: I'm writing with what I think might be a simple question about using fruit flies in education (I'm a professor at a small

college in New Hampshire in the USA). I'm really excited about the Drosophila4Schools project and website. I'd like to start using *Drosophila* in my first year classes with undergraduates, and also with high school students I teach in a variety of outreach activities. I was wondering if you, or someone you could direct me to, would have the recipe for the nitroterazolium blue solution for assaying the presence of active alcohol dehydrogenase in *Drosophila* larvae, which is described and pictured on the website. I'd like to do some lab experiments around that with the students, but I can't actually find a protocol anywhere. Thanks for any help you can provide on this, and for the excellent project.

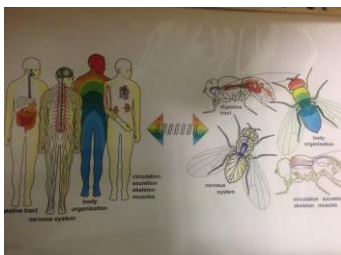
- Associate Professor Biological & Biomedical Sciences at North Carolina Central University, (01 August 2018): I was looking over all the wonderful materials on teaching students about fruit flies and was interested in doing the larval assay pictured in Lesson 2, Section 3: "The breakdown of alcohol requires enzymes which are encoded by genes". It is described as taking only 5 minutes for the Adh+ larva to turn the NBT blue in the presence of 2-butanol and phenazine methosulfate. I looked for the protocol, but can't seem to find it. So, I'm asking if you would be willing to send it please?
- PhD student at Kansas State Univ (01 August 2018): I am emailing to request permission to use your human-fly muscle comparison figures at <https://drosophila4schools.wordpress.com/organs/> in my thesis. I do not plan on modifying them in any way--they show exactly what I need them to! Thank you for creating these resources for the fly community.



- Nicole Green @Drosophiladysci (17 Feb 2018; comment on <https://t.co/S28LBaxioQ>): Love the drosophila4schools project. Use their resources all the time in our #scicomm projects! Check out their article below. #Drosophila #STEMeducation
- Associate Prof & Head at Mount Carmel College, Bangalore, India; (24 February 2018): I am fortunate to use your above resource for teaching my undergraduate students. I am extremely thankful and grateful which has made my teaching effective because of animation and thoughtful study material comprising of various disciplines to arrive at holistic approach of understanding biology. My request to you is query: (1) can we buy those for teaching purposes as in our classes we don't have internet connections. (2) can you suggest if virtual lab is effective and how to start. (3) Can I use your resources for lab manual.
- Instructor at Medical Professions Program & HOSA Advisor, East Career and Technical Academy (30 November 2017): I would like to receive the lesson and adjunct materials on the Lesson 3: Flying through the fundamental principles of the nervous system. This information will be used for educational purposes only and will not be resold. Credit will be given for resources and authors. Thank-you,



- Anna Bajur @AnnaBajur 5 Feb 2018: Ready to teach!!! Thank you, @Poppi62 for a great teaching resource! #schoolproject #tud



- PI at Berkley, US: I wanted to let you know that I gave a talk to local high school students today and found the figures on your website and video extremely useful in putting together

a talk. Of course I pointed them to the website for more info. Hope that others are finding it as convenient as I did for getting some help for popular talks.

- Science writer/communicator in Vienna (29 June 2018): I have, in the meantime, switched tracks to become a science writer/communicator in Vienna. I'm currently developing school outreach projects, and as a former Drosophilist, I would like to use fruit flies in some of our projects. This is how I came across your fantastic droso4schools project, which I found very inspiring and encouraging! I do have a few questions about how you carry out these lessons, would you maybe have time to briefly chat on the phone about your initiative? It would be great to get input from someone who has experience carrying out fly projects with school kids! Many thanks in advance!



- Lolitika Mandal @LolitikaMandal (15 Jun 2018: Replying to @Poppi62 @Manishj29): This has been a great resource to teach undergraduate students...also have used it a lot for introducing model organism to high school kids and non Biology audience. Thanks a lot for this great resource.

- PI at University of Alabama: I found your fly lessons extremely helpful. I prepare lessons for teachers in the Western Alabama, USA region. I have been carrying out experiments on artificial selection regarding bristle count and comparing the shifts to replicated experiments in which flies have been raised in the dark to see if there is a melatonin-induced epigenetic effect on the parallel population. It would be helpful to use some of your pictures (gender of flies, etc.) in my lab. I will, of course, cite your source in the reference section. However, I wanted to check in with you before I used them. The site said "for the public." However, I just wanted to double check. Our organization, [Alabama Science in Motion](#) is a free resource to our teachers. This is certainly not for profit in any way.

- Teacher at Nelson Colne College:

12 May 2017: Just to let you know we had amazing success with our fruit fly inheritance project. The flies breed so well- we had hundreds to count!!! I've attached our data sheet in case you are interested. The Chi square analysis was absolutely spot on, too. I think the main reason for our success this year was the help and support you gave us, we really appreciated everything you did for us. The students gained a great deal from this investigation as they could actually "see" the results, and it's a practical I don't think they'll forget in hurry! Many thanks again for all your help, and we'll get the payment sorted ASAP. I look forward to working with you again next year.

12 September 2020: The genetics project is run with my second year students (Year 13) . I have 4 groups of second year students totalling 60-65 students in all. The number of flies I have ordered from you in previous years have been enough to take the breeding project through into the F2 generation- in fact the F2 generation can often produce over 1000 offspring, so plenty there for statistical analysis of inheritance patterns! I've attached the data collected from March 2020, the past 4 years have generated very similar results. Using the fruit flies that you have supplied over the past 4 years, has really benefited the student's learning experience, and really brings to life the "realness" of inheritance patterns.

- Teacher at Ashton Sixth Form College:

13 May 2015: You recently visited Ashton Sixth Form College and ran a session for our A2 Biology students. We are putting together a wall display about your facility and the session and I was wondering if you had any posters or other resources I could include in the display.

23 May 2015: The images are fantastic! Thank you so much, really appreciated.

The Fly Facility does familiarise students with work as a scientific researcher, the university laboratory, equipment and stimulates student minds to consider a career in scientific research..... an invaluable experience for A Level science students.

39 June 2020 In response to... All I need is a rough number of students that were taught using the fly resources. Over two years around 250 students.

- Teacher at Birkenhead School:

11 December 2014: Thanks a lot Sanjai, they came safely on Tuesday. The whole department asked me to pass on their thanks as well; it means we can do so much more for our students.

01 December 2014: Thank you very much, we really appreciate your service as always and have the delight of using the excellent paper and computer poster resources you sent us in the past.

31 January 2014: You have been so helpful and efficient; I can't thank you enough. I'll let you know about food. Thanks again

13 March 2014: All the little chaps are doing great and causing great interest with every year group.

14 July 2020: In terms of the number of pupils that would have benefitted over the years (and we are not a big school)... I think we started getting flies from you in the academic year 2015-2016, so that's been 5 years now. With perhaps 70 per year group x 2 year groups each year x 5 years = 700 GCSE pupils altogether. At A level, perhaps 30 pupils x 5 years = 150 A level pupils altogether. It would be close to 1000 in total if you factor in the clubs that have also benefitted from these. In terms of benefit, we have found them to be very useful, to teach all sorts of topics and techniques, including variation, mutations, genetics crosses and the nervous system (the mutant flies being absolutely amazing for this!) The expertise of the staff in your department has been great. I have often email saying what learning points I would like to get out of a genetics cross, and the team has told me exactly which crosses to use. The online lesson plans and further information have been very well produced. The flies are also ideal because they can be used for simpler ideas at GCSE and then the same pupils meet the flies again to do more complicated things with them at A level. This generates the most ideal learning experience you could possibly have! At all levels, the flies have made for some of the most engaging lessons, with the ideal mix of excitement and intrigue. And they WORK – i.e. I have often got EXACTLY the ratio expected from crosses. They have also generated further interest among students who go on to study degrees in neuroscience or biology. Having hands-on experience working with these flies has allowed them to have some insight into research careers and how science is done, using model organisms.

- Teacher at Loughborough Grammar School:

08 May 2012: Thanks very much for the email and resources, and an excellent day at the University. I would be very interested to show the year 13s the temperature and pressure/force sensitive mutants. Is there any source of these *Drosophila* which I can use? I am based in Loughborough so I am a bit of a distance from Manchester. Thanks again;

11 June 2012: There isn't any possibility of having some more, particularly the heat sensitive ones. They went down really well with all the primary school children who visited for National Insect Week

- Teacher at Ponte de Lima, Portugal (02 April 2017): Your material is being used in the laboratory classes of the biology discipline of the 12th year of secondary education. It aims to study Mendelian and Morgan heredity. The results have been excellent because the practical work in Portugal in regular secondary education has been little used and as it is natural the students like to make experiments. It also allows students to train and develop procedures and techniques during practical work. We intend to continue the *Drosophila* project for the next few years and since we do not have an incubator for the flies, we only have an improvised incubator, our professional school courses will build an incubator for next year. So we will continue to request your material and support.

▪ Teacher at King's School, Chester:

18 April 2014: I just wanted to let you know how valuable your *Drosophila* for schools resources have been. As you are aware our students follow Edexcel A Level specification B and your flies have really helped us teaching the following from the spec:

8.2 Transfer of genetic information

i Understand the terms 'genotype and phenotype', 'homozygote and heterozygote', 'dominance', 'recessive', 'codominance' and 'multiple alleles'.

ii Be able to construct genetic crosses and pedigree diagrams.

iii Understand the inheritance of two non-interacting unlinked genes.

iv Understand that autosomal linkage results from the presence of alleles on the same chromosome and that the results of crosses can be explained by the events of meiosis, including black/grey body and long/vestigial wing in *Drosophila*.

You may be interested to know that we sought feedback from our students as they approach the end of their course. A number of the core investigations (designed by Edexcel) were not thought to help them but the flies you provided together with the resources on your website were cited as being 'instrumental in learning about autosomal linkage'. Indeed, when we looked at our end-of-topic test results we found that for many students this section was their highest performing topic. We asked them to reflect on their scores and several students said they understood genetic linkage much better for having performed the crosses. On another note, Atharva Salvi, continues to love Biology and is really thriving at A Level. You may remember you kindly hosted him for several days experience in your labs over the summer a couple of years ago. He is still hoping to study a life sciences course at University.

25 November 2014: I was amazed how they were in perfect synchrony with each other. Flies we have bought from Timstar have been rather sporadic going through the life cycle....

19 June 2019: From my point of view, your resources have been superb and when we taught AQA A Level Biology they had a big impact. We then moved to Edexcel A Level biology where we struggled to fit in the practical work due to the greater subject content. We have now switched back to AQA and will now make more use of them because we have the time needed to discuss genetic crosses in more depth.

- Teacher at Harris Academy St John's Wood (03 July 2020): As you will be aware students did not sit external exams this year, so we are unable to provide an update. We have the grades teachers gave, which will be moderated, but we are not allowed to share these until after results day in August. In terms of applications to science, last year we started Year 12 with about a dozen students who wanted to apply for Medicine, in the end only two applied and the rest choose to apply to degrees in the sciences instead.

▪ Teacher at Beaulieu Convent School, Jersey

18 June 2020: Would you be able to help me set-up a small fly-lab for our school? We would like to do some simple, and reproducible crosses with GCSE and A level students to introduce the ethical use of animals in research and genetics. At the moment, any advice regarding what we need, would be greatly appreciated too.

16 November 2020: The students have been really enjoying the handling and seeing the results of their crosses, so thank you! I was thinking whether it would be viable to PCR out mutant genes and wt ones to see if there is a size difference.

▪ Teacher at Bohunt Secondary school in Liphook

16 June 2020: I am a science technician working for Bohunt Secondary school in Liphook. My specialism is STEM, but I have been asked to look at *Drosophila* for the Biology side. So I am trying to put together some training notes and some resources that we need for maintaining, cultivating and running a programme for *Drosophila* for Secondary school students and sixth Form. I have found your site and will attach a link for our teachers to

view. As you can see I am a bit of a novice so if you are able to give me some pointers that would be very much appreciated.

30 June 2020: Thanks for your time, lots of useful info for me. Again thank you very much.

- Teacher at Hamilton Heights High School (21 August 2020): I am interested in lesson 7, rules of inheritance: from chromosomes to genes to disease. I saw on the site it mentions to email you for resources.



- Haifa Alhadyian @haifaalhadyian 25 Oct 2017: I used activities from [@ManFlyFacility](#) in the most recent outreach event I organized. Thanks for amazing work!



- Andrew Bellemer @AndrewBellemer 28 Sep 2016: [@Poppi62](#) I wanted to let you know that I am teaching a workshop for international secondary ed teachers on *Drosophila*. - [@Poppi62](#) The resources that you have developed have been tremendously valuable. We will be running trials of your wall-climbing assay.



- Andrew Bellemer @AndrewBellemer 21 Sept 17 : Worked with the Teaching Excellence and Achievement fellows this morning. --- We used the wall-climbing unit developed by [@Poppi62](#) to illustrate how model organism research is conducted and how it can be translated... --- ... to a middle or high school classroom. --- This is the second time I've used this one, and it worked perfectly both times. It's a rare demo that works as expected with novice students --- I'll also mentioned that the work these fellows are doing is phenomenal. Emmanuel (just over my left shoulder) teaches science... --- ...at a school for the blind in Rwanda. Wants to know how *Drosophila* experiments can be adapted for his students.



- Andrew Bellemer @AndrewBellemer Sep 21 2018: Yesterday was one of my favorite days of the academic year. I had an opportunity to work with the 2018 Teaching Excellence and Achievement Fellows to discuss and demonstrate how model organisms can be used in research and teaching. -- This year's fellows are Seba (Uruguay), Nongluk (Thailand), Victoria (Zambia), Cynthia (Ghana), Shirin (Azerbaijan), Juan (Venezuela), Nongluk (Thailand), Rabson (Malawi), and Yousef (Jordan). -- All are outstanding secondary ed science teachers who went through a super competitive application process to come to App State to work on Science and English pedagogy and act as guest instructors in regional high schools. -- You can read more about the program here: <https://today.appstate.edu/2014/06/25/teaching-excellence-and-achievement-grant> -- We spent the morning working through some of the excellent resources developed by [@Poppi62](#) and [@ManFlyFacility](#) as part of the droso4schools project (<https://droso4schools.wordpress.com/>) -- Negative geotaxis assays in progress. -- These

are some of our Teaching Excellence and Achievement fellows. Victoria from Zambia, Cynthia from Ghana, and Nongluk from Thailand. All high school science teachers.



- Researcher at Universidad Nacional del Sur, Argentina; comments on droso4schools; Your material is fantastic, we have used it many times during school visits to our institute. I would like to point to a minor mistake in one of your images. The spleen has been placed on the right side of the body, while it is actually on the left. thanks for all the hard work that helps to spread the benefits of flies as a model organism
- Distance Learning Coordinator-Museum Instructor at The Cleveland Museum of Natural History (15 August 2017): I work at the Cleveland Museum of Natural History (www.cmnh.org) , creating and teaching virtual lessons for students both in the US and in several other countries (<https://www.cmnh.org/ivc>). Currently, I'm working on a lesson that highlights research being done by our Curator of Invertebrate Zoology, Dr. Gavin Svenson: (<https://www.cmnh.org/c-r/invertebrate-zoology>). My challenge is this: We have specimens aplenty, but no graphics designer on staff. This inability to generate my own images often sends me into the wilderness of the Internet, which is how I found you! The illustrations here: <https://droso4schools.wordpress.com/organs/> are 100% perfect for our introduction to the evolutionary links in cellular function. How may I obtain permission to use your images during our educational program? We're a non-profit museum, and all images used would have a "Used with permission by" notation clearly placed at the bottom of the screen. Thank you for creating such valuable graphics for teachers!
- Teacher:
April 2017: May I use some of the pictures on this website? I am making my own site and I love the simplicity of the photos! Thank you for the helpful information!—_Thank you to the team, I love this website. The pictures will be only to be downloaded for education purposes -- I am making a website for my gifted class, to inform them of the reproduction of maggots.
- PI at the NIMR (11 December 2014): Perhaps you remember that I contacted you concerning a London school hoping to teach *Drosophila* genetics in flies. They would like to do the experiment, using the climbing assay comparing young and old flies. From the talk, you shared with me, I tried to guess, the details - but couldn't. Are wild type OregonR flies ok for this? And how old or young do they need to be to show differences? For ageing flies, I just would need to start to think ahead already! Thank you so much!
- Fly Facility manager at the University of Sheffield (10 May 2017): I manage the fly facility at The University of Sheffield and am just starting to gather information and resources to start some fly outreach in the next academic year. This will consist of:
 1. A room of experiments/craft activities for Discovery Night during science week
 2. Going into Primary schools during science week for 3 x 1 hour sessions
 3. Running workshops here at the university for 3 hour sessions

Most of these activities will be aimed at children aged 7-10. You have some fantastic resources at Manchester and I would be grateful if we could use some of them in Sheffield. I am especially interested in using the cartoon fly pictures and organs/systems pictures as part of a workbook I am preparing. I would, of course, acknowledge anything I use as your work. Please let me know what you think. Any additional help or advice would also be appreciated.

- Teacher at Riverside High School, US (05 March 2019): I am requesting the instructional material packet for your Lesson #3: Flying through the fundamental principles of the nervous system. We are trying to implement a version of this lab in our Biology classes. I teach a college level Biology class in Leesburg, VA, USA.
- Lab Technician, Wiltshire College Lackham, Wiltshire (15 November 2017): We teach our HE learners about light and light perception so Lesson 5 on vision is of great interest. Please could you send the PowerPoint for this lesson, and advice on where to buy light emitting diodes (LED) of specific wavelength in order to carry out phototaxis experiments with *Drosophila*.

6.3. Impact of school resources on teachers', pupil's and researchers' choices

- School pupil at Menai High School, Australia (13 January 2019): I'm currently in my last year of schooling and am doing a research project on epilepsy with fruit flies. My teacher showed me the youtube video that you had on 'Illustrating epilepsy with *Drosophila* experiments' and read the information on epilepsy in your lesson 3 on the droso4schools website. I was interested in what type of fruit flies you used and the mutation that they obtain?

14 February 2019: Thank you so much. I will certainly make sure you are recognised in my report. Again thank you

- PI at the University of Georgia: Cool to interview a student who wants to be a science researcher as a result a high school visit from @poppi62 on *Drosophila*
- PI at Univ Ibadan Introducing, Nigeria (12 September 2017): I received your response with delight. Many thanks, Sir. Thank you for the links to the articles. Indeed, we will need your assistance in the area of science communication, and the articles in the links are great resource materials for us. We will carefully read through and gradually follow the instructions. In addition, I am working on a *Drosophila* Research Centre in Nigeria where we will carry out introducing *Drosophila* to secondary schools students. Your Droso4schools initiative materials would definitely be helpful to us in this regard. The need for such a centre cannot be overemphasised due to the demands for *Drosophila* research by scientists across Nigeria. We shall attempt to convince the government to introduce *Drosophila* into the Biology curriculum. We will also have a lab for the training of scientists and for workshops. The advice in your email can be better achieved with this forthcoming *Drosophila* Centre, because the fly is not currently widely accepted in my institution. I will update you on this regularly for advice, Sir. I will be glad if you could accept to serve as one of our international advisers in this new centre. As a teaching faculty in my present university, we train postgraduate students in their projects with the *Drosophila* model. Some of these trained scientists will be allowed to serve in the *Drosophila* Centre as resource faculty members from time to time. Another area we may need your assistance is to link us up with places where we can have mini grants for *Drosophila* research. Lastly, Sir, I will likely visit University of Cambridge in November for 6 weeks to work with a PI on a collaborative project. I will be glad if I am allowed to visit your facility in Manchester during my visit for further interaction. Please accept the assurances of my highest esteem.
- Teacher at Denbigh High School, Luton (21 October 2015): Last year my colleague was in contact with you regarding a project we were looking at running in school. We kept the flies and managed to breed them successfully, although we had a few teething problems with temperature-sensitive mutants in a hot prep room! We would like to run the project as a silver CREST award project for a year 9 group, and were thinking that a natural selection experiment may be the best way to go with the equipment available in school, whereby the students could track the increase in numbers of flies with a favourable phenotype. From what I recall the white-eyed mutant might be the ideal variant, as the students will be able to track the numbers easily and I think I am right in saying it has reduced fitness. Would we be able to get white-eyed flies? Are there any other projects which would be suitable as an

extended project for a high ability group of 13-14 year olds? It doesn't have to be original but does need to be written up in the manner of an academic paper.

