

Statement of Contributions to Diversity

About this document

Diverse and inclusive environments in work and professional settings are difficult to find, and more difficult to create. Tech companies, academic departments, conferences, governing bodies, all are increasingly hunting for better practices to reduce bias. This statement relates my record and contributions to diversity, and my vision for continuing to make a lasting difference in the communities and institutions I belong to.

Inequalities in our society are structural, permeating through various dimensions of our endeavors. Being active to curb inequalities thus involves many efforts: some through formal programs, others through spontaneous and informal interactions with individuals in our circles. In my role as an academic and educator, I have taken the opportunity to advance diversity through both systematic activities, and eclectic minor actions—this statement reflects that mix.

About me

I am a Latin American woman and engineering professor. According to a recent study, US academia counts just over 100 of us,¹ which comes out at under 0,4% of the number of tenured or tenure-track faculty in engineering.² But it's not by merely *being* one of so very few that I contribute to diversity, but by communicating about, advocating for, and working to include and attract the underrepresented groups I belong to.

My experience spans three continents, having worked in Chile (my native country), Great Britain and the US. I have taught at every level: freshmen, sophomores, juniors and graduate students in MSc and PhD programs.



Tweet thread from January 2018, citing the MRS special feature on Latino engineering faculty in the US. <https://twitter.com/LorenaABarba/status/955900766526550017>

Opening doors for young Latin American researchers

Shortly after starting my first academic position, at the University of Bristol, UK, I put together a network of collaboration and wrote a proposal for the EuropeAid ALFA program.³ The goal of ALFA is the promotion of co-operation in higher education between the European Union and

Latin America, as a means of fostering economic and social progress by improving the conditions of training of highly qualified persons. My project was titled “*Scientific Computing Advanced Training*” (SCAT) and it involved more than 45 members at 6 institutions in Europe and 4 in Latin America. In the duration of the project, we held ten international meetings, and awarded 31 mobility grants to graduate students and postdocs, mostly from Latin America. These grantees visited a research lab in Europe for periods of 6 months to a year, and capitalized on the experience to enhance their future careers. The total budget of the project was 1.34 million euro (ended July 2009), of which I was the sole PI. The project website remains live, with details about the activities: <https://www.scat.bris.ac.uk>.

Advanced summer schools for US and Latin American researchers

In 2010, I obtained competitive funding from the NSF Office of International Science and Engineering PASI (Pan-American Advanced Studies Institute) program to hold a two-week intensive school titled “*Scientific Computing in the Americas: the challenge of massive parallelism.*” The event took place in Valparaiso, Chile, in January 2011. The NSF funding covered 37 graduate students and post-doctoral researchers to attend, plus 14 lecturers. This PASI generated more than 40 hours of lecture videos as screencasts, with all materials from lectures disseminated via a website (see links therein).⁴ Two years later, I organized a second PASI titled “*The science of predicting and understanding tsunamis, storm surges and tidal phenomena,*” held January 2013 in Valparaiso (with additional support from ONR).⁵ Twenty five graduate students and post-docs participated in the event (from Latin America and the US), with 10 speakers and instructors delivering lectures and mini-courses.

.....

My goal for these PASI events was that they be a catalyst for collaboration and provide training to a top-class group of young researchers throughout the Americas. Like the EuropeAid-funded SCAT project, these efforts were aimed at developing scientific capacity in Latin America, and in particular in Chile, my native country. It’s a recurrent theme for diaspora scientists to want to foment science “back home.” But one thing I learned with these experiences is that such initiatives benefit both sides—every effort to develop scientific capacity abroad opens perspectives and innovation opportunities for the scientists from the richer country, even if just on the conduct of research in resource-constrained environments. I wrote about this as part of my reflections after attending the 2013 Global Diaspora Forum in the State Department:

- [The science diasporas lead the action from campus to society](#), blog post, May 23, 2013.

Promoting women in engineering and computing

Promoting women in GPU computing

At the 2014 GPU Technology Conference,⁶ I noted the poor gender diversity, and floated with my connections at NVIDIA the idea of a campaign to feature women in computing. I then worked with their marketing team to issue a call for (self-)nomination and helped advertise via Twitter. The [#WomenWhoCUDA](#) campaign was launched with a post in the NVIDIA blog:

- [Parallel Lives: Women in GPU Computing](#), May 8, 2014 by Linda Caplinger

NVIDIA then published a web page profiling 30 women in computing: “[Women and CUDA](#),” and I was interviewed for the *HPC Wire* podcast about the project:

- [Dr. Lorena Barba Talks “Women Who CUDA”](#) by Nicole Hemsoth, May 28, 2014

The initiative was covered by an industry magazine, featuring me among others:

- [Women Who Compute: Overcoming Lack of Gender Diversity in Science and Technology](#), by Rob Farber for *Scientific Computing* magazine, pp.18–21, November 2014; in print and digital edition.

The following year at GTC, I helped organize a special session, and NVIDIA published: [Women@GTC Focus on Innovation, Inspiration and Roadmap for Inclusion](#), by Tonie Hansen, March 19, 2015. The company has kept the momentum of these initiatives, and this year they feature a [Women’s Early Career Accelerator](#). Given my extensive correspondence, teleconferences and