- Second Teacher at Denbigh High school (21 April 2015): Myself and a colleague (both science teachers at Denbigh High School, Luton) are interested in using *Drosophila* as part of a STEM project working towards a CREST award. Our initial thoughts were to use the *Drosophila* for a project for inheritance but we are also aware of other possibilities, such as ageing. We have been looking through your website and were wondering if it would be possible to obtain fly-related teaching materials, flies and food.
- Teacher at Oldham Hulme Grammar school (16 October 2012): The flies were a success, though the bang ones refused to all lie down dead, so yes we could have done with keeping them all a bit warmer to start with. They are still being used in our normal lessons now even though we're not up to Genetics yet. The teachers who originally got your details (our Head of department) who attended a day at Life Sciences in the Spring as part of the "Liverpool Group"..... Heads of Biology from Private schools. He was so excited to see the flies that he banged one tube half to death and split it....before I could find him a soft surface to do it on....luckily the kids who tried it were gentler. I did a small display about *Drosophila*, see attached photo. , and have also produced a poster and letter to go to all students about the Science spectacular, as it falls in the half term holiday. I haven't had time to research *Drosophila* equipment for schools yet but I will keep in touch as a talk and demonstration to our 'Gifted and talented' students and 6th form would be welcome. Many thanks



- Teacher at Bury College (18 May 2016): Thanks for getting back to me, we are looking at just trying to set up some simple crosses with our AS students w/c 13th June, TimStar seem to be able to supply some flies so we should still be able to do this but if you are able to provide fly food that would be helpful. Thanks for the link below. We will definitely use some of the resources, particularly the introduction to *Drosophila* and its importance in the lessons. There is mention of a genetics lesson but it says coming soon - do you have any of these resources available yet as it will be the genetics aspects we will be focusing on with the students.
- School pupil (11 July 2017): I am currently on a Mission Discovery programme hosted by ISSET (International Space School Educational Training) and we are researching potential experiments to carry out on the International Space Station. The winning group's experiment will then be sent to the ISS. I attended the Discovery Biosciences day a few weeks ago and was fascinated by the effects of temperature and motion on the fruit flies, which caused paralysis and epileptic seizures. The parallels between the *Drosophila* flies genes and ours mean that this research in microgravity could be hugely beneficial if humans were to colonize other planets. Are there any other factors which you feel could be investigated in space which complement your ongoing research?
- Teacher at Bronx, NY (26 March 2017): I am a high school science teacher in the Bronx, NY. I currently teach neuroscience to students in the 11th grade and thoroughly enjoy it. Instead of taking state exams, our students must write a formal lab report based on an original experimental design and present their findings to a panel of teachers, local college students, and other members of the community in order to successfully complete the course. Students have been designing simple, yet interesting experiments concerning the neuroscience field. However, our students have only been able to use human participants, which has led to an extreme amount of limitations. I am highly interested in possibly

developing a partnership with your organization. Because I also want to teach a genetics course next school year, I think it would be a huge opportunity for both classes to use the fruit fly in their scientific research. I would need help on getting started building a strong curriculum that would involve this amazing organism to fully engage all students in scientific inquiry.

- AP Biology and Anatomy & Physiology Teacher at Junction City High School, Kansas:

07 March 2015: I enjoyed speaking with you at the GSA convention. (I am the high school teacher from Kansas you spoke with during the workshop time.) I would be very interested in helping push your initiative to bridging the gap between high school educators and research scientists. I have visited your site and look forward to exploring some of your resources. I would be very interested in the long term/multi-disciplinary unit that you mentioned is still in development and would gladly provide feedback to you and your team. I will pass along our U.S. standards and learning objectives after the conference so you can link them to your website. Thank you for helping to close the gap between high school and academia.

OUTCOME: we together presented a workshop at the 2018 ADRC conference (section 1.5)

I wanted to let you know I appreciated your guest blog about *Drosophila* outreach programs that was featured in GSA's "Genes to Genomes." I continue to try to find more ways to include flies in my classroom curriculum. As we have just begun summer break, I will be redesigning my curriculum and will review many of your resources for inclusion. Next year I will be teaching Human Anatomy & Physiology in addition to Advanced Biology. Do you have any thoughts about specific lessons/materials that might be especially applicable to this new course? Thank you again for sharing your views about the inclusion of education initiatives in current research. I will continue to push from my side (high school education) as well. See also comments in Section 6.2.3.

- Biology teacher in Brisbane, Australia (19 May 2016): I am a biology teacher in Brisbane, Australia. I have just found your website which is really great because next semester, we are hoping that some of our students will be able to do some experiments with *Drosophila*. In our course, we ask the students to develop a research question and hypothesise themselves and carry out experiments to test this. We usually give them a few suggested variables to investigate to get them started so I was hoping you might be able to suggest some as we have never used *Drosophila* before. I was wondering how the type of food might affect numbers of offspring, or perhaps something to do with alcohol as one of your experiments suggests. What about temperature? Any information or suggestions you have would be greatly appreciated. Thanks so much for your help
- Biology Course Tutor at Franklin College, Grimsby (10 July 2020): After being a biology teacher for over 20 years, I have managed to avoid doing experiments with *Drosophila*. But next year I will have to, as we are carrying out a BTEC Applied Science Unit that makes this mandatory. Obviously I am not very confident with doing this and want this experience to be worthwhile for the students. I was wondering if anyone in your department would be willing to give some training on *Drosophila* to a group of teachers in preparation for teaching a Genetic Unit in this next academic year, with the possibility of doing an outreach session for a few classes later on in the year? At the moment, we are unaware of what the situation relating to COVID-19 is for this next academic year, so could you base your answer on the basis that everything will be back to normal.
- Teacher at King Edward VI Grammar School, UK (25 May 2016): I teach biology at a secondary school in Chelmsford, Essex and our department is interested in introducing practical studies involving *Drosophila*. In starting to look at what we could do, I came across your site and wondered if you could offer some advice about the practicalities of using *Drosophila* in schools. We were thinking about buying an incubator (we have a small amount of money that has been awarded through the Jack Petchey scheme) and so would

need some general advice on looking after and maintaining *Drosophila* (it has been a long while since any of us have done this). I can't tell you how excited I was to find all of the different ways that we could use these animals - I'm afraid we were thinking that we would have to confine ourselves to genetic crosses but your support material has certainly broadened our horizons. I am not sure if your remit is to work just with schools in the Greater Manchester area and apologise if my request for help is inappropriate but I would appreciate any advice you could offer.

- Teacher at Birkdale School, UK (26 March 2015): Last summer I attended the teacher's summer school in your department. I would like to do a practical with a class on the effect of caffeine on *Drosophila*. Do you have any ideas of where I could source some? Thank you so much for any help you can offer.
- Teacher at Whalley Range School, UK (07 October 2014): I was wondering if you could go through the assessing motor skills of drosophila and relate it to how it helps the research into situations such as epilepsy. I would like the students to do the drosophila practical modelled on the PowerPoint (I have attached the PowerPoint you used during the summer course). I have also attached a GCSE grade A question that ties in well with this topic that I hope to use with the students . Due to the workload for our year 11s, the only time window I have is Tuesday 21st October 11:15 – 12:20. We are on half term starting from the 24th and we move on to the chemistry unit after the half term. I would really appreciate if yourself or a representative can come if not, are you able to please send us what we need to carry out the practical with a class of 25
- Teacher at Holy Cross College, UK (23 December 2014): Thanks for the link. Thought it was really good. Was wondering whether I could bring some students in to see the work being done? Maybe sometime in February? I spent quite a bit of the final year of my degree looking at *Drosophila* so find it all very interesting. Could you send a link to the second part movie?
- Teacher at Bolton School Boys' Division, UK (08 May 2012): We offer a number of *Drosophila* practical activities in school and our technicians are quite skilled in looking after them. We tend to use simple mutants like vestigial and white eye. The temperature and motion mutants that we were introduced to were excellent. I would be very interested in speaking to you further about different ideas either by phone or in person. I look forward to hearing from you.
- Teacher at Sidcot School, Somerset, UK (28 Sept 2016): Thank you for sending the fruit fly order to Sidcot School. The students have thoroughly enjoyed working with them, as they did last year. I hope to be in contact next year and perhaps will try the alcohol experiment
- Research student at Swansea University:
29 September 2017: I am writing to enquire about your fly facility and services in Manchester and wonder if you could help me. I am a research student at Swansea University and beginning a new project in which we will be using *Drosophila melanogaster* as a model organism for a variety of genetic based experiments. However, the department does not use this species and therefore has no sourcing. Would you be able to provide some information on if you are able to provide a source stock as we have been unable to find a UK based supply and was recommended by Cambridge fly centre. Your website has provided some great information on rearing, storage and feeding of a maintained stock in which we will soon be ready to house.
5 Oct 2017: I have downloaded and read the genetics training package which has been great for showing why and how these are great model organisms.
- Researcher at the Institute of Biosciences and BioResources, Naples (23 October 2017): I am an Italian researcher working in the *Drosophila* field. In the last few years I started to work with high school in my country, with the goal of using the fly to teach genetics and biology. Recently, I had the opportunity to visit your website and I was very impressed with it so I'd like to congratulate you for your excellent activities. I am very interested in engaging

in such activities in my country. In particular, I am fascinated by two activities that I have never done during my lessons: Optogenetics (fly laser quest) and Seizures and Paralysis. So, I come to my request: can I use your lessons, with the appropriate citations? could you send me fly strains to carry on these activities?

- Researcher at the Dept. Molecular Genetics Weizmann Institute of Science (19 May 2015):
I am a *Drosophila* researcher at the Weizmann Institute in Israel. I had the pleasure of listening to your talk describing the impressive educational and public outreach activities of the Manchester fly facility, at the recent DRC in Chicago. I have been asked to introduce/present the topic of "genetics" to grade school pupils (5th-6th grade) at a nearby elementary school (a single 45 minute session), and wanted to ask for your advice. Encouraged by your Chicago talk, I would like to make *Drosophila* a focal point of my presentation. I've been looking at the MFF website, which has given me some ideas, but the various activities seem to be geared primarily towards middle-school students and older. Do you have any specific advice regarding presentation content or can point me in the direction of relevant resources, when it comes to teaching grade school pupils, with minimal background? Thanks very much for any help you can provide.
- PI at the IBioBA-MPSP, Buenos Aires, Argentina): I think getting youngsters excited about *Drosophila* is very important in a region like Latin America where science funding is so tight. Ridiculously, we don't have that many fly labs around here...I hope we can change this. Actually, I am now collaborating with a high school teacher who is organizing an after-school program called "El cuarto de las moscas" to get kids to know flies and scientific activity, it's fun and rewarding.
- PI at Brunel University (07 January 2019): ..., I've been enjoying your droso4schools project from afar for a while and think you're doing amazing work with it! I am thinking about doing something similar with local schools we here at Brunel University are partnering with. In your recent blog post about teaching in KS2 classrooms you mention to contact you for information about affordable microscopes: could you give me some information about this?
- Researcher at Hobart & William Smith Colleges, Geneva (03 October 2015): I'm interested in using your climbing assay in my neurobiology lab. I want to use a mutant that would be considered a model for a human disease such as ALS or MS. The disease is not important as long as it effects the motor system and there is an analog in humans. What I'm most interested in is what mutants you think I could get a hold of (from Bloomington) that would show a reduced ability to climb as adults or to crawl as 3rd instar larvae. If you have any recommendations/stock numbers, I'd be grateful.
- Researcher at Bogazici University, Istanbul, Turkey; (07 June 2017): I have been following you excellent work on science education something I would like to do more as well. Currently, I have been given a task in an area that I am not so experienced with. I have been asked to train high-school students for the biology olympiads in the field of biology in particular in *Drosophila* physiology! ... I have a few days to prepare for this. I was wondering if there are any experiments that pop up in your mind.
- PhD student at Ahmadu Bello University, Nigeria
06 Sep 2017: I am interested in genetically characterizing *Drosophila melanogaster* and sigma virus in the 8 vegetation zones of Nigeria with a goal of establishing a research and training center on *Drosophila* and outreach programs in high schools on the use of the fruit flies in improving teaching and learning of biology. During my MSc I characterized *Drosophila melanogaster* from 3 Savannah zones of Nigeria using microsatellite markers. The results were amazing indicating a high genetic diversity, reproductive isolation with great genetic differentiation. I have after attending some workshops like TReND in Africa in Tanzania last year October, molecular biology by TReND-Bingham in Abuja, 2017 and DrosAfrica Ibadan 2017, seen so many loopholes in my MSc research as I am the first to conduct such Research not only in my institution but in Nigeria and getting useful assistance and contribution hasn't been forthcoming. I am determined to establish this field in my country, the various faculties in the various workshops I have attended can attest to

this fact. I am not yet gainfully employed like I earlier stated this field is new in my environment and the value is yet to be appreciated. I am inquiring if the fly facility program could collaborate with me in establishing this great field in my country and support my research in any way. I am willing to provide any further information about my self, referees and research.

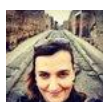
11 March 2018: I am through with my course work and now ready to start my outreach programs by inviting three schools per program. I have gone through the links you once sent to me which will be very useful on my subsequent outreach. XXX strongly recommended a chat with you on possible assistance. Please how can we collaborate with the fly facility on successful outreach programs in my country?

04 April 2018: Thanks, I was able to download most of the articles I needed. I visited some of the schools like you suggested before the Easter break and will do same when the school activities resume. My chats with them shows we are on track on the problems and possible solutions. We have also sent out words to the public on possible volunteers for the outreach. Thanks once more

09 April 2018: Thanks Andreas, am currently discussing with them on sourcing for fund. We have also copied some documents from the Manchester facility page including its link so the teachers can have a direct access to our pioneer and mentor. thanks

18 May 2018: We were preparing for the pilot outreach as I earlier said. The outreach was successfully carried out on Tuesday, 15th of this month, with 3 schools (10 students and two biology teachers each, totalling 36) in attendance. We took pictures, videos and were interviewed by the university press which I will send later. Prices were won by the students who participated in the quiz while t-shirts were given to teachers. Questionnaires were distributed and the responses are quite encouraging with a school signifying interest in using the fruit flies in it's biology practical, while the other school want to take the existence of the outreach program to the state ministry of education. We are on further discussions with the schools for in school training. The jotters and protocols distributed to both teachers and students contained the links to Manchester fly facility and Droso4school. Will send summary and evaluation reports after my exams.

- We are currently applying for funds to allow XXX to visit Manchester and formalise our collaboration



- [Arzu Celik @acelik100](#) 7 Dec 2019 - Getting ready slowly but surely. High school biology teachers training [@Poppi62](#) [@StefanKoestler](#)



- Researcher at Bogazici University, Istanbul, Turkey (20 November 2019): We are getting ready for our first run of Droso4schools in Turkish. We will actually start by educating high school teachers and our first trial is planned for mid of January, followed by april, july and october. The translation of the ppt presentations are also underway. After the first trial and

getting feedback from the teachers we plan to submit a proposal to the education ministry to incorporate these experiments into the regular high school education program. I am not sure how realistic this is but the teachers I am working with are very optimistic. I hope it will be successful! I would like to ask you for help. As we plan to perform the same experiments you usually perform it would be great if we had the same fly strains. If it is not too much of a hassle could you provide me with those lines. I guess we would need flies for the chromatography experiment, ADH and ALS flies. I hope I mentioned all of the relevant ones. Please let me know if this would be possible. Thank you very much in advance.

▪ Postdoc in Mount Sinai

01 May 2018: I am a postdoctoral fellow at Icahn School of Medicine at Mount Sinai, and we chatted very briefly at the poster session at #Dros18 about science outreach and communication. Just wanted to thank you again for your amazing website and the resources on it which were really useful to me when I taught my outreach class on using *Drosophila* to study human diseases to the 5th graders at my local after-school program. I created a game using the mutant fly generator in your resources section, and then printed about a thousand of them as small pictures, and mixed in a handful of mutants (Cyo, vg, w, etc) amongst them and then I had the kids physically screen them and identify all the mutants they found. They turned it into a game of who could find the most in 15 mins and they had a great time doing it and learning about flies and how they grow and how they are super useful to biologists! None of this would have been possible without your wonderful website and all the efforts that you've taken to curate it. Thank you so much! I'm attaching a few pictures from the outreach class that I taught!



25 June 2019: I used the resources on your website to create an interactive active learning based activity for 5th grade kids. My idea was to give them a taste of what a genetic screen was like, so the activity basically entailed them finding out a mutant fly from 10s or 100s of other normal looking flies. I used the Genotype Builder psd file to generate different genotypes of flies that I wanted. I printed out ~ 100 normal-looking fly images on a single printer sheet and then printed 10 or so CyO fly images. And repeated that ~20 times for different mutations (Eg.: W, Sb, Tb, etc etc). Cut the sheets of paper up into tiny squares so that each square had the image of one fly on it. Then mixed up all the 100s of normal looking fly squares with the 10s of mutant flies. Then I handed each student a pile of the little squares/flyes and asked them to "screen" their pile for mutants. The idea was to show them that conducting a screen requires sharp eyes and good observation skills and also that mutants are not so frequent in nature. Only after scanning a 100 or so would you get 1 mutant fly. And then I tied them up the small lesson with an introduction to how *Drosophila* has been used as a model in Biomedical research. That was the only time I used the MFF resources--but I think they have fantastic use as a tool for outreach--at least my 5th grade class was convinced of the utility as well as "coolness" of flies after the lesson! Attached please find some pictures of the class, as well some feedback that I got from my instructors of the science communication course I was part of and which let me teach the 5th graders. Hope you find this useful!

- This initiative was inspired by our genetics activity and genotype builder: [MRC MBU @MRC MBU](#), Cambridge, [28Jun17](#): Here we are... at the Big Bang Eastern...ready and waiting for our visitors [@TBB_Eastern](#) Eastern [@AngliaRuskin](#) Chelmsford 😊



Finding mutant fruit flies!



Dear Andreas

Thank you very much indeed

Best wishes

Penny

- Assistant Prof, University of Rijeka, Croatia (12 December 2018):

12 December 2018: I'm writing to you regarding your amazing project Drosophila4schools. I am trying to do something similar in Croatia, on much smaller scale, what makes me appreciate even more all the effort you have put into your project. Because your input would be very useful for me I was wondering if you would be interested in visiting Croatia so that we can meet, talk and you could give a lecture or two (one potentially for the teachers, the other one for scientists at the University). I lead a small fly lab at University of Rijeka, and after almost a decade since moving here from US, I'm still the only fly lab in the whole Croatia. So, spreading the gospel about flies to the small scientific community in Croatia in order to establish collaborations has been my mission since the beginning. Recently though, as I got highly disappointed with the educational system and consequently, the level of public understanding of science, I decided to put my token effort into bringing more science into classrooms. I am currently applying for a tiny University grant aimed at connecting University with the community where we work and live. My target are elementary schools, grades 5 to 8, and high schools. My plan is to first educate teachers about characteristics and importance of *Drosophila*. Second, I plan to lead workshops (together with my postdoc and students) where I would demonstrate simple experiments that teachers can use as part of their biology curriculum. Lecture and workshops would be part of teacher's professional development requirement. I would love to hear about your experience, especially how you dealt with problems that you encountered in your work will be very useful for me. --- I'm very excited to hear such positive feedback from you and so fast. Considering overall climate in academia and schools in Croatia, I'm not sure if this initiative will be well received, but I will at least try. ...Thank you for the link - I didn't know about it. I do however use your site a lot for my elective class *Drosophila* as a model organism in neuroscience, and for many other talks and classes where I have to introduce people to *Drosophila*. --- The project got funded with notice from 21/02/2019, with Andreas Prokop/Manchester Fly Facility as official collaborators

01 August 2019: Things have been happening slowly but steadily. We have Vision/Mission statement, logo and parts of the web site. My new PhD student is artistic and has the basic knowledge about web site creation. I'm sending you the link – it's under construction – but have a look at it. I still need to check the translations that she did and she will contact you

regarding some of your videos, etc. <https://musiceunastavi.wordpress.com/> We have given one lecture about the aim of the project to elementary and high school teachers where a fair number of them showed interest. Current school curriculum in Croatia is under revision – it kind of is all the time, which might make implementing our ideas a bit easier – logistically and financially. We had couple of high school teachers visiting the lab, and they were very excited and interested in potential experiments which we can present to pupils. The collaboration will pick up in the fall. Also, I don't know if I have already mentioned, but several of my colleagues are organizing a 2 day symposium about the importance of STEM education in schools and how can we as academia get involved in it. The Symposium is being planned for mid Nov. – if you are available we would love to have you as one of the speakers at the Symposium. Dates are not fixed yet, but I'll let you know as soon as they are.

- Student at Lee University, Cleveland, US (06 November 2018): I am a student currently conducting research in my genetics course. I was reading your *Drosophila* metabolic pathway investigation. I am currently investigating *Drosophila* eye pigmentation in the Brown-eyed mutant. Do you have any research that you used that represents incomplete dominance with the brown, scarlet, and brownish red eye color?
- Scienteens Lab of the University of Luxembourg (04 December 2018): I am writing you in the name of the Scienteens Lab of the University of Luxembourg We are a young Student Lab, we celebrated our 5th birthday this year. We offer Workshops in Biology, Mathematics and Physics and welcome 1400 high school students from Luxembourg and the Greater Region each year. We are currently developing two new workshops which focus on the topics of model organisms and the effect of alcohol. Having some experience with fruit flies, I've decided that the fruit fly would be the perfect model organism to convey these topics to the students. During my research, I came across your wonderful site and the incredible work you do promoting *Drosophila* as a research and teaching tool. I would also like to take the opportunity to thank you greatly for making all you material available to the public. The University of Luxembourg does not itself conduct research on *Drosophila* and we therefore need to establish a new fly lab ourselves. As this is now easy task, I would be grateful If I could count on your support and expertise in this field e.g. getting feedback on the suitability of the equipment we want to acquire to set up the fly lab and the techniques used in the workshops. Furthermore, I would like to know whether you would be open to a visit of our team members to your lab during the next year, accompanied by a training session in regard to fly dissection and behavioural assays? This visit would be a great source of knowledge and ideas for our team. Thank you very much for you time and I look forward to hearing from you.

Teacher comments after CPD event:

- Absolutely brilliant. Will certainly be using the resources for science clubs in lessons, visiting schools. Everything!!' -- The associated experiments were simple and one could draw strong conclusions based on the results and connect to the theory -- Neuroscience was the highlight for me as it went into more detail than I previously understood with good gifs and images to model the concepts. -- I liked best the overall description of how *Drosophila* research can be applied to KS3 & KS4 curriculum as this was never something I had experienced at high school & with the lack of engaging biology practicals I found this very enlightening. -- The Principles of the nervous system session took a complex subject and provided me with a greater understanding as well as interest in the subject
- Our Vision: Understanding light and light perception lesson included a wide range of ideas that covered topics in all 3 sciences at a range of ability levels -- The Climbing Assay is most applicable for KS3 & KS4 teaching and could be used for all year groups to differentiate levels in a period of 1/2 weeks to develop knowledge of doing research with real organisms & data handling

- Teacher at Burnley College (03 September 2014): I would just like to say a belated a thank you for the summer school session I attended with you a few weeks ago, it was incredibly useful and hugely appreciated. I'm currently doing my planning for the upcoming A2 Biology and I was wondering if you had any resources/ideas to demonstrate monohybrid and sex inheritance, sex linkage as well as co-dominance, multiple allele genetic crosses as well as any data we can use to demonstrate the Hardy Weinberg principle.

6.4. Impact on other activities

- Science Curriculum Support Manager at AQA (19 June 2020): In the summer of 2019, Andreas Prokop, Sanjai Patel and Barinur Rashid visited the AQA office in Manchester to talk to members of the AQA science curriculum team about the 'droso4schools' initiative. We followed up this meeting with further correspondence which led to two outcomes that had an impact on both our schools and our examiners. The first outcome was that we were able to highlight these materials in our free termly science hub meetings. These face-to-face hub sessions run after-school at over 50 school venues each term and are attended by several hundred teachers, so we were pleased to be able to offer teachers access to additional learning materials set in a scientific context that they could use in the classroom. The second outcome came in November 2019 when Andreas and Barinur were able to present to the AQA A-level Biology senior examining team. They discussed with the examiners the scientific concepts underpinning the 'droso4schools' initiative, and the resources available for schools to access. It is important to AQA that we provide opportunities like these to our senior science examiners. The senior examiners are responsible for the live science assessments that we set for tens of thousands of students each summer, so it's important that they are kept aware of research developments and outreach programmes such as the 'droso4schools' initiative. This type of activity helps the examiners produce stimulating and novel question papers each year. We look forward to continuing our relationship with the 'droso4schools' initiative in the future.
- Teacher at the Universidad Nacional Autónoma de México (11 March 2020): I am a teacher of Genetics I, at Universidad Nacional Autónoma de México(UNAM), I frequently use your fly images. I am very interested in knowing your laboratory and maybe develop a teaching project. Could I visit you from July 1st to 30th? On the other hand, my daughter is also studying biology at Universidad Nacional Autónoma de México, she is very interested in participating with you in a neuroscience project or at least visit your laboratory, she also can visit you from the first to July 30. I am sending you a powerpoint presentation (Manejo de Drosophila_2020A.pdf) that I use in my classes. I really appreciate that you accept my visit, in that case, I can request support from my university to visit it.
- Creative Producer; Caring for Flies / artistic query:
31 July 2019: I found your contact details via the <https://droso4public.wordpress.com/contact> website, which I came across whilst looking online for advice on caring for flies. I'm Creative Producer on a theatre production which is playing in London in the autumn. The project (named: Even Fruit Flies Get Frustrated) is a contemporary staging in which the life of a woman is compared to the life of a fly. A live fly will be projected onto a gauze during the show, which leads us into the pathway of ensuring we can ethically catch and care for a fly during rehearsal and performance. After reading about your research on *Drosophila*, I wondered if you were available at all to speak on the phone / in person / offer some advice via email in how a fly would be cared for within ideal circumstances? I'm based in Manchester so also available to offer a coffee in a location of

your choice if that would be preferred. We'd really appreciate any possible signposting on this subject.

06 August 2019: Looking forward to seeing you at 2.30pm. A bit of info about the show: Perhaps you've heard of a study conducted by two researchers in the USA which blew air into tiny holes of a plastic box which contained fruit flies? The study showed that the air blown in blew the flies off their flight path. With this in mind, we're interested in how the female body is similarly tested on within contemporary medicine. The text of the show compares a fly's living experience to that of a woman, alongside a live projection of a living fly (caught and present on stage). The invitation to the performance of the show in London also has some information. In case it is of interest to you. Looking forward to meeting you later!



The Oxford Samuel Beckett Theatre Trust and
idontloveyouanymore
Would Like to Invite You to a Sharing of

**EVEN FRUIT
FLIES GET
FRUSTRATED**

ON FRIDAY
18TH OCTOBER 2019
AT
THE PIT THEATRE
THE BARBICAN CENTRE, LONDON

A fly's skeleton is on the outside. Their body rots from the inside out. Unlike us but so so like us. In this one woman/one fly production, idontloveyouanymore explore the lives of each, blurring the two to look at each passing moment, under the microscope, as fleeting, or as fragile as the heartbeat of a fly.

A spectacle. An experiment. An indulgence in life made insignificant. idontloveyouanymore present Even Fruit Flies Get Frustrated, a 30 minute sharing.

idontloveyouanymore is an experimental performance collective based in the North of England, exploring speculative futures, alternative modes of reality and the intersection between technology and the contemporary human experience.

We create work that is led by the battle and collaboration between design and text, and a passion for bringing technologically spectacular work to the places it often fails to venture.

TO RSVP
OR FOR MORE DETAILS
PLEASE CONTACT
ALI@IDONTLOVEYOUANYMORE.ORG



- PhD student at the University of Oxford (30 March 2019): I recently saw your article online about your *droso4schools* project and I think this is a fantastic concept and I'm interested in running some original artistic ideas past you. I agree that practical experimental work is key to the study of science, but, being a core subject, science in schools can often be overly focused on passing exams and attaining grades, resulting in the engaging, inspiring, and equally important practical aspects of the subject getting sidelined. I am currently doing a PhD at the University of Oxford, studying behaviour in *Drosophila melanogaster* and I agree that it is a perfect model organism to be used in school science lessons. I was privileged enough to experience a very high quality of science education throughout my school life, inspiring me to take the subject further. However, I am aware that not everyone is this fortunate in school science education. As both of my parents are teachers, having taught in a wide range of schools including the private sector, the state sector, and a free school, I have heard lots about the current state of science education and I agree that a more practical, hands on approach, whilst still being relevant to the curriculum, is essential. Whilst studying for my PhD, I like to relax through sketching and doodling, and started to draw fun cartoons of *Drosophila*, aiming at capturing aspects of *Drosophila* research that I've encountered in a fun and lighthearted way. My mum has showed many of my sketched to the pupils at her school and she tells me they find them really engaging. I've recently worked with her to design a *Drosophila* cartoon based visual illustration of the school's new learning objective policy. I've attached images of a sample of my sketches to this email, but a full range of my work can be seen on my twitter or Instagram account 'fruit flies like a banana'.
- PI at Champalimaud, Lisboa, Portugal (23 September 2017): I am interested in developing tools and curriculum for introducing *Drosophila* to schools as a way to study multiple biological processes using real experimentation. While I was searching the web I have discovered that you have developed very nice educational resources. My main idea

currently is to start a company that will among other things develop and tools that use *Drosophila* and other invertebrate model organisms in school education. In the past I have developed the flypad (flypad.pt) that I am planning to use as my first product that will allow to measure various aspects of feeding behaviour in flies. It will need to be redesigned to become more affordable first, but my experience is that there is a lot of interests in these kind of tools from the school STEM teachers. We have been using it extensively for school visits that are regularly scheduled in our institute (Champalimaud centre for the unknown, Lisbon, Portugal). I also presented in at the Maker Faire in Lisbon, and it was very popular (to my surprise) among 8-12 year old kids and their parents. Given your extensive interest in science communication I was wondering whether you will be interested in talking to me on skype. Looking forward to hearing back from you.



- [Kayleigh O'Keeffe @KOKeeffe12](#) 5 Dec 2018: During my final class (intro bio for non-science majors), I would like to give my students a list of twitter folks to follow if they would like to continue to engage with science. Who would you suggest? [#scicomm](#) [#STEM](#) [#sciencetwitter](#) [#phdchat](#)



Reply by [Suzana Ulian-Benitez @su_benitez](#): I suggest [@Poppi62](#) he has a great material on [#scicomm](#)



- [Suzana Ulian-Benitez@su_benitez](#)
I have signed up to teach a high school class about my [#drosophila](#) research, guess how excited I am to prepare my lecture based on [@Poppi62](#) [@ManFlyFacility](#)



- [Drosophilosopher 🦋 @HammedBadmos](#) - 17 Jul 2018: Following [@Poppi62](#) advice about a year ago. Am taking part in [@NC3Rs](#) summer school from tomorrow to friday. Great optimism for more [#Drosophila](#) advocacy in pre-clinical research. [#learningmystuffsgradually](#)
- [Senior Producerr at BBC Radio Science Unit](#)

07 February 2018: I am emailing with the news that unfortunately I had to make the decision to leave your segment of the Radio 4 feature 'Inside the Killing Jar' out of the final cut of programme. This was only done (along with other cuts I had to make) to get the length of the programme down to duration required for the radio broadcast slot. I do apologise for this and any disappointment you may be feeling. I should have emailed you earlier than this for which I also apologise – I went straight onto a World Service health show after finishing the Radio 4 programme and my attention got switched onto that. However, the compensatory good news (I hope) is that we will be making two ½ hour programmes for BBC World Service on the same theme as the Radio 4 insect programme and your interviews will be used in one of those programme – and at considerably greater length than they would have featured in the other programme. Those programmes will air in late March/early April in the World Service science feature slot 'Discovery'. These programmes will have much much bigger audience than the Radio 4 programme – an

estimated 25-30 million listeners worldwide. Discovery is also the World Service's third most popular podcast.

14 June 2018: The BBC World Service insect research radio programme (which includes you, Sanjai and Matthew) finally gets its airing next week, on Monday 18th at 20:30 BST. It also has a repeat at 05:30 BST the following morning. Here's the url for the episode page: <https://www.bbc.co.uk/programmes/w3csxqp4>.

- PhD Student at the Univ Manchester (16 March 2018): I was thinking about writing an article for the FBMH PGR blog about the fly facility and its outreach programme. I was wondering if I could link the droso4schools website and perhaps use some pictures from the flyfacility pages? Also do you have anything in particular you'd like me to write about?
- Droso4schools Placement student (22 November 2017): Following my viva I was asked if myself – and the droso4schools project – would consider a new outreach venture for gifted and talented students, only this would take place in Serbia. Could we have a meeting to discuss this proposal and whether it would be something that could be made possible? I am unavailable from the 30th of November until 13th of December so if we could meet up, maybe at a lunch time to discuss this further in the coming week then that would be great. I now have access to MSB so I should be able to come to the café if that's the easiest thing for you. Hope to see you soon,
- Senior Assistant Editor, The Hindu, Chennai:
21 November 2017: I am a science journalist with The Hindu, an indian daily. My colleague and I set a quiz everyweek for the publication The Hindu in School, a newspaper for schoolchildren. This quiz is also shared online later in The Hindu's website. For this week, we plan to make a theme quiz on *Drosophila*. We would like to source information from your website. I would like your consent for this... I look forward to your response.
01 December 2017: Our online quiz on *Drosophila* is up now... please find the link here. We have linked the answers to your website... <http://www.thehindu.com/sci-tech/science/the-hindu-science-quiz-november-28-2017/article21011246.ece>. Please do share the quiz if you like it., The Hindu, Chennai
- Collaboration with NC3Rs to promote the Replacement strategy (31 October 2017): It was lovely to meet you at the symposium yesterday and I very much enjoyed your talk. I think there are good opportunities for us to work together. We will discuss together, and it's probably useful for you to discuss with her too as she's manchester based, and we'll come up with a plan of action. From what we discussed you have a lot of ideas, and initiatives on the go. It would be good to work out what the priority areas are for you? Perhaps the www.flyfacility.ls.manchester.ac.uk/ website? So we can work strategically and prioritise activities.
- Regional NC3R Programme Manager (03 November 2017): Firstly, many thanks again for giving such a great talk - so much of the positive feedback I have heard of the event has mentioned your talk as a highlight. I think it would be a good start for you and I to sit down and decide on priority areas to begin with, and where you envisage NC3Rs support, and then I can discuss with colleagues to take things forward. -- see Section 6.5 for invitation that followed.
- "Fly Indonesia" collaboration between Dr. Firzan Nainu (Hasanuddin University, Makassar, Indonesia) and the Manchester Fly Facility (Faculty of Biology, Medicine, and Health/FBMH, The University of Manchester) to establish *Drosophila* research in Indonesia.
Firzan Nainu, Ph.D (Makassar, Indonesia)
27 October 2016: Greetings from Indonesia. I hope this email finds you in a great condition. First of all, please allow me to introduce myself. My name is Firzan Nainu and I am a lecturer in The Faculty of Pharmacy, Hasanuddin University, Indonesia. I have known your name and your exciting research and education contributions in the *Drosophila* field, since my PhD days in Japan. In my PhD days, I carried out researches using *Drosophila* as well

and I have published one of the study in the Journal of Immunology. In fact, to be honest, I am really eager to visit your laboratory someday and if possible, learning some techniques about *Drosophila* in your laboratory that can be applied in Indonesia. After finishing my PhD in Japan, I came back to Indonesia and trying to establish a *Drosophila* laboratory in my university. With the help of the Dean of the faculty, I have managed to establish a small *Drosophila* workstation. Using this, I am currently trying to promote the application of *Drosophila* model system to solve some biomedical problems in Indonesia. It is a fair task since most of the people in here are get used to work with mammalian model system. In fact, I believe only a small number of people are working with *Drosophila* as a model organism in Indonesia at the moment and perhaps almost none tried to promote biological education using flies. I have used some of the resources such as presentations and documents created by you and your lab to engage young students' curiosity about biology and to secure funding from some agencies in my country, Indonesia. The result, I was able to secure a research grant from my university and currently in the final selection for two research grants from my government. Using the grant, I am currently hosting eight undergraduate students and one master student that are now doing some basic research using *Drosophila*. Many more had come but unfortunately, my funding could not cover more people. Therefore, please allow me to offer my gratitude to you for creating such great resources and beautiful images and for sharing them online. It has helped me a lot to promote *Drosophila* work in my university. Next month, I am going to promote *Drosophila* research at a national level conference and I hope people in my country will give a positive response. I am sorry for taking your time to read this long email. It is the nature of people in my country to write long email when we are so happy. Thank you very much for your kind understanding (and patience) and I am sorry for any inconvenience that may be caused by this email.

- A visit to start the collaboration was supported by Hasanuddin University (total £2,180) and FBMH (£1,700); first deliverable was the [Fly Indonesia](#) website



- [Fly Indonesia @Firzan Nainu - 12 Aug 2017](#): Just had a chat with head of the lab. We will introduce [#Drosophila](#) research in the students' practical, formally this year :) [@Poppi62](#)



- [Fly Indonesia @Firzan Nainu 24 Aug 2017](#)- Replying to [@Poppi62 @ManFlyFacility](#): [@Poppi62](#), I am going to use all of your droso4schools resources for students practicals in Faculty of Pharmacy, Hasanuddin Univ.

06 September 2017: I would like to inform you that I am still working on translating your resources ... we have started to use *Drosophila* in the practicals. We will use the bang-sensitive flies in the experiment next week. I remember in the Science Discover Days with Sanjai, we shake the flies for a minute and those flies will develop seizure. But, I did not see the written protocol. Do you happen to have it? If yes, I will be happy to translate it right away. In addition, we are going to use the locomotor assay using the Droso4schools protocol available in the website. We included it in the practical book. I will take pictures of student enjoying the practicals next week and send them to you, if you like. Please let me know.



- [Fly Indonesia @Firzan Nainu 1 Nov 2017](#): Half of speakers in 3rd MIPS (<http://mips.farmasi.unhas.ac.id/>) will talk about fly research. First to Indonesians!!! [@Poppi62 @DrosAfrica @DrosDGRC](#)




- [Fly Indonesia @Firzan Nainu 29 Nov 2017](#): Happy Indonesian students!! Photo was taken after doing experiments using *Drosophila* (protocols provided by [@ManFlyFacility](#) and [@Poppi62](#))



- 16 November 2017: I am currently managing practicals for 2nd year students in my faculty. We just finished anatomy and physiology practicals using *Drosophila*. Number of students involved in the practicals are 142. Of ten practicals, we used *Drosophila* for three of them. The experiments were: 1) Basics of *Drosophila* anatomy and physiology using all of your resources (droso4schools website and G3 paper). 2) Learning nerve systems and problems in it. One of the practicals was using epileptic bang-sensitive flies. 3) Locomotor activities of organisms. We used *Drosophila* to show the age-dependent difference of locomotion in *Drosophila* and extrapolated the results and analysis to human. We have some pictures of students and my assistants conducting the locomotor activities comparing between young and old flies. In addition, we also did an experiment for the locomotion of flies under the influence of ethanol or not.
- Translation of our movie into Spanish: PI at the IBioBA-MPSP, Buenos Aires, Argentina): Last year I got an independent position and I am starting my lab now studying sleep in flies, a bit of behavior, some confocal and, of course, electrophysiology. I'm only starting, but it is exciting times! The reason I am contacting you is that a friend, who is very into science education, stumble upon the great material you've produced for schools and forwarded it to me (mocking me about my photo there, of course!). I think the website and movies are great (Oliverio, who is now 10 years old and very into science, loved it as well). I automatically thought that it would be fantastic to have that sort of material in Spanish, do you think it is possible to translate it? Maybe on the home page get a Language icon to choose English or Spanish? Do you think that may be something Manchester Uni would be happy with? And you? It would certainly open the material to big areas of the world. If you guys are on board I could do the translation of the text myself, then find some people to help with the technical aspects of the website and edition of the movies (welcoming all the help from you guys if you could manage some time and resources). I could also try to apply for some local funding to get a bit of professional help from here, I haven't applied for that sort of funding here yet, but it would be educational for me to give it a try.
- PI at the Institute of Biomedical Sciences, University of Chile: I hope this finds you very well. We met at the *Drosophila* meeting in Chicago last year,.This year our labs will be working with students in a meeting in Chile doing a *Drosophila* mini lab demonstration and we would love to use your educational movies "Small fly: Big Impact" to introduce the kids into the fly world. I was thinking into translate the audio or maybe just do a little talk on top of the video before the activity, perhaps use subtitles. In any case I would like to know about the permissions to use the videos and some of the images that you designed as an educational resource during this activity. I have to say that they are incredible!!! I hope you can help us with this, I believe it will be very helpful!! all the best,
- "Pequena mosca, GRAN impacto - pt 1"; translation of our first educational movie into Spanish (by Patricio Olguín and Daniela Medel, University of Chile, Santiago, Chile): -- [\[LINK\]](#)

- Translation of our movie into Arabic- PhD student at The University of Kansas; (04 October 2017): In the beginning of this year, I discussed with you the possibility of translating *Drosophila*: Small Fly, Big Impact videos to Arabic and you asked me to email you when I am ready to work on the project. I will be working on the project with the help from a postdoctoral associate at Weill Cornell Medical College. Both of us have experience working with model organisms. To start working on the project, we would like to meet with you over Skype to discuss the steps and ask few questions about translating the transcripts to recording and adding the voice-over to the original videos. If possible, please let me know what times and dates work for you to schedule the meeting. We are thrilled to have this opportunity to communicate the importance of model organisms to the Arab scientific community. We look forward to hearing from you.
- Translation of our droso4schools resources into Spanish by a student at the Centro Andaluz de Biología del Desarrollo, CABD, Sevilla
 - " The climbing trial: learning data analysis through real experiments with fruit flies"--
[\[LINK\]](#)
 - (30 October 2017): I am writing again because I would like to translate your KS5-Genes&Alcohol resources to use it like I did with the "Climbing Assay", if that is ok with you. It would be great to have the Adh mutant flies to do the experiments with the teachers here. Do you think it is possible? Thanks again for this great resource!! --
[\[LINK\]](#)
- Filming of one of our droso4schools classes at Loreto Sixth Form College by the Royal Society -- film was generated but then never publicised due to internal reorganisation of RS programs
- Reasercher at Cardiff University (17 September 2014): Here, Biology students can do as final year a "public engagement" project, where instead of lab work they produce materials for the dissemination of biological knowledge. I would like to tap into this resource to create a permanent website that would explain the past and present of *Drosophila* research and its impact (expanding one student at a time; students would also benefit from having a stable platform where to contribute; a bit like a student radio station). It seems to me that in the realm of science communication and *Drosophila*, you are the person from where to get advice. I was wondering whether you would mind having a chat about this and if that is the case, when and how (Skype? Phone? email?) would it be convenient to you.
- The droso4schools project was selected as a case study for the BBSRC Excellence with Impact award application in 2016
- Statements/ideas from our website were used in newspaper articles:
 - Article in the Observer (08 October 2017): [Six Nobel prizes – what's the fascination with the fruit fly?](#)
 - PI at Berkeley (12 October 2017): Just saw the Guardian article via the GSA link – congratulations and great work spreading the message! D
 - PI at Berkeley (12 October 2017): Thanks to the many of you that have sent nice notes about the NY Times Op-Ed piece. For those who haven't seen it: www.nytimes.com/2017/10/04/opinion/nobel-prize-fruit-fly.html?_r=0. I want to mention that this is one of the things that we had in mind when the advocacy committee re-started a number of years ago, after Sarah Palin. In particular we talked about 1). being able to react quickly to breaking news and 2). having ready, succinct resources available on-line to show non-experts the value of the fly in biomedical research. To give you a sense of 1). I submitted the piece after midnight, woke up to an encouraging note from the Editor, and fact-checked/revised between 9 AM and noon (all while driving rapidly to meet my son's school field trip in Northern CA). It was online 15' after I finished. With respect to 2). I was able to point the NYT Editor working on the piece to Andreas' Manchester Fly Facility pages, including the videos. I don't know exactly which ones she checked out, but they clearly had the desired effect. So kudos again to

Andreas!

- Impact on scicomm teaching -  [Sam Illingworth @samillingworth 11 Oct 2017](#): Discussed this paper today with @manmetuni MSc #scicomm students and they were very impressed with scope and resources provided! 🍌👍👏



- PI at the University of St Andrews (02 July 2017): how would you feel about me sharing this link with the whole CSHL course and asking the students for feedback? Would be a chance for you to get feedback from a lot of people and would raise profile of you and Sanjay and manchester fly facility at same time. Would also be a nice opportunity for our students to act as peer reviewers. sound ok?

6.5. Invitations

- Invitations to present at conferences (see 1.5)
- Assistant Editor of Gene, (17 July 2018): We are launching a special issue *Drosophila melanogaster* - a tribute to the legendary fly in Genes (ISSN 2073-4425) an international, peer-reviewed, open access journal of genetics and genomics that has a current IF of 3.191. Given your expertise in this area we wanted to extend an invitation for you to guest edit this special issue. --- Thank you very much for your prompt response. We understand your current time limitations, but at the same time we are pleased to see your interest in the proposed special issue topic.
- FBMH and FSE Researcher Development Officer, (Manchester; 29 June 2018) Invite to share public engagement/involvement experiences for Wellcome PhDs: I am running a public engagement training programme for the UoM Wellcome funded PhDs on Mon 9th July. To help bring engagement/involvement to life and to encourage the participants to take action, we'd like to introduce them to those who are actively involved in a range of diverse engagement/involvement activities. The aim is to have a panel of guest speakers, who would each have 15min to share their experience and insights of engaging people through 1-2 specific example of engagement/involvement activity. We would be delighted if you could be a part of this panel to share your experiences. The panel will run for an hour (13:00 – 14:00) and each speaker is asked to share: -- A brief summary of the activity/event/opportunity -- A brief summary of the audience -- What did you take away from the experience? -- Any tips/advice you would pass on to other researchers. Let me know your thoughts.
- Program Manager of African Population and Health Research Center, Nairobi (15 March 2018): I am writing you to see if you are interested in participating in a public engagement application around Cerebral Palsy. the African regional representative of Trend), is putting together an application to celebrate stakeholders meetings in Nigeria and Uganda. Since you have a profile in neuro and such an extensive experience in outreach and public engagement, I suggested your name as a possible team member. Looking forward for more opportunities to collaborate.

- Post-doc at the University of Sussex (21 March 2018): I'm a Post-doc in a lab at University of Sussex. I'm writing to ask for a potential collaboration with Fly Indonesia to run a science course at University of Hasanuddin with a focus on fly as a tool. I have been communicating with Firzan to run a "TReND in Africa" based science course and, in this process, we were suggested by the dean at University of Hasanuddin to ask if Fly Indonesia would be interested in co-organising a course. We think this is a great opportunity and we would be grateful if Fly Indonesia is on-board.
- Chief Executive at NC3R (16 May 2018): I am emailing to invite you to speak at a workshop the NC3Rs is organising in central London on 4 September. Each year the NC3Rs has a highlight notice across all of our funding schemes to encourage applications in specific areas that we consider strategically important to the 3Rs. We are preparing the highlight notice for 2019 and plan to launch this at the workshop. The theme is the use of non-mammalian multicellular model systems for 3Rs purposes.
- Head of fly facility at Bangalore, India (25 February 2018): I am heading the fly facility here in Bangalore. I am writing to you as we are planning to organise a course on setting up a fly Facility in collaboration with DrosAfrica. The course will cover general organisation, transgenesis, CRISPR cas9, FlyBase and some level of bioinformatics. We expect that the participants will come from Africa, India, and SE Asia and from this course we hope to establish a lasting network of fly community. We have interests in bringing flies to the Universities and there is no better person in the world other than you take guidance from. We are currently at the grant writing stage for this course that is planned for February next year. I am writing to you to invite you for this course. Please advise if you would be interested in and able to come to Bangalore for this 5 day course.
- Director, Engagement and Development of the Genetics Society of America (05 January 2018): I am in the process of organizing some events for the *Drosophila* meeting (April 11-14th in Philadelphia) and wanted to inquire about your interest in potentially leading a discussion during our Community, Connections, & Lunch event (description below). While I have several scientific topics available, I felt that you would be an ideal fit for leading a discussion on science communication & outreach. Goals for this event: (1) Provide greater visibility for mid-career scientists; (2) Create networking opportunities for early & mid-career scientists; (3) Foster a sense of community. Format: (1) Round table discussions (10-people per table); (2) 2-hours in length on Thursday, April 12 12-2pm. Published Event Description: Community, Connections, & Lunch - Do you want to re/connect with the fly community? To meet new colleagues and learn from stimulating discussions on topics you care about? Join us for lunch with moderated discussion tables on scientific, professional development, and other topics. All career stages are welcome - we want you to join the conversation! Lunch will be provided. Advance registration required. Fee: \$40. Limited attendance. Please let me know if you are planning on attending the meeting and interested in leading a discussion -- [\[LINK\]](#)
- Didsbury Scibar, Manchester (10 March 2018): I hope you don't mind me emailing you like this. Would you be willing to come and speak at our scibar? It takes place on the third Monday of each month starting at 6.30pm. This scibar has a dedicated audience who know how to ask great questions. Thank you for your time.

Organiser of the Didsbury SciBar (24 April 18): Thank you to both you and Sanjai for last night's Scibar. It was fantastic! I hope you get plenty more offers of public engagement.



Didsbury SciBar @DidsburySciBar (23 Apr 2018): Thanks to [@Poppi62](#) and his team for this evening's brilliant interactive talk. Next [#Didsbury #SciBar](#) will be on Mon 21st May [@TheAlbertClub](#). Details to follow - <http://www.didsburyscibar.co.uk/events>



- Deputy Director BSF (31 October 2017): Thanks for your talk I which very much enjoyed yesterday. You kindly agreed to talk to BSF staff so please give me some dates early December and I will book a room.
- Biology teacher at Haberdashers' Aske's Boys' School, Elstree, London (05 July 2015): Currently, I am working on a conference that would be held here for Year 10 boys next June. The conference is tentatively entitled 'Frontiers in Biology' and it aims to give the boys an understanding of the cut - and - thrust of research, and also a taste of exciting, dynamic current work that's being done. My HoD recently went to a group meeting at Westminster School, London and he was told that you do a lot of outreach work and that you come into schools to present on the use of Drosophila in research. He also mentioned that you have a mutant strain that goes to sleep when they are warm! I used to work at Cancer Research UK as a research scientist, and now I'm looking to engage and inspire the next generation of scientists! Most of the boys we have here take GCSE Biology, and a large number go on to careers in the field of Biology. Hearing talks from leaders in their field will be a fantastic opportunity. I was wondering if it might be possible to arrange for you to come and talk to our boys?
- Assistant Prof, University of Rijeka, Croatia (11 October 2019): Main reason why I'm writing is to remind you about your visit. I was convinced that I told you the date for the STEM symposium, but now that I cannot find the email I'm not sure I did. Sooo, it would be really great if you could visit on 15th of Nov - that's the Symposium date. However if you could afford time to arrive a day or two earlier, then you could give a talk at our Department, and we can have more time to talk and brainstorm. I should be able to arrange the accommodation for you here on Campus in guest apartment housing. I also have funds to pay for your flight, although I have to check with our accounts to see what's the procedure for reimbursement - do we purchase the ticket or you.

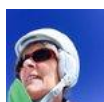
Part B: Comments demonstrating quality of resources & activities

7. School Visits, droso4schools, Teacher Seminars & Conferences (teacher comments)

- Teacher at St Johns Primary (26 June 2019): Thanks for the photos Andreas. They certainly illustrate how engaged the children were in the activities! Having had some time to reflect on our trip to Manchester University and Museum, we would like to thank all those involved in organising such a day. It was a large group to accommodate but the facilities and staff ensured that the children were able to work in pairs and had time to engage in all activities. I know the St John's children have been very impressed to learn that humans are so similar to fruit flies! The vast majority of our children have never been inside a university lab before, and they definitely enjoyed the whole unique learning experience. Similarly, although many of our children have visited Manchester Museum before, they thoroughly enjoyed being able to spend time there with friends and classmates. I'm sure the Spanish children found it to be a similarly successful experience, and we would love to liaise with

your team again on the next Spanish Exchange.

- Education consultant at CSciTeach (20 February 2020): My awareness of the work of the Manchester Fly facility was raised when I was working in a consultancy role supporting a colleague to organise a series of workshops for a group of school across Greater Manchester. At the time this work was part of my role as a Regional Development Leader for STEM Learning, and my focus was science teacher CPD. I am now retired. I attended a short workshop run by Professor Andreas Prokov and a teacher at Loreto College. The workshop was well developed (and well received by the 24 teachers attending) with a series of activities that teachers could trial with a view to using them back at school. This was only possible because of the preparatory work that included PhD students working closely with other teachers in their own schools alongside pupils. Thus developing an insight into the school curriculum, and how schools work. This aspect is a novel approach, and has the potential to provide greater impact on the work that schools do following outreach. I quickly realised that here was a model for teacher CPD that had two way benefits for both the school and the University. My next step was to develop a relationship with the Fly Facility myself to organise a half-day CPD session, where a group of 6 teachers from across Yorkshire and Derbyshire as well as Greater Manchester attended a more in depth experience where there was more time for explanations of the use of fruit flies as model organisms and the science supporting this, as well as the hands on practical aspects, and a visit to the Fly Facility. It is important for science teachers to reconnect with 'real' science, and the experiences provided are inspirational and non-threatening, whilst providing an insight into research methods which have the potential for great impact in modern medicine. The understanding and excitement generated can then be passed on to pupils back at school. All 6 teachers completed evaluations after the event, and said they "Strongly agreed" that the CPD was inspirational and was "relevant and useful. Whilst it is recognised that it is difficult to follow up CPD at a later date, 2 teachers did respond 8 weeks later, and reported that the CPD had a medium to high impact on themselves and their students. The science activities used are relatively simple, and could be replicated, with the Fly Facility also offering support with equipment, organisms and expertise after the event. These develop teacher confidence in what could be unfamiliar procedures and are important aspects of the outreach offered. My own previous experience of fruit flies was carrying out genetic crosses during A level biology so to see other examples of research was eye-opening. For example the use of flies to research into neurodegenerative diseases especially those brought about by ageing, with the potential for greater understanding of brain disease seen in Alzheimer's. Also the work being done on alcohol addiction. At the time of these workshops (2015) there was a relatively new English National Curriculum, it should be easier now to make more explicit links to this, but not to overlook the potential of linking overtly to aspects of 'Working Scientifically' for example opportunities for collecting and analysing data; mathematical and simple statistics and use of sampling skills. Teachers could be encouraged to use the opportunity to have ethical discussions around the use of flies for research as there are few examples that are safe to use in the classroom with all pupils. There is also potential for application of ideas in unfamiliar contexts, an area that is a challenge for teachers to develop.



- [Linda Needham @NeedhamL56](#) (Retweeted Andreas Prokop, [18 Jul 2018](#)): Great work going on with [@Poppi62](#) and the [@ManFlyFacility](#) take a look it's not just genetics [#biology](#) [#ASEchat](#)
- Teacher at Scarisbrick Hall School

29 January 2018: I am just planning ahead and I wondered as this years event was such a success, would it be possible to run exactly the same event in July next year, involving the partnership schools? The students enjoyed it so much, I was hoping we could get a date

planned in. Look forward to hearing from you soon. -- two school events were arranged for April and July 2019

15 November 2018 (following school visit to FBMH): Great to see you again yesterday, the students really enjoyed your brief lecture, being stretched in their knowledge and understanding, leaving them wanting to explore this area more. They were amazed how the fruit fly has led to so many discoveries and how it can be used to as a model for human disease theories, so thank you. ... We must also try and get a date booked for the fly day at school, I will look on our calendar and suggest some dates of that is OK with you, it will most likely be early July again.

05 July 2018: Thank you so much for organising such a fantastic day yesterday, all students were 'buzzing' on the way home about going to university in the future and all that it can offer. They really enjoyed all aspects of the day especially talking to the students who showed us around and the medical students, that peer to peer interaction was so important as they could ask the questions they wanted away from an open forum. They thought Manchester was a fantastic place to come and study and all are interested in visiting it again on the university open days. All enjoyed listening to both Mahesh and Andreas, as they showed them the great enthusiasm that the lecturers have for their subject and the passion to know more, inspiring them in their own studies.

11 February 2020: The UoM fly day's on 4/7/18, 25/4/19 and 4/7/19 were incredibly inspirational to both teachers and pupils, linking what is taught in the classroom to everyday life such as aging, epilepsy and alcohol abuse making science relevant. Being able to complete practical activities to demonstrate these concepts using equipment that is not available in school and the use of flies, opened students' eyes to studying at university and the role of research scientists. Over 700 students from 8 schools in the North West (Sefton and Lancashire areas) over the last 2 years (2018-2019) have been influenced and all teachers (10) involved have seen the benefits back in the classroom, through a better understanding of genetics when answering GCSE questions and a greater enthusiasm for the topic. For teachers it was a good opportunity for CPD and provided them with a range of examples that could be used to support their teaching and stretch and challenge within lessons. Using the flies, was a completely new and novel to all involved as they do not have the opportunity to use animal models in practical's, other than woodlice in choice chambers within the school environment. Seeing how real-life organisms reacted in the experiments they completed and also being able to observe the variation for themselves down them microscope rather than from photos in a book or worksheet, provided a far better learning experience and improved the understanding of key concepts. Even though some activities stretched the learners beyond the curriculum, the students were keen to take on the challenge and were able with confidence to answer questions asked by the UoM staff, showing a good understanding of complex science and an ability to apply the knowledge they had learnt. The development of this key skill, being able to 'apply knowledge' is key to the new style of GCSE and A level questions and all the activities promoted the enhancement of this key area, which is hugely beneficial to the students. From this day, 6 teachers have included the fly when teaching genetics, as way of getting students to apply their knowledge from the basic human examples usually given such as tongue rolling and non-tongue rolling to more complex ones centred around the fly. 68 students from these events have now expressed an interest in studying science further at A level or University and for 22 students it has confirmed this is the pathway for them. The 'hands on experience' and the inspiration from working with Professors and PhD students, who are hugely passionate about their area has been key in this process. I would hope that in the future this outreach could continue, and we could go on to inspire more students into a career in science



- [St John's RC Primary @St Johns RC 17 Oct 2018: @ManFlyFacility](#) Our year 5 & 6 had a fascinating day today learning about the fruit fly, mutations and evolution. The level of brain power used by these children today was astounding. Thanks [@Poppi62](#) for organising a superb day of investigation. #superflyguy



Responses to CPD event in January 2018:

- Teacher from Sidcot School (26 January 2018); in response to a CPD teacher event the previous day):
 - Great to hear from you - it was such a wonderful day. Puts a smile on my face when I think about it. I am looking locally to run a day of lessons across the key stages in a local school (East Anglia) I will be in touch as and when this happens. In the meantime, could you let me know your lead time for the flies and the dead staged ones. Thanks so much
 - Thank you so much for yesterday, it really was inspiring and also great to meet and network with other teachers also interested in the flies. I attach some thoughts (for ease of reading) following on from the final discussions and hope these are of help. With best wishes for a fruitful future !
 - Thank you so much for inviting me to Thursday's excellent CPD day on fruit flies - it was both stimulating and thought-provoking ! It was so good to put a name to a face Sanjai ! Please thank all your team. I have been thinking about how we teachers can help with your outreach and, firstly, let me thank you for approaching us, chuffed, really ! There are very few interesting biological experiments at GCSE/A-level, and as the same topics (but scaffolded) are developed from KS2 through to KS5, students can be bored by the time they get to GCSE let alone A-level. Also, I know from experience that students love using real biological specimens rather than the abstract. When I teach with the fruit flies I often also run a forensic lesson where students utilise the length of larvae & pupae to work out time of death and criminality of a scene but I use coloured pipe cleaners instead of real maggots, and I can tell you that although they enjoy the intellectual aspect of solving a crime, they get much more excited by the fruit flies! Your current resources are in very good shape, and with some tinkering, I believe could develop into a wonderful package to present to schools. The suggestion at the meeting was the climbing assay to start with, which is a good idea. However, I just wanted to give you some food for thought:
 - I don't see how the fruit flies can be utilised for the GCSE prescribed practicals, however, there are distinct possibilities for the A-level (esp. AQA); there may also be possibilities for the current BTEC Level 3 sciences. If these prove popular, the exam boards may consider fruit flies for the GCSE prescribed practicals when the curricula are reviewed in 5/6 years' time;
 - Maths is the key outcome for GCSE and A-level sciences, so I would recommend ALL experiments (esp GCSE) target these (I attach the government's GCSE required content - Appendix 3), and you sell the packages

as an exciting, innovative and interesting way of meeting scientific maths requirements as well as biology;

- schools are very short of funds therefore I would recommend a suite of experiments suitable to each KS so the flies can be used in many different lessons;
- funds - 6th form colleges could justify costs better if the flies were used for both A-level and BTEC;
- the climbing assay was suggested for use across the three Key Stages, and I think this would be a good starting point. However, students will not want to do the same experiment again when they go up a Key Stage so I would suggest you aim long-term for different experiments for each Key Stage;
- teachers are incredibly busy so a "complete package" (ie. powerpoints, worksheets etc, and technician notes/training) will get you a much bigger take-up.

With regard to your application to Wellcome:

- emphasise that the fly experiments are an exciting way for students to achieve the Government's scientific maths outcomes as well as the biology - Maths & English are so key at present;
- I suggest the sabbatical teacher would need state 11-18 age teaching experience - they can liaise with 6th form college, independent and primary school teachers for their input;
- as well as a teacher, perhaps also ask funding for:
 1. an apprentice to breed and ship the flies (you may be inundated - expensive to use uni staff) and help with outreach (teaching and/or instructing school technicians/teachers). Stress the apprentice will come from a disadvantaged background with a Level 3 science qualification (ie. BTEC), and you and Wellcome will tick lots of lovely BOXES !
 2. Outreach funding for primary schools in disadvantaged areas - again emphasising the maths possibilities in an innovating, exciting way that will generate enthusiasm for science; and/or (if this funding already comes from somewhere else):
 3. Equipment used on outreach to be given to the primary schools (those lovely small microscopes would generate a lifelong enthusiasm for science!)

Whilst you are deciding about the Wellcome application and if to go ahead, perhaps I might be able to be of help with primary outreach. I have delivered science days to primary schools (usually with a geological theme, but can change!). I have several primaries locally (East Anglia) that would meet the pupil premium requirement (my lovely local one has 50%!). If this is of interest, lets chat. I would need to be paid for the day, however, so the funding from your source would have to include this. And if they could be gifted the little microscopes as well - wow! Again, thank you for such a wonderful day. It was well worth the expense of travelling and the overnight stay several times over.

- Teacher at St Christopher's Accrington (26 January 2018): Thank you for the excellent Fly day. It was great to get involved again. I would like to ask teachers in our next department meeting to get involved in using the drosophila schools resources. Thanks again for making us welcome.
- Teacher at Birkenhead School: This was an excellent day. Thank you very much for providing it for us. Online resources are excellent. You should set up a focus group of A level Biology teachers to adapt some of the practicals and advertise them as fulfilling the CPACs in the required practicals.

- Associate Dean, Head of Science Faculty, Head of Sixth form, Scarisbrick Hall School; 29 January 2018: Dear all, I am sure you will all agree that the CPD at Manchester University was fantastic on Thursday and we all came away inspired.
- further statements from evaluation form:
 - 'It was thorough and very informative. I hope to maintain a link to allow our students to benefit'
 - 'Excellent all round. Thoroughly looking forward to having a go!'
 - 'No the day was very interesting and inspiring. It was also delivered extremely well.'
 - 'Activities are much easier to use/do then I thought. Would definitely give wow factor to some lessons to give further understanding and support data analysis (fly climb)'
 - 'Potentially excellent. Good how experiments last for several weeks- like a mini research project for the pupils. Also, most of the lessons with flies provide a good synotic opportunity'
 - 'Absolutely brilliant. Will certainly be using the resources for science clubs in lessons, visiting schools. Everything!!'
 - 'Will try to incorporate some of the videos into the teaching sessions. I like the activity at beginning where you had to identify which type of flies could be seen under microscope.-will consider the other teaching material on nervous system and visual perception'
 - Teacher: I was extremely overwhelmed by most of what you said. Afterwards I asked how you knew that there were over 50 different microtubule motors and you said that if I emailed you, you would send me one of your articles. So here I am emailing and asking for your article! I was amazed at how much research have involved *Drosophila* and how similar our genetics are to what people consider to be pests. I look forward to your reply.
- Evaluation sheet comments:
 - Principles of the nervous system- The associated experiments were simple and one could draw strong conclusions based on the results and connect to the theory
 - Neuroscience was the highlight for me as it went into more detail than I previously understood with good gifs and images to model the concepts.
 - I liked best the overall description of how *Drosophila* research can be applied to KS3 & KS4 curriculum as this was never something I had experienced at high school & with the lack of engaging biology practicals I found this very enlightening.
 - The Principles of the nervous system session took a complex subject and provided me with a greater understanding as well as interest in the subject
 - Our Vision: Understanding light and light perception lesson included a wide range of ideas that covered topics in all 3 sciences at a range of ability levels
 - The Climbing Assay is most applicable for KS3 & KS4 teaching and could be used for all year groups to differentiate levels in a period of 1/2 weeks to develop knowledge of doing research with real organisms & data handling
- Collaborating teacher on droso4schools; Trinity CoE High School: Josh and Sophie worked with me at Trinity for one term each. They acted as teaching assistants in lesson, working with children of all ages and abilities. They worked with special educational needs, Year 7, year 8, Year 11 and Year 12. In year 11 classes they worked with a bright top set GCSE Biology group and also an all-boy GCSE science bottom set. Each of these classes provided challenge for Josh and Sophie, which they managed to combat, building positive relationships with the students. They supported both individual students and small groups to allow differentiation within the class room. With Year 7 and year 8 they started to deliver lesson starters and plenaries, teaching small parts of lesson to whole classes.

Josh and Sophie were at their most effective with our Y12 AS Biology classes. Their current, up to date knowledge of their subject area's proved to supplement greatly class teaching and discussions. At all times Josh and Sophie were enthusiastic and engaging with our students and on occasion made the expectation on them for independent learning once at University very apparent to the students.

Their experience in the class room led Sophie and Josh to develop lessons that are relevant to the curriculum being studied, at the right pedagogical level for the students to whom the lessons were aimed. They were able to learn from their discussion with myself and other teachers how to scaffold lessons so that learning is constructive and successful. Most importantly they were able to create lessons with clear learning outcomes that engaged students in research beyond the classroom within which they may play a role themselves in the future. They opened a world of scientific knowledge, research and excitement to our students from which they had previously been excluded.

- Teacher at Manchester Grammar School (02 February 2015): Thanks again for running such a brilliant session for our brightest Sixth Form students this evening. It was an absolute pleasure for me as a teacher, and I know that the pupils who attended were hugely stimulated; your session has generated a fantastic range of potential follow up enriching activities for them. I cannot think of a better recruiting tool for the University of Manchester, nor for the Life Sciences in general. The multiple experiments the pupils took part in were pitch-perfect, and I'm looking forward to seeing how they will process their data over the next week; I'll send you more feedback after our next session. As a former occupant of the Smith Building, I know that outreach work can be one of the less valued areas of academic activity within universities, so I took the liberty of copying in Martin Humphries, to ensure that he is aware of the stellar work that you are doing in providing low-cost, stimulating experimental resources for schools: well beyond the bog-standard Mendalian fruit fly investigations. As we discussed, a copy of your PowerPoint would be most useful in following up the session with our pupils. I will direct the lads to your excellent Fly Facility website, and our Biology teaching staff to the excellent resources you have uploaded onto www.figshare.com. With best wishes for your continued excellent work – in and out of the lab.
- Vice-President & Dean, University of Manchester (02 February 2015): Many thanks for copying me in to this email. I'm delighted that Andreas' session was so well received, and you can rest assured that his contributions to public engagement are well known to me and very, very highly valued!
- Teacher at Cheadle Hulme High School (11 July 2014): I'm really happy with how the day went. I think the genetics crossing exercise was potentially one of the most useful but the level of language and difficulty was perhaps not what the students were used to. I think the 3 main activities and the lecture were absolutely fascinating. I was wishing that I had no responsibility on the day so I could just join in! Thank you very much to all of your team, we really appreciate all of your efforts. Inspirational!!
- After our school visit to St. John's RC Primary (05 April 2016): Thank you so much for preparing and delivering such an exciting interactive lesson yesterday. The children enjoyed it so much and we really appreciated it. The Year 5 Team



- Hayley Monk (Senior Technical Operations Manager, University of Manchester) – after Priestly College visit: Thanks again, Sanjai, that was great. They were quite a tough crowd up to that point but you really engaged them and I've been asked specifically what degree they can take to do more fly work!
- Teacher at Manchester Grammar School (18 May 2017): I have heard great reviews from the boys about Science Day. They seemed to really enjoy the sessions you ran. Thanks again for giving up your time to come and run them with your colleagues.
- Second Teacher at Manchester Grammar School (19 May 2017): Just wanted to say a big thank you for coming to help with science day! I know Dan has had lots of positive feedback about the fly workshops from both students and teachers, and it was great to see you guys again. I know he was also most impressed with your set up and material for the day.
- Teacher at St. John's Primary School 05/04/2016): Dear Mr Prokop and Mr Patel, I'm just writing a quick note to let you know how much we appreciated having you visit today. The children enjoyed it immensely. We know how busy you both are so it was incredibly kind of you to support the children with their learning. All the children have mentioned how much they enjoyed the slides, videos and worksheets you brought with you. I can't imagine what time and effort went into creating them! They have all written in their evaluations that they would have liked more time with this activity. Luckily you anticipated this! You can't imagine how thrilled they all were to discover that you had left the microscopes and slides behind! We also look forward to logging any changes in our larvae over the next few days.
- Teacher at Cadbury Sixth Form College:
January 2015: I am contacting you to see if there would be any possibility of your team coming down to Cadbury Sixth Form College, Kings Norton, Birmingham, to run a one day workshop. We teach OCR A level Biology. Next term we will be looking at Genetics and in particular we thought it would be a fantastic idea if you could bring to life dihybrid crosses using *Drosophila* for our students and if possible to include a section on epistasis. This comes from 5.1.2 Meiosis and Variation, outcome (h), (f) and (g). I can forward the syllabus and any other information you would like. We have 66 A2 students and 25 BTEC Level 3 second year students, who would also benefit from the day as they study Unit 18 - Genetics and Genetic Engineering in the second year. I attended a STEM day with you in July this year and really enjoyed the *Drosophila* workshop. I remember at the time that it was said that you were happy to visit colleges. Any help would be fantastic as I think this is an area that you would be able to really excite our students about. Please let me know your thoughts.
05 May 2015 Yes, we had a fantastic day last half-term. The students really enjoyed it and the genetics team were fantastic. Thanks for your help.

8. School Visits (a selection of the pupil comments)

8.1. Extracurricular school visits

- Teacher at Scarisbrick Hall School (20 December 2019): I hope you are well and I am sure looking forward to a well earned break over Christmas. I have just heard from Roz that you are unable to run the fly day in the summer as in previous years. Can I just take this opportunity to thank you for all your work you have done with our school. It has been highly successful and many students talk about the experience they had on these days. It has made teaching genetic in particular much more accessible to the students as they have had real life examples to refer to when we talk about the fly. I know many of the schools who attended also really valued the experience the students had and how it has awakened an interest in studying science further in their students. If there is any chance you would be able to work with our school in the future again, it would be much appreciated as it has such a lasting impact on our students.
- Teacher comments after the Scarisbrick Hall School visit (04 July 2018):
 - Teacher at Scarisbrick Hall School: Students ... chatted all the way back to the buses about what an interesting day they had and how they wanted to know more. ... it really does make a difference to students at this age seeing how the fundamentals they learn in school are applied to science and medicine in everyday life and at university. We need to inspire this generation to become our scientists of the future and I certainly felt we managed to get the students thinking down this pathway. ... It would be great if we could run a similar event next year
 - Teacher from Christ the King School (Southport): Pupils ... commented on how interesting it was to see some of the principles they had learned in class in action. The staff from Manchester University delivered really challenging information in a clear and approachable way.
 - Teacher from Meols Cop High School (Southport): My pupils genuinely loved the event – they got to experience hands on what it's like to “be a scientist” and the opportunity to work with living organisms in a hands-on way, performing their own ‘mini-experiments’, was extremely engaging for them. I have already had pupils asking about the different “types” of scientist ... and they loved seeing the bigger picture as to how laboratory research can impact human quality of life. It linked brilliantly with practical-based questions in the new GCSE specification, and I really think it's inspired pupils to take a Science A Level. Please run more events!
 - Teacher from Up Holland High School (Wigan): The pupils from Up Holland thoroughly enjoyed the workshops & hands on experiences using the fly's to demonstrate some, usually quite complex theories. I also hosted our West Lancashire collaborative meeting this afternoon and would like to pass on that all of the schools that attended provided feedback that the pupils had really enjoyed the experience offered.
- Pupil comments:
 - ‘The neurobiology was the most interesting as you got to see the mutated flies. It was really interesting and gave a good insight into what university is like’
 - ‘I think it is very important to use the flies, because it can help the scientists discover how we work, and find cures to disease.’
 - ‘I think it is a key part in scientific research and is very efficient way to collect information about genetics’.
 - ‘Yes, useful to both my course and has stimulated my interests’.
 - ‘It helps develop our understanding of human biology’

- 'I am fascinated and want to learn more'
- 'It was very interesting and I learned a lot- I never knew that fruit flies had a similar neurone structure to humans'
- 'It was good and inspiring activity and I have learnt lots of new things'
- 'I thought it was good because I got to learn how flies are useful and more about the nervous system'
- 'They are very useful in finding out about the effects of aging'
- 'They are really useful in understanding genes and how they affect us'
- 'Essential to future understanding of human disease'
- 'They are simple organisms with similar body plans to us there excellent specimens to use in order to research genes and drugs'
- 'Today has provided a very interesting insight into how flies are used in research'
- 'The session on the nervous system/neurobiology links into topics taught later in the A level syllabus'
- 'My biology has been helped by studying this course, especially in genetics and neurobiology'
- 'It was very interesting to see how nerves can affect memory and to understand how different factors eg light affects behaviour'
- 'This will help me in my science and triple science class'
- 'The genetics about flies was helpful to see other experiments linking to genetics at biology A level'
- 'It was useful learning about the nervous system which we learn in Yr13'
- 'I enjoyed the day and saw it as extremely interesting'

8.2. Within droso4school project

- 'I found the help really beneficial in neurobiology as I didn't understand the topic beforehand'
- 'Josh has had a very positive impact on my lessons as he provides an alternate/more understandable answer on occasions'
- 'Josh was very helpful during the lessons as he understood how to explain the work to students at our level' He also helped those who are interested in studying Biology'
- 'The placement students explained things very well in lessons and I understood what was being taught fully'
- 'They were very helpful because they could help with A level syllabus as well as answer relevant questions about University'
- 'Josh was very useful in lessons I found his explanations very clear and he greatly improved my understanding. I found that explanations given by Josh and Sophie to be more memorable and simple to understand'
- 'I think they were very helpful and often clearer than the actual teacher'

8.3. School Visits (Pupil reports and drawings)

- Cheadle Hulme High School Reports ([PDF](#))
- St Christopher's Pupils Reports ([PDF](#))
- St Johns' Pupil Reports ([PDF](#))
- Manchester Grammar Junior School Reports ([PDF](#))

9. Online Resources (Teacher comments)



- [Pete Sanderson @LessonToolbox](#) - [4 Sep 2017](#) (about the fly Scratch game): Learning the life cycle of fruit flies as computer game via [@Poppi62](#) <https://scratch.mit.edu/projects/74443210/> ... #asechat #ukedchat



- [Rose Edmondson @RoseEdmondson5](#) (trained secondary science teacher looking to move to primary teaching) 15 Jul 2017, replying to [@Poppi62](#) [@LynneBianchi](#): Fantastic idea- I absolutely LOVED studying fruit flies and first discovered them at UofA in Canada- would love to bring them to my class 😊
- [Teacher at Merchant Taylor's School, Crosby \(07 November 2014\)](#): Would it be possible to order some more flies from you? I need about 50 wild type males (long wings) crossing with 50 vestigial winged (females) and the reciprocal? Many thanks for the flies and food you sent. They were great.
- [Comment from blog \(28 February 2017\)](#): very useful for teacher to explain to students would appreciate it can be downloaded for teaching purposes only thanks to the team for commendable work.
- [Head of Science at Nottingham University Academy of Science and Technology \(02 September 2017\)](#): The website and outreach you have set up is amazing and the accompanying materials look great- well done and please keep it up!

10. Online resources (comments from other researchers)

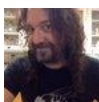
- [Lecturer at Boston University \(26 July 2019\)](#): I am a new lecturer in the Undergraduate Program in euroscience at Boston University and am interested in incorporating *Drosophila* into a systems neurobiology laboratory course and very interested in resources provided by your group "droso4schools".
- [Assoc. Professor of Biology at Stockton University \(26 June 2019\)](#): I can't tell you how much I enjoy (and use) your *Drosophila* resources. I'm an old chicken geneticist, who has moved on to teaching Genetics (nearly) full-time at a small liberal arts college; and have been using *Drosophila* in our lab sections to do a variety of crossing/breeding experiments. One thing I didn't notice on your website was a way of anesthetizing the *Drosophila* for phenotyping/counting/breeding (other than the ether bottle pdf)... so... thought I'd share this video with you. We've been using ice for the last 2 years to great advantage!! <https://youtu.be/0tsrF6WdD84> In any case, thanks for all the hard work and wonderful ideas!!
- [Researcher at the University of Salento, Italy \(22 July 2019\)](#): I am wondering if I can translate in italian your wonderful movies (Why the fly 1 and 2) and use them for my lessons. If the answer will be positive I can share the movies with you. It is difficult for all the young students follow the english version of the movies, they always miss something. If you have rules for this request, please let me know. This is just my first contact.
- [Researcher at the University of Barcelona \(22 July 2019\)](#): We are now designing a new video for our second year Genetics students. We would like to have 2 videos, a more basic one and a second, more advanced. Both about 5-6 min. The idea is they serve to introduce *Drosophila* Genetics to our 2nd year students. We have been looking through your videos and it would help us a lot if we could use some of your material. Is this possible? For instance some of your cartoons and animations. Of course, we would share our video with you and we would acknowledge you! Let me know.
- Comments on our new [Lesson 6 resources](#) on life cycle and evolution for primary schools:



- (1) [Andrew Spracklen @AndrewSpracklen \(10 Sep 2018\)](#): As usual, [@Poppi62](#) and the folks over at Manchester Fly Facility are putting out some top-notch resources for the classroom and beyond!



- (2) [Anne-Claire Jacomin @acjacomin \(10 Sep 2018\)](#): Awesome docs from [@Poppi62](#), certainly handy for teachers or anyone with interest on the topics. Very didactic and great illustrations! [#teaching](#) [#biology](#) [#sciences](#) [#scicomm](#)



- (3) [Eric Spana @EricSpana \(10 Sep 2018 - commenting on Lecture 6 online page\)](#): Love that wing expansion video! ;-) Seriously, that's a great site! Well done!

- (4) [Prof at the Texas Tech University \(04 November 2018\)](#); in response to sending the [primary school resources](#): It's masterful, as usual. I love your animations! & your clever graphics. Very clear & engaging! The experiments are cute. I love your old-young race. Good illustration of aging. Thanks for doing all this! It's a great public service. It should provoke interest. We need more devotees!



- (5) [Dr Erica McAlister @flygirlNHM \(24 Jan 2019\)](#) Wow - just having a quick skim and it looks amazing!!! - Yes - i think its great. I am going into some primary and secondary schools and if ok by you, id like to crib some of this. Very nice and simple method for engaging! thank you Andreas! - hey [@amentsoc](#) [@Buzz_dont_tweet](#) [@RoyEntSoc](#) - have you seen this?

- [FBMH_CentreForPPIE @FBMH_PPIE 29 Nov 2017](#): FBMH_CentreForPPIE Retweeted and commented: This is great to see! Congratulations and thanks to [@Poppi62](#) for leading such a valuable project!
- [Anatomist, editor@PLOS | BLOGS \(12 November 2018\)](#) in response to sending in the [Manchester Fly Facility blog post](#): I really like this piece, and want to publish it at PLOS SciComm. ... Thank you again for your high quality work, but in writing blog pieces, but especially in the scicomm and outreach that you're doing. The world needs more people like you right now!
- [Rev Edu \(16 November 2018\)](#): Thank you for the interest in [our paper](#). The 'droso4schools' project you developed and investigated is a wonderful communication channel for connecting students to the world of science. Do you occasionally go to education conferences, such as the NARST conference? I will be happy to meet with you and discuss this interesting and important topic.
- [Radiant Holistic health Academy, Bangalore, India; \(12 September 2018\)](#); commenting on the ["droso4schools/Organs" page](#): Great article. Very well put together and this is really helpful and reliable. Thanks for sharing this and keep up the good work. Very much appreciated.
- [Lecturer in Aston Univ., Birmingham, UK: Fly stock for Genetics Practical \(13 September 2018\)](#): I am running a first year undergraduate genetics practical for the first time this year – I am trying to get hold of a suitable stock to demonstrate a dihybrid cross – so something like e vg. Would you happen to have this or something similar that you could send to me? -- Many thanks Andreas! I have seen your undergraduate resources – they are super useful and I will definitely be using them in my classes this year 😊



- [Andreas Prokop @Poppi62 \(27 Jan 2019\)](#): Our educational [#Drosophila](#) movie now available in [#Arabic](#)! Thanks so much to [@haifaalhadyian](#) and her brilliant team for the excellent work!!!!!!



- [Mohammed A. khallaf @khallaf13 \(29 Jan 2019\)](#): Very Beautiful! Now I can tell my parents what I am doing :) :) Thank you for making this!!



- [Didem P. Sarikaya @biodids \(Jan 27\)](#): This is amazing! Great job Haifa!



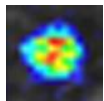
- [Haifa Alhadyian @haifaalhadyian \(Jan 27\)](#): Among the many outreach projects I worked on, this project holds a special place in my heart because I got to communicate my passion for science in my native language. It was a challenge, but totally worth it! (1/3) - This project would not be possible without the help from two amazing scientists: [@faten_taki](#), a postdoc associate at Weill Cornell Medical College, and [@faionah88](#), a recent Master's graduate in Immunology and Molecular Biology from King Saud University. (2/3) - And many thanks to [@Poppi62](#) for giving us the opportunity to translate the movie to Arabic. (3/3)



- [Gaius J Augustus @gaiusdivifilius \(24 Jan 2019\)](#): Yes! 🌟 Very simplistic, but adorable & totally enjoyable! I really liked the videos and the game! Thank you so much for sharing them with me. If you're ever interested in doing more, I'd love to work on a *Drosophila* project! Some of the coolest science out there (sorry C elegans)



- [Hannah Davis @hedavis_msc \(23 Jan 2019\)](#): Hm, seems legit. Source: [@Poppi62](#)'s excellent website, <https://droso4schools.wordpress.com/organs/>



- [FlyCalcium @GaitiHasan \(14 Feb 2019\)](#): FlyCalcium Well written with clear facts and arguments



- [Haifa Alhadyian \(@haifaalhadyian\) 13/04/2018](#): I had an amazing conversation on science communication with [@Poppi62](#). So excited for future projects with [@ManFlyFacility](#). Thanks [@GeneticsGSA](#) for bringing the great minds together! [#Dros18](#)



- [CSHLflyneurocourse @CSHLflycourse 5 Jul 2018](#): [#CSHLFLY18](#) [#AlumnioftheDay](#) Andreas Prokop [@Poppi62](#) was a student of [@CSHLflycourse](#) in 1991. Today, he is a professor at [@OfficialUoM](#) where he studies development/aging in [#Drosophila](#) He also runs the [@ManFlyFacility](#) which promotes outreach, education, & research in the fly! 🙌



- [Suzana Ulian-Benitez @su_benitez 15 Feb 2018](#): I think you should not doubt the

power of what you are doing. 6 year is not a long time, your impact will be seen many years ahead. Also, remember you are setting an example for us, young scientists. Please, do not stop. :)

- Lecturer at Hampden Charter School of Science, Chicopee (18 December 2017): Hello, Do you have the classical genetic lesson plan available?
- Vitreoretina and Uvea Consultant, ICARE Eye Hospital, India (24 Decemvber 2017); email in response to a tweet about the vision resource): [Great job!!!!](#) 🍌🍌🍌🍌🍌🍌 Thanking you,



- [Julie Fooshee @ocaptmycapt](#) (Science communicator, Rhode Island, US; [14 Dec 2017](#); Twitter thread in response to Charlotte Blackburn's drosophila4schools blog): One of my MSc classmates (Charlotte) talks shop about building meaningful relationships with scientists to create engaging [#scicomm](#) in this blog post on her work w/[@ManFlyFacility](#) Must read. - I think it's also important to note here esp considering my last big [#scicomm](#) thread — but Charlotte was a vertebrate biologist and was able to learn and enthusiastically educate about fruit flies. - an argument I hear far too often is that the research people are doing is TOO COMPLEX to be taught by anyone else other than those who are doing it and that is a dangerous assumption. - if you're saying that, I think it honestly means you (as the scientist) don't think the public are capable of understanding what it is you do when that's not the case. - I love that Charlotte delves into that here - and also explains that some scientists are pressed for time and resources... and some make it priority to outreach and educate! But also that a good communicator is what makes the difference in all these cases. - [#scicomm](#) can be woven in to hectic schedules if the drive/desire is there. She's right. Also I am so deeply enthusiastic about this quote: - "Scicomm strategies don't just materialise overnight (nor do they need to) – the most successful are formed from a careful step-by-step process of pooling, developing, and evaluating ideas over the long-term." [#SciComm](#) - Dead on, Char - this so encapsulates much of what I talk about when I discuss [#scicomm](#) and that people really need to understand. Chuffed to have you as my classmate.



- [FBarb @francescharber 16 Jan 2018](#): Going to attempt some drosophilisation of U1/2 Biology this year, some great resources here [@ManFlyFacility](#) [#Drosophila](#)
- Nicole Bournias-Vardiabasis (Professor; comment on blog post "Advocacy for Developmental Biology": As a fellow flydoc, I certainly appreciate all the outreach effort you have undertaken. I am a professor in a primarily undergraduate institution I have offered early opportunities for students to carry out research and *Drosophila* makes it all possible.
 - In response to tweeting about our fighshare oureach resources:



- [Ruchi Jhonsa @JhonsaRuchi](#) 6 Oct 2017: [@ClubSciWri](#) [@ipsawonders](#) [@fuzzysynapse](#) you can use these images for free for [#scicomm](#).

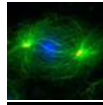


- [Soc for Devel Biol. @SDB 5 Oct 2017](#): Fantastic free resource!



- [MadScientist @MadS100tist 5 Oct 2017](#): This is an awesome resource, my dudes

- in response to ManFlyFacility For the public:



- [Raff Lab @JRafflab](#) 4 Oct 2017: Thanks [@Poppi62](#) for sharing this list of interesting [#Drosophila](#) facts, our favourite model organism! [#WhyTheFly](#)

- [IMPRS-TP @ImprsTp](#) 24 Oct 2017: Free resources for Science Communication and Education and a wonderful platform for productive Interaction: visit <https://droso4schools.wordpress.com>

- referring to tweet about <http://www.flyfacility.manchester.ac.uk/forthepublic/whythefly>



- [Drosophila Lab, UI. @DrosLabUI](#) 14 Sep 2017: Thank you Prof [@Poppi62](#) for this! Permission to share it with acknowledgement please



- [Nichole Broderick @nabroderick](#) - 14 Sep 2017 - retweeted and added: Love this! Why we like working with flies - they are great for understanding host-microbe interactions too.



- [Jacob Kagey6@ MileFlyGuy](#) - 15 Sep 2017 - Retweeted and added: I want to include this image on all future grant proposals. And perhaps have it framed for the lab.



- [Melanie Stegman SPX @MelanieAnnS](#) - 16 Sep 2017 - Retweeted and added: This kinda silliness and seriousness is why I loved being a fly scientist. [#Drosophila](#) [#womenintech](#) [#scicomm](#)

- Responding to a tweet about <https://droso4schools.wordpress.com/organs>:



- [Meaghan smith @M3aghanKate](#) - 14 Sep 2017 - Replying to [@Poppi62](#): Great diagrammatic representation! Love it / It had never crossed my mind... but now I'm extremely glad it is! How cool!!



- [Cathy Slack @cathy_slack](#) - 14 Sep 2017 - retweeted and added: You're more like a fly than you think...



- [Anna Sharman @cofactoranna](#) - 14 Sep 2017 - retweeted and added: What a great graphic!



- [Georgia Orton @GeorgiaRFO](#) - 14 Sep 2017 - retweeted and added: Great graphic = powerful tool



- [J. Colomb, @pen @j_colomb](#), 23 Sep 2017, replying to [@Poppi62](#) about collating arguments for fly research: [#openscience](#) [#oer](#) the world say thank you (or will).



- [A. Sánchez Alvarado @Planaria1](#) [4 Oct 2017](#) (in response to a tweet about our [outreach resources](#)): A great resource!



- [Sean Coakley @stcoakley](#) [17 Aug 2017](#) Retweeted: Andreas Prokop: Awesome resource to learn about wiring the sensory nervous system 🧠👉👉👉 #neuroscience



- [Ghent Uni Research @ResearchUGent](#) - [5 Sep 2017](#) - retweeted a tweet about our HAMA bead patterns and added: If you're looking for something to do with the kids this weekend, why not this?
- in response to a tweet about fatigue:



- [K. VijayRaghavan @kvijayraghavan](#) - [26 Jul 2017](#) - Replying to [@matthewcobb @Poppi62](#): What you are doing is fantastic [@Poppi62](#) Should be publicised world over by [@GeneticsGSA @___SDB___](#) etc translated widely. Hang on hero



- [Hammed Badmos @HammedBadmos](#) - [27 Jul 2017](#): At least you inspired me and others alike. Not a waste of time at all but an exceptional use of it [#innovativeminds](#)



- [Bing Zhang @Goodflies](#) - [26 Jul 2017](#) - Bing Zhang Retweeted Andreas Prokop: Don't. You have been an [#inspiration](#) for many of us. [#FlyHigh!](#)



- [Caramelised Onion @caramalised](#) - [26 Jul 2017](#) - Replying to [@Poppi62](#): We use your material all the time! You do phenomenal work, and 'wasted time' is as far from what you do as is possible!







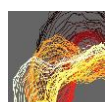




- [CSHLflyneurocourse @CSHLflycourse](#) - [28 Jul 2017](#) (about droso4schools): Happy Friday, Fly Friends! Please see this amazing resource from the [#ManchesterFlyFacility @Poppi62 #TeachWithFlies](#) <http://goo.gl/X8UHFD>
- PI in Basel; comment on droso4schools): Andreas: a fantastic overview of organ system comparison and similarities. I was looking of a nice image depicting human and fly for a talk and found your images really perfect.
- comment on YouTube channel:




- [Jorge Beira](#): Great stuff! really well made! congrats! This makes it much easier to explain to people



- [朱瑞驰](#): I am Ruichi. It is so impressed and well performed!

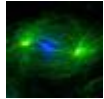
- 
 - [Mukesh Maharjan](#): Great work ! I am really grabbed by its flow... looking forward to more videos on fly...
- 
 - [the Node @the Node Jul 14](#): Ah, the faithful funnel method...until you graduate to the quick flip! More great [#Drosophila](#) tips from [@ManFlyFacility](#)
- 
 - [Philipp Schlegel @uni_matrix Jul 2](#): Thanks [@MichaelBREiser](#) - inspired by the great resources from [@ManFlyFacility](#)
- 
 - [Kavitha Kannan @kavkannan Jun 14](#): Great going! Congratulations and may the impact keep growing!
- 
 - [Alexandre Carisey @alexcarisey 19 Jun 2017](#): Fantastic initiative from Manchester Fly Facility [@FBMH_UoM](#) to communicate top quality science, congrats [@Poppi62](#)! <http://www.sciencedirect.com/science/article/pii/S1084952117303312> ...
 - retweets for <https://ndownloader.figshare.com/files/8753464>:
- 
 - [CSHLflyneurocourse @CSHLflycourse 26 Jun 2017](#): and added: Andreas Prokop An excellent resource for [#Drosophila](#) advocacy and outreach. See the link and download to share!
- 
 - [Genetics Soc of Amer @GeneticsGSA 26 Jun 2017](#): Genetics Soc of Amer Retweeted Andreas Prokop and added: nice list of resources & tips for ways you can conduct outreach & advocacy for [#Drosophila](#). sing it loud & proud. thanks [@Poppi62](#).
- 
 - [Sofia Araújo @sofiaaraujo 14Jul2017](#), added: Revamped [#droso4schools](#), fantastic resource for taking [#Drosophila](#) to school students
- 
 - [Carsten Timmermann @ctimmermann 30 Jun 2017](#): Carsten Timmermann Retweeted Andreas Prokop. This is a great school outreach programme.
 - [PI at Texas Tech University \(10 July 2017\)](#): Permit me one last observation about the *ethos* of your presentations--from a teaching angle. Your text & images exude the sort of pure *curiosity* that impels us nerds to do *basic* research. I tell my students that their inner *Alice* will be a better tool than their disciplined *White Rabbit*



- [Alastair Gittner @agittner](#) Jul 18, 2018
Evaluation [@ManFlyFacility](#)'s event with 8 schools at [@Scarisbrickhall](#) clearly supports our arguments for bringing [#Drosophila](#) into the [#biology](#) [#school](#) curriculum -we show how it can be done: <https://drosophila4schools.wordpress.com> -blog to follow soon [#ASEChat](#) pic.twitter.com/TDkQAjcFgA [@ejsearle](#)
- Researcher (27 November 2014): The way in which you explain every aspect in every paragraph is very entertaining and easy to understand; continue to write in this way!
- Researcher (24 February 2016): As a beginner practitioner I find any advice helpful and good resources and blogs are hard to find.
Researcher at the University of Cambridge (04 December 2016): great images for teaching
- Researcher at the Monash University, Australia (14 July 2015): These images are great! I was hoping to use them in a talk I am giving soon to a bunch of 'non-fly' people. Can I reference them to this website or is there a more appropriate reference for them?
- Researcher at the Universidad de NAVARRA, Pamplona (24 June 2015): Thank you so much for this. Great article; I've already sent it to several colleagues and labs.
- PI at Berkley:
Still, it was enough to confirm all my positive thoughts about your tremendous initiative and accomplishments in this communication area. It is great news that you have joined GSA, and that we can coordinate efforts. As you say, our initial efforts are towards decision makers in government and funding agencies as well as the press. I am working with Raeka on a succinct but high-quality website about flies and biomedical research to begin with, while the Communications Committee that we just founded is going to take up some other initiatives. I plan to consult with you as we shape the content of the website, at the very least. With respect to communications with the fly community, I couldn't agree more. In fact I raised this issue at our Board Meeting on Wed. before the conference. The news feed is absolutely the way to go; the question is I believe whether someone in the Flybase project can add that to their existing responsibilities. As you may know, Flybase is going through some transition now so this may be a good opportunity for change. I will pursue this a bit and keep you posted. On the same subject, can you give me a transatlantic perspective on a question. Do you have a sense of whether most UK/European fly workers self-register at Flybase(with emails, etc. for communication?) —or whether they are unaware that this is useful/important? I think it's important to get a count of who our community is, and critical to disseminate information to all of them. I'm figuring out the best way to promote this now. So glad to have you on board!
30 January 2015: Just a quick note to compliment you on the youtube video that you produced. We have been talking here in the US about putting together a website promoting fly work (cf Hugo's perspective now out in Genetics) and I came across your video —it is very effective and covers a lot of the ground that we have been thinking about. (looking forward to seeing the sequel). Raeka from GSA tells me that you are helping to organize a workshop at the fly meeting —unfortunately I won't be staying through Sat. but hope that we can say hello earlier.
- PI at the Liverpool John Moores (09 March 2017): Just a short note to thank you for being so helpful yesterday. I aim to undertake my first cross next week so "wings-crossed"!
-  TReND in Africa @TReNDinAfrica 30 Apr 2015: [@Poppi62](#) [@figshare](#) our outreach team will certainly benefit from this resource to teach about [#Drosophila](#) in [#African](#) schools!



- [Sarah @Drosophilista 16 Sept 2014](#): Great outreach stuff by [@ManFlyFacility](#)! "the equivalent of the population of London can be kept on a few trays in the laboratory"



- [Raff Lab @JRafflab 16 Sept 2014](#): FF [@ManFlyFacility](#)! Their website is well worth checking too, fantastic [#outreach](#) and [#scicomms](#): <http://www.flyfacility.ls.manchester.ac.uk/forthepublic/teachersandschools/#.VBgd5UtYVg0> ...



- [Matthew Freeman @mjafreeman 16 Sept 2014](#): I'm seriously impressed by [@ManFlyFacility](#)'s outreach efforts. Includes plan for a Hama bead *Drosophila* <http://www.flyfacility.ls.manchester.ac.uk/forthepublic/#.VBgKUkvWgfk> ...



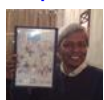
- [Jim Woodgett @jwoodgett 15 Sept 2014](#): Why researchers work on fruit flies. Superb [#scicomm](#) outreach from [@UoMNews](#). <http://www.flyfacility.ls.manchester.ac.uk/forthepublic/> via [@SimonBullock11](#) cc [@caseybergman](#) ½



- [Simon Bullock @SimonBullock11 Sep 12](#): Fixed link (I hope)....fantastic outreach activity from Univ of Manchester fly folk <http://www.flyfacility.ls.manchester.ac.uk/forthepublic/#.VBN6gWK9KSN> ...



- [lisa landskron @lisa_landskron 14 Nov 2016](#): [@Poppi62 @ManFlyFacility](#) thank you for putting together a great [#Drosophila](#) resource for outreach! very helpful! <http://bit.ly/2eWUe0F>



- [K. VijayRaghavan @kvijayraghavan Jun 22](#): K. VijayRaghavan retweeted Genetics Soc of Amer. This resource is really worth a visit!



- [K. VijayRaghavan @kvijayraghavan 23 Jun 2015 New Delhi, Delhi: @Poppi62](#) Terrific service to scientists which we can use for communication with society and government.



- [Genetics Soc of Amer @GeneticsGSA 22 Jun 2015](#): Human vs. [#Drosophila](#) organs! <http://bit.ly/1db5gv0> educational resource from [@ManFlyFacility @Poppi62](#)



- [Sonia Hall @SoniaHall 21 Dec 2016](#): we also benefit from the open science communication efforts of [@ManFlyFacility @Poppi62](#)



- [Firzan Nainu @Firzan Nainu Jan 13](#): Firzan Nainu Retweeted Andreas Prokop - Happy to see another great *Drosophila* resources from [@ManFlyFacility](#)

- LINK out to our *Drosophila* movie -  [Firzan Nainu @Firzan Nainu 4May 2017: @Poppi62](#) My recent Facebook post on why we should embrace the application of *Drosophila* in biomedical sciences in Indonesia. -

11. Fly training (training package and in-course training)

- PI at Berkley:
23 October 2013: I think that the committee in the past has favorably looked upon images reflecting community resources --and I would encourage you to 'officially' submit it. As a personal note I think that your publication was very valuable, formalizing and beautifully organizing the way we have long trained researchers in our own lab --I salute you and think you did the community a great service.
 - I wanted to follow up on my praise for your G3 article by suggesting that you submit an image for this year's. Although most of the entrants display primary research data, I think that your extremely useful 'genotype builder' kits are a wonderful resource for the community and their elegance and clarity might find favor with the judging committee.
 - Writing you from the fly meeting, where I announced your special commendation Image Award at the first plenary session. Your reference was up but I have also fielded a few questions at the meeting about your toolkit. Should be good publicity!
- The 2014 Image Award Committee (06 March 2014): I'm delighted to tell you that the Image Award Committee has decided to award your submission from 'Rough Guide to *Drosophila* Mating Schemes' a Special Commendation for Training *Drosophila* Biologists. This is an unusual recognition that we grant when the committee feels that an image makes an exceptional contribution to educational resources. To date we have granted it only twice before, in 2007. The committee was uniformly enthusiastic about doing so this year for your submission. We would like to prepare for you a plaque and give you the opportunity to be recognized at the US fly meeting in a few weeks, if you plan to be there. Let me know, and in the interim could you send me a high resolution image of your submission?



- [Esther Verheyen @EstherVerheyen](#): Replying to [@drosophilosophy](#): Have you given him the great @Poppi62 article? It is essential reading for new fly people!
- Former student, then PhD at Weizmann Inst., Israel (12 June 2017): The genetics training course together with the training guide were both a comprehensive and well-explained method of teaching undergraduates with little previous experience in dealing with *Drosophila* and genetics. The course itself was interactive giving the opportunity for students to work out the results of mating schemes, and well-illustrated allowing for a greater understanding of the way crosses work and the phenotypes to expect. The course gave a broader understanding of fly genetics, from its relevance to biology and biomedical research, down to understanding the more complicated gene constructs found within the fly. When starting my masters I again found that the accompanying booklet to the course came in handy and it's a good reminder guide to everything we learnt.

12. Comments by students/postdocs

12.1. Students/postdocs who participated in Manchester Fly Facility initiatives



- [Jo Sharpe @comeflywithJo April 27:](#) Fab morning helping out [@ScienceWeekUK](#) with [@ManFlyFacility](#). Overhearing one school pupil exclaim "flies are cool!" after visiting our stand made my day. [#fliesAREcool](#) [#Drosophilaresearch](#) [#publicengagement](#) [@UoMEngage](#)

- PhD student now teaching at Manchester Grammar School (22 May 2017): For me the one thing that stands out about kids when teaching them something new is the great questions they ask. That has always amazed me and that they can influence and change how you think about something by asking really interesting questions that you may not have thought of, but can also change your perspective. The other thing I enjoy about teaching anything is seeing that eureka moment when people finally understand the point you are trying to make and are amazed by how complex life on this planet is. I like the problem solving aspect of this, where I try to use different ways to explain or show something until people understand something. Having the chance to experience teaching during my PhD helped me see that I was quite good at it and that not all schools are as bad as the one I attended (where we made our teachers lives hell).
- Undergraduate student going into teaching (24 May 2017): The fly facility and its staff were absolutely vital in the preparation and completion of my final year project. The prepared *Drosophila* strains used in the project clearly had a significant impact on the students attending the outreach session. Their learning was shown to be significantly improved due to the use of optogenetic *Drosophila* in their lesson. The flies offer an unique opportunity to showcase advanced physiological concepts, such as optogenetics, clearly and effectively, to a wide range of student ages and abilities. The equipment, expertise and advice that the Manchester Fly Facility provided was invaluable throughout my project, and demonstrated the huge potential of the Droso4schools outreach programme in the promotion of science learning in schools.
- Former PhD student (13 June 2017): The fly outreach events helped me consider a career in science communication and assisted me in obtaining my current position as a Writer for a Medical Communications agency. I further developed my skills for communicating to different ages and abilities by participating in the outreach events, and they were a key part of my CV when I applied for a Medical Communications job.
- Post doc into teaching (02 July 2017): At the end of my second postdoctoral research position I made the decision that I would like to change career and become a secondary school teacher. I wanted to gain experience in working with children so I began doing some outreach with schools in the local area. One such school was Bolton School; they wanted to give students the opportunity to find out what research scientists do. Working at the University of Manchester I was fortunate to have access to the fly facility where I could take a variety of flies into schools to help to explain genetics and the role of research scientists. This opportunity gave me a huge advantage when I came to applying for teacher training. It gave me the necessary 10 days experience that I needed to be accepted on the course and gave me plenty of experience in working with children. During my interview lesson I used resources from the university to explain endothermic and exothermic reactions and I got accepted onto the programme. I have kept close links with the fly facility especially in my teacher training year where I used flies to run practical sessions to help explain difficult concepts such as genetic crosses and inheritance.

12.2. droso4schools placement students

- Droso4schools placement student (1); extracts from her [blog](#): "I have to confess, before I began my placement at the Facility, I hadn't had any significant experience with invertebrate biology, let alone *Drosophila* – and I was only aware of its use as a model organism in the field of connectomics. Up to that point, I had been much more interested in discussing research involving rodents, or non-human primates. However, by the end of my placement, I could be found happily listing the merits of fruit fly research with anyone who would stand around long enough to listen." ... "Apart from having gained an insight into the biology of a truly remarkable organism (which once I would have swatted away without so much as a second thought), this placement has been a fantastic learning experience. I've had a chance to synthesise and exercise my theoretical knowledge in practice, and gain hands-on experience in the busy world of academic science communication. I've been able

to engage in lively discussions regarding scicomm strategies with my supervisors, and with other researchers at the facility. Yes, scientists are busy, but with a clear, overarching objective, scicomm participation can be woven into even the most hectic of scientific lives. Scicomm strategies don't just materialise overnight (nor do they need to) – the most successful are formed from a careful step-by-step process of pooling, developing, and evaluating ideas over the long-term. I have learned some of the ways in which information I've generated can be communicated, in order to maximise impact, and capitalise on time invested. For example, the practical experiment I devised could not only be used in school lessons, but also at science clubs, and as a demonstration at science fairs. Furthermore, the video has been posted on YouTube, and can now be shared via other social media platforms. I've also been involved in some exciting discussions regarding the potential development of a large-scale engagement initiative, one which could reach thousands of pupils, far more than could ever be reached through scattered school visits."

- Droso4schools placement student (2): Outreach and public engagement are often perceived as unidirectional in that they only benefit the lay audience. However, I feel that my experience during this project has contributed towards my own professional and personal development. I have learned and developed simple tricks and new ways of communicating that will benefit the delivery of my own research to a wide range of audiences, and will help me to capture interest and maintain attention at conferences and in grant proposals. In addition to enhanced communication skills, I gained insight into the use of *Drosophila melanogaster* in scientific research, and this has given me ideas and inspiration for integrating this model organism into my own work.

Seeing a whole project through, from observing at the back of a class and gaining an appreciation of a teacher's day-to-day life, to thinking of material that would be relevant and of interest to schools, bringing a story together, linking different scientific theories together in a creative, appealing and concise format, and finally teaching this material myself and seeing the students' eyes light up proved to be incredibly rewarding. It was a steep learning curve in a setting and subject area that I was very unfamiliar with, but it was also a highly enriching experience for this same reason. Working with academics from a different research background to my own, as well as teaching a variety of biology topics to a lay audience, highlighted the importance of appropriately pitching my own work - facts are essential but creativity is key to put these across appropriately.

On a personal level, I gained a better understanding of the British schooling system, as well as teaching styles and techniques. I now appreciate the level and background of undergraduate students, and I feel that this will help me when demonstrating in lab practicals, helping out in tutorials, or even teaching classes myself one day. As a result, I also consider this placement opportunity as investment into the development of improved academic teaching.

- Droso4schools placement student (3): Back in August 2016 when I started on the droso4schools project, my teaching experience was very limited. I had taken informal lessons during a lunchtime revision session at school but I did not know the first thing about formulating a lesson to deliver so school pupils. My understanding of *Drosophila Melanogaster* in biology was also very basic – I knew that it was an important model organism used in biological research but not a lot more.

Now, having spent nearly a year working on the project it is clear it has impacted me in a multitude of ways. My teaching experience has now rocketed – I spent three full days a week in schools for almost 6 months. In that time I've managed to plan and take lessons, mark work and get invaluable feedback on my teaching style. This time in schools has, according to the teachers with whom I worked, meant that I would easily be able to get a place on a PGCE course, if I so wanted to. Obviously that is the other main benefit of the time in schools – I was able to experience first-hand what life was like as a teacher and it has made me seriously consider it as a future career.

The feedback on my teaching from the schools was used constructively to help shape the

lessons which I created. I was able to see how different activities benefitted different aptitudes of students, as well as experiencing how important it is to build a key base of understanding before going in to more detail on a certain topic.

The resources that I made were carefully and considerably built over a long period of time, establishing a key storyline throughout the lesson and making sure that new concepts brought in were done in an understandable manner. These considerations which I made are also key for teachers, the main difference being the time they have to create each lesson will be less. Having taken on board the core essence of tailoring lessons to allow students to understand specific concepts, again acts as a brilliant base if I were to go into a teaching profession.

Each lesson created on the droso4schools project has demonstrations and practical elements using *Drosophila Melanogaster*. New practical experiments had to be developed for the lessons which I created, meaning I got the chance to use *Drosophila* in a lab environment whilst developing these sections of the lessons. The experience I gained from using this model organism helped me to secure a final year project where I will use *Drosophila Melanogaster* to study the benefits of a potentially new anti-epileptic drug.

Throughout the project, both of you have supported me fully with whatever problems may arise. The feedback on the resources created was thorough and extremely constructive. Although it was a steep learning curve, I am positive that the feedback I received throughout the project will benefit me enormously in final year. Sanjai, who manages the Fly Facility, was a constant point of contact when developing the practical elements for the lessons as well as suggesting improvements to experimental designs I came up with.

Along with all the personal experience gained throughout this project, I also got the chance to be involved in publishing an article – an ambition of mine since joining university. Being able to appreciate the time and effort it takes to publish an article is something I feel is very valuable to me if I ever have opportunity to do so again.

Overall, the project has allowed me to develop skills which will not just be useful in an academic sense, but skills I feel will help me achieve all my goals in the future.

▪ Droso4schools placement student (4):

- Last week I had an interview for PGCE teacher training with the teaching alliance Trinity is a part of and got an offer. Hopefully I should be back next year doing my training! I also have place to do a PGCE here, but it think I'm going to choose the more in school training route
- I have almost come to end of my teacher training year and I have got a job as a teacher at Trinity next year. I am very keen to keep up contact with the project going forward. I was speaking with Cath and she mentioned that we could do some fly work with year 12 before the end of this year. I appreciate that it is very short notice but I wondered if it might be possible to bring a group of (approx 12) year 12 pupils to visit the fly facility? They are studying animal response so it would be a good chance to have a look at some. If at all possible we could do it the afternoon of the 24th or the morning of the 25th June. If not I was wondering if I could possibly do a lesson, one that involves animal response, the climbing assay? or response to light? I appreciate that this is very short notice, but if there is anything we could do it would be brilliant. Many thanks,
- Earlier comment: Taking part in the droso4schools project has been beneficial in improving many areas, not only developing my teaching ability but it has also helped me to gain the many skills necessary to complete a project on this scale. Although before beginning the project it did have some teaching experience, the opportunity to work within a classroom setting at different schools and levels has been invaluable. It has provided me with a realistic impression of the challenges and rewards of the teaching profession.

I have taken several lessons with large classes at several ages and ability levels. I have learnt how to communicate often complicated ideas to students in terms which they understand. Similarly, how to lead the class and question them in order to understand a concept, without simply giving ideas to them. A way of thinking which has also been incorporated in the lessons which I have developed, I have seen during my time in school students often have a higher level of understanding of concepts when an investigative and inquisitive approach is taken. The ability to be in a classroom on a regular basis has really fed into the project and allowed resources to be relevant and useful. It has also been of benefit as it allows ideas to be tested and direct feedback to be given by teachers.

I also gained an appreciation of the teaching profession during my time in school, the daily challenges such as behaviour, time pressures, production of resources as well as constant assessment. Before beginning this project, I was not as aware of these aspects of the job, being able to see how teachers cope and manage this has been useful should I face the same issues in the future. Being in schools on a regular basis has allowed me to see how schools are run which will benefit me should I pursue a career in this area.

Carrying out a project on this scale has also helped me to develop many key skills such as time management, organisation and communication. However learning the importance of critical evaluation and then how to use this to improve my work have been the most valuable. Also my ability to be self-critical and reflective has been improved though keeping a blog and reviewing my work regularly.

The project has also enlightened me to the importance of meaningful outreach in science, before I did not appreciate the true value of this work. Especially at school level where the curriculum can be restrictive, this is the age to enthuse pupils in science. Not only to encourage them to pursue a scientific career, but also that in the future they will have an appreciation of science in society. Although I was aware of the importance of *Drosophila melanogaster* in biology as a model organism before the project, I now better appreciate their role in understanding fundamental biology and how they can be used to capture the attention of students and the wider public to highlight important areas of biology.

- Droso4schools placement student (5): I have just completed a 3.5 year PhD in neuroimmunology. I undertook a 3 month PIPS placement in the second year of my PhD within the fly facility at the University of Manchester and Trinity Highschool.

The purpose of the project was to design a series of practical lessons that utilise fruit flies to teach curriculum-specified biological concepts to secondary school students. The project involved working as a teaching assistant within Trinity Highschool, whilst liaising with the fly facility, in order to identify, develop and test aforementioned practical lessons. Materials with the lessons plans included relevant paperwork such as risk assessment forms in order to minimise any addition to teachers existing workloads and thus streamline the inclusion of these lessons into schools.

The experience of working within Trinity school was enjoyable and well-supported by the teachers within the department. The placement enhanced a number of pedagogical skills, notably organisation and oral presentation. In particular, the ability to distill complex scientific ideas into simple concepts, which can be understood by a lay audience, without losing any veracity, has proven the most transferable to academia.

12.3. Work experience students at the Fly Facility

- Teacher at King's School Chester (08 September 2015): I'm teaching my school pupil for the first time since school started back and he is so enthusiastic about his visit to you! He has told me all about the *Drosophila*, *C. elegans*, the aquarium and so on and is now

determined to be a scientist. Thank you so much for hosting him. He is telling everyone about his experience.

- PI at the University of Manchester (05 November 2014): Last year Sanjai hosted my niece for an hour or so at a time when she was considering dropping science. She had an amazing time and is now doing GCSE science and your lab was her favourite bit! (think I may have put her off worms :(). She is hoping to get some work experience next year the week of the 22nd. Any chance she could spend some time in your lab again? I am offering cake bribes :)
- Work experience student (19 July 2016): I just wanted to say thank you for letting me come into the fly facility. I really enjoyed today and I found it really interesting; I especially liked the microscope work at the end. Thanks again,
- Work experience student (29 April 2014): Thank you very much for showing me round yesterday it was very good of you and I enjoyed it! Thanks again.
- PI at the University of Manchester (19 June 2014): I just wanted to say thank you for having the student in the fly lab yesterday. I had chance to chat with him today and he was really excited about the things he had done with you.
- Lecturer at the University of Manchester (28 July 2017): I also want to thank you again for hosting Emily for work experience. She thoroughly enjoyed her 3 days here and her Mum tells me she was telling her all about fly anatomy on the Monday night.
- Technician at the University of Manchester (14 July 2017): Elliot had his best day with you. Thank you for your time with him

12.4. Other pupil comments

- Pupil from New Hall School; (20 June 2017):
 (1) Dear Sirs, I am a year 12 student at New Hall School in Essex and I am doing an EPQ experiment involving *Drosophila*. I know you are both busy, but I would like to ask for some advice as I have no experience with handling *Drosophila*. If you are too busy please can you forward this to anyone who can help. The question I am asking for my EPQ is : Will the findings in quantum biology one day prove that microwave cooking is dangerous?
 I am summarising what we currently know about the safety of microwave cooking and what some of the recent findings in quantum biology are suggesting. I will also carry out an investigation using *Drosophila* and a selection chamber experiment with two media. One will be prepared by boiling and the other by microwaving. The selection chamber will have three compartments: a central release chamber and a chamber with media on either side. (Please see pictures in the attached document) I will be releasing 25 male and 25 female virgin wildtype flies into the central release chamber. The flies will have been "starved" for 12 - 15 hours before released into the central chamber. After the flies have made their selection and mated they will be anaesthetised after 4 - 5 days and counted. After 12 - 15 days the hatched flies from each chamber will be counted. I will repeat this 3 times and do it with control media too (both chambers boiled). I will carry out a Chi square test (on the selection results) and a T test on the hatched off spring results. My questions to you are :
 1) Do you think the selection chambers connected with funnels will work ? Or are the flies unlikely to fly through the funnel?
 2) Am I starving the flies long enough?
 3) How long after their arrival from the laboratory supply company should I let them settle? They will just be sitting at room temperature in a school lab. Is that Ok?
 4) I have narrowed it down to 2 recipes, one with apple and another with molasses? Which would you recommend and is it OK to leave out the fungicide?
 5) Are the timings right ? 4 - 5 days long enough to mate and lay eggs ? 12 - 15 days long enough to hatch before they mate and lay eggs?

6) Do you have any other advice ?

I will acknowledge any advice given in my project and would be very grateful for any hints or improvements as it has not been easy to put together a method. I have attached my mid way review and rationale that I have sent my teachers as it explains my choices.

I thank you in advance for your time.

(2) I really appreciate you looking over my outline and you having given me a lot of good points to think about. Thank you also for all those links to articles, I've started reading through them and they are very user friendly and helpful! The other articles online go way over my head. By the way I searched "fruit fly experiment high school" and that is where your website came up. Once again thank you so much for getting back to me.

13. Faculty Events

- Lecturer at the University of Manchester: I interviewed a student yesterday who was so impressed with your bit on the Animal Research Day that they applied to us and have us as their first choice!
- Vice Dean for Social Responsibility and Public Engagement at the University of Manchester (30 March 2017): Hawys told me that the Animal research went very well. Can I convey my most sincere thanks and gratitude to your personal commitment and involvement in this key area related to animal welfare.
- UK/EU Recruitment & Marketing Officer at the University of Manchester (25 July 2016): I am just writing to thank you for participating in the Year 10 work experience (2016) last week. The week is such a valuable experience for the pupils. 88% of the pupils said they enjoyed visiting the fly labs (the only one who really didn't enjoy it was afraid of flies!).
- Recruitment Intern at the University of Manchester (07 July 2016): Thanks again for helping out Tuesday. The feedback was excellent. Many people said your practical was the best due to the hands on experience, and the variation of the practical i.e. being able to learn as well as engage in practical skills. So thank you very much for your help, it is much appreciated. Best wishes,
- Recruitment Intern at the University of Manchester (19 November 2014): Thank you for your time, the flies and the microscope, they were very popular. The students really enjoyed learning about them and how useful the mutations were to research.
- Lecturer at the University of Manchester (24 July 2014): I just wanted to thank you again for hosting the Yr10 work experience students a couple of weeks ago. We've been through their feedback now – the whole week was a resounding success, and of the various activities they did during it, 60% said they enjoyed the lab shadowing most of all. I thought you'd like to know that one of the pupils I spoke to was particularly captivated by his visit to the fly facility – thanks for that.
- PI at the University of Manchester (8 Sept 2014) - Developmental Biology Open Day You may remember the open day that was held a month or so ago. I just want you to know that where most other programs received feedback of good from 60% and excellent from 10-12% Dev Bio got 95% good or better and 68% excellent. You obviously did an amazing job.
- Technical Apprenticeship Programme Coordinator at the University of Manchester (05 July 2018): I just wanted to thank you for the time you spent with the apprentices during the internal network event. The feedback from your session is very positive with this being a major factor in the 'most enjoyable part of the day' so again thank you for taking the time to accommodate this and making such a positive impact on the day. Since then we have three apprentices going to Lund to work on research for Damselflies. I expect the extra enthusiasm has been jeered by your session. If you ever wanted to take on an apprentice please let me know, I feel there would be massive uptake on working within your area.



- [Fiona Reeves @fionahreeves 7 May 2016](#): Tour of the fly lab @LifeSciencesUoM open day. Loved the practical activity identifying mutations through microscope

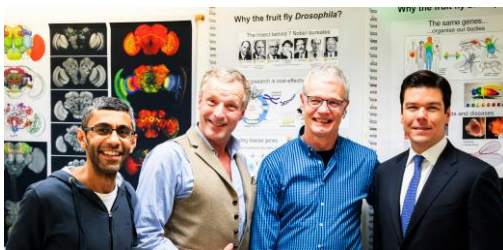


- [ANTHONY CASSIDY 27 Jul 2016](#): Next #OpenLabsMcr stop: Fascinating @ManFlyFacility's world-leading fruit fly research @LifeSciencesUoM #ESOF16



14. External visits and visitors

- 18 April 2019: visit by the Panamanian ambassador to UK and the Royal Photographer and Panama Wildlife Conservation Charity



- Organiser of Bollington Scibar (20 October 2019): I would like to thank both yourselves for the interesting talk on the fruit fly, the fact that you involved the audience using both specimen and live flies made it particularly interesting and memorable. As a small favour, please let me know of anyone you may come across who would be interested in presenting at the Bollington Scibar. Once again - many thanks for your time and efforts in making the evening a success.
- University Lead for Environmental Sustainability (UoM), (10 October 2018); about the visit by the Commissioner for Protected Areas and Biodiversity, Panamá: Thank you so much both of you for making the time today for our visit. It was much appreciated and the minister was very impressed!



- [Andreas Prokop @Poppi62 26 Sep 2018](#): Wonderful discussions with [@amosabolaji](#) who came to learn our fly genetics training package (<http://www.g3journal.org/content/3/2/353.full> ...) for use at his newly founded "#Drosophila Research & Training Ctr" in Ibadan, Nigeria.



- Macclesfield SciBar (24 January 2018); in response to a pub science event two days earlier Thanks from All at Macclesfield SciBar - Andreas & Sanjai, What a wonderful evening. Top class presentation and superb entertainment for all our supporters. The feedback has been of the highest order. 'One of our best ever scibars' has been uttered by several people. With regard to the gloom that you expressed afterwards on the effectiveness of 'science outreach', I think you are unnecessarily pessimistic. In my 50 years involvement in science outreach nothing seems to have changed. The learned people are willing to learn some more, the majority just are not interested. Unfortunately that majority includes most politicians and decision makers. At least the learned minority is improving its level of scientific knowledge. I discussed these issues with my daughter who gives 'inspirational' talks to various organisations. She is most positive and says 'it only takes one person in your audience to spark the next Nobel prize winner, the next Einstein. 'So keep going' she says.
- Macclesfield U3A (23 January 2018); in response to a bar science event the day before: We thoroughly enjoyed your talk last night at Macclesfield SciBar and are very pleased that you agreed in principle to come to talk to our Science and Technology Group. We formed this group in our U3A towards the end of 2013 and it now has about 75 members although typically we get about 40 at a meeting. They are from a range of backgrounds - from a retired university physics lecturer to lay people with no scientific background – “intelligent laymen” is probably the best description of the group. We meet monthly at 2pm on of the month. We encourage our members to give talks and these have covered the LHC and Higgs Boson, aero engines, the chemistry and uses of tin, the history and future of energy use, the measurement of “G”, nuclear power, wind turbines, geotextiles, epigenetics, gravitational waves, the life and death of stars and the air traffic collision avoidance system. We have had external speakers from various industrial companies, the Nuclear Regulatory Agency as well as Imperial College and the Universities of Manchester, Keele and Salford. I have a programme of speakers for most of this year, but I am looking for someone for September 25th. If any of this is not suitable, then we could arrange for any fourth Tuesday next year, except July August and December. I recognise that a day time meeting makes it difficult for you, but I would be delighted if you could come.
- University Lead for Environmental Sustainability (UoM)- Visit of the Costa Rican Ambassador (27 January 2016): Sorry for dropping in on you like that! Great job and hope we didn't disturb you too much
- Technical Operations Manager at the University of Manchester (05 December 2014): The tour that we gave to HR was such a success that they would like to organise another date in January. Could you please let me know if you are free to do this, it will be the same format as last time; however, this time there will only be one small group.. Thank you very much,
- Head of HR, UoM (12 November 2014): I just wanted to take the opportunity of behalf of HR Services to thank you and your teams for your time today. The team found it informative and very interesting. I'm sure you will be pleased to know that the team have said it was the best session they have attended to date!
- President of Genesee Scientific (23 February 2017): I made it back to the US in one piece and I'm fondly looking back on my UK tour. Thanks again for taking time out a few weeks ago to talk about fly things. I am really impressed with your awesome facility! We sincerely

appreciate your business and I am always at your disposal if we can ever be of support to you in any way. Have a great day!

- Recruitment and Marketing Coordinator, UoM (07 October 2013): Thank you very much for taking your time today and received our guests from Shandong University and Nanjing Medical University. Guests were very happy about the visit at your facility. Personally I have learnt a lot from you too!
- Technical Resource Manager at the University of Manchester (09 February 2012): The visit (Board of Governors) went extremely well and our visitors were very impressed with the fly facility and the work that goes on there. It was good to see so many people working in there and thanks again for helping out
- Development Officer, UoM (07 July 2014): Thanks for that Sanjai, real shame about the alarm but I guess we can't plan for everything! Really great to be able to show a visitor some live science, especially if that live science has a glowing brain! Thanks again
- Deputy Associate Dean for Teaching, Learning & Students, University of Manchester (09 May 2013): I really appreciate your time and effort – the panel seemed very impressed! Thanks again

15. Brain Box

- Producer & Project Director Walk the Plank (24 June 2016): I was also in early meetings and could see the enthusiasm bubbling and starting to get exciting at the point we had to move focus to the outdoor activity. I have to say I think it was absolutely brilliant!!! I visited at 3 points during the day; pre parade when it was starting to get busy but there was enough space for me to dip into a few experiments, again when it was post parade and packed and then again near the end when I could see how delighted the whole team were at the success of the day. And rightly so, you really made something special happen. The public clearly loved the diverse and exciting hands on experiments, demonstrations and performances on offer. Thank you all for your hard work and ingenuity. Let's hope it's future collaborations are on the horizon.
- Creative director-Walk the Plank (21 June 2016): Having been part of very early meetings about the Brain Box & then concentrating on all the outdoor activity on Manchester Day it was wonderful to visit the Brain Box on Sunday and see the results of all your hard work. I would like to express a huge thank you to you & all the fantastic members of your team who made the inside of the Town Hall shimmer with scientific inspiration on Sunday. It was wonderful to see so many people, young & old, captivated by all the various demonstrations & opportunities for hands on participation. There was a brilliant atmosphere & I am sure you have inspired some young scientists of the future. Thank you so much, very best wishes.
- members of the public (kept anonymous):



"My son spontaneously wanted to paint a brain (all be it with a smiley face on it) and then a neurone and give me a lecture on how electricity in our brains helps us think and move. He said 'I loved that museum yesterday. Can we go there again please dad'. He took the squidgy brain into school today for a 'show and tell session' all about the brain. So the message clearly got across!"

"Just wanted to pop a quick line to let you know how much we enjoyed the brain box exhibition yesterday. We attended with our 4 children, aged 3 - 13 and all of them had a lovely time. We particularly enjoyed the brain hats (worn proudly to school this morning) and the dance presentation in the "Broken Brains" rooms. I think each child learned something new! We spent a long time by each of the rooms and were almost the last to leave"

"Thank you so much for organising the event. I really enjoyed the day and lots of the visitors

- were asking if it'll be an annual thing. They were very impressed."*
- ".. it was a phenomenal achievement. There was such a buzz in the main Hall and a great mix of fun and pretty sobering stuff."*
- "there were a wide range of brand new engagement techniques, equipment, games, interactive exercises etc used that will provide a great platform for other future science engagement opportunities"*
- "... my 5 - year - old keeps talking about how small a fly's brain is but with so much "stuff" inside – it has really captured her imagination."*
- "We thoroughly enjoyed the event yesterday and just wanted to say that we received numerous positive comments. On behalf of everyone here at the Stroke Association in the North West, thank you very much for having us and we look forward to the next event!"*
- "...it was wonderful to visit the Brain Box on Sunday and see the results of all your hard work. I would like to express a huge thank you to you & all the fantastic members of your team who made the inside of the Town Hall shimmer with scientific inspiration on Sunday. It was wonderful to see so many people, young & old, captivated by all the various demonstrations & opportunities for hands on participation. There was a brilliant atmosphere & I am sure you have inspired some young scientists of the future."*
- "I was well and truly in my element on Sunday (recently graduated with a MSc in Science Communication) and can say it was one of the best events I have had the pleasure to be involved with."*
- "Thanks for the opportunity, I thoroughly enjoyed the day and judging by the visitors I spoke to they all did too."*
- "This was an excellent event – so nice to see so many different stands all together and a great range of interactive activities which the visitors all seemed to really enjoy."*
- "These type of events always make it clear how important our research is – people are counting on us to find answers and help the fights against diseases!"*
- "We had a fantastic day. Thank you so much for inviting us. It was wonderful to watch how involved and enthusiastic the children were."*
- "... thanks very much ... for inviting us to show off our [company's brain surgery] drills; It was really wonderful to see the reaction of the children (and some adults!) to the opportunity to try them out ... I've already fed back to [our company] that I believe we should support future instances of this event so please let us know if you require our services again."*
- "... it was absolutely brilliant!!! I visited at 3 points during the day; pre parade when it was starting to get busy but there was enough space for me to dip into a few experiments, again when it was post parade and packed, and then again near the end when I could see how delighted the whole team were at the success of the day. And rightly so, you really made something special happen. The public clearly loved the diverse and exciting hands on experiments, demonstrations and performances on offer. Thank you all for your hard work and ingenuity. Let's hope it's future collaborations are on the horizon."*
- "I had a superp time. I was seriously impressed with some of the activities there, such as the "brain wave game", the dance and interactive demonstration of imitating an action potential, the staining game for kids, the ability to touch real brain tissue with gloves of course ... I liked the set up and the structure of the event. Every room had its major theme and topic and it fit all well. The booklets, which were handed out were extremely valuable in order to*

gather information and to be rewarded with a nice sticker for every correctly answered question. Very nice idea indeed and great for kids... I really liked how very interdisciplinary it was (combining arts, science, creative writing in forms of poems/paintings etc.). I really hope we can re-create this experience with our table top activities for regenerative medicine."

"I enjoyed the event a lot ... only after spending more than an hour in one room we realised how much more there was in the other rooms!"

16. Resource provision (flies and/or food)

16.1. to researchers

- Weizman Institute, (May 15)
- Cardiff University (Sept 14),
- Cornell University (Oct 14)
- NIMR (Dec 14)
- University of Birmingham (Jan 15)
- University of Liverpool, (Sept 16, July 18)
- University of Sheffield (July 16),
- Makassar, Indonesia (Oct 16)
- Cambridge (Feb 16)
- Liverpool John Moores (Aug 16)
- University of Chester (Aug 16)
- Keele University (Aug 16)

16.2. to FLS/FBMH

- UCAS Open days (2013-2019)
- Developmental Biology Open Day (June 14, Sept 14, Oct 15)
- Neuroscience Open Day (June 15)
- University practicals and lectures (2013- 2020)

16.3. to schools

- Loughbrough Grammar School, Loughbrough (June 12, Oct 12,
- Hulme Grammar school, Oldham (Oct 12)
- Merchant Taylors School, Liverpool (Sept 13, Oct 14, Nov 14, Dec 14, Jan 15, Oct 15, Jan 17, Nov 18)
- Bolton Girls School, Bolton (Oct 13, Feb 14, June 14, Oct 18)
- Bolton School Boys' Division (Nov 18, Sep 19)
- Birkenhead High School, Birkenhead (Jan 14, Feb 14, May 14, Aug 14, Dec 14, Jan 16, April 17, Nov 18, Sept 19, Jan 20)
- Bolton Muslim Girls School, Bolton (June 14)
- Loreto Sixth form College, Manchester (July 14)
- Burney College, Burnley (Sept 14, June 18)
- The Kings' School, Chester (Sept 14, Oct 18)
- Trinity High School, Manchester (Nov 14)
- Urmston Grammar (Nov 14)
- St Mary's School, Trafford (Jan 15)
- Bolton School, Lancashire (Feb 15)

- Cardinal Newman College, Preston (Sept 14, Nov 14, Dec 14, Feb 15, March 15, Nov 15, Dec 15, Feb 16, March 16, Nov 16, Feb 17, March 17, Nov 17, Feb 18, March 18)
- Ryburn Valley High School (April 15)
- Denbigh High School, Denbigh (May 15, Dec 15, Jan 16)
- Ashton sixth form college, Ashton (May 15)
- Sidcot School, Sommerset (July 16, July 17)
- Rossall School, Lancashire (Jan 16)
- NUAST, Nottingham (Oct 17)
- Nelson and Colne College, Nelson (March 16, March 17, March 20)
- St Johnfisher Catholic School, Medway (Nov 16)
- Xavarian College, Manchester (Jan 17, Oct 17)
- Wiltshire College, Lackham (Jan, Feb 17)
- Escola Secundária de Ponte de Lima, Portugal (Feb 17, April 17)
- Mallaig High School (Oct 19)
- Brompton Academy (Sept 18)

Part C: Evaluation

School Evaluation (*updated files can be downloaded [here](#)*)

- ManFlyFacility-SchoolEvaluations.xls [[LINK](#)]
- Scarisbrick-Evaluation.pdf [[LINK](#)]
- 18-10-17_StJohnsEvaluation-4b.xlsx [[LINK](#)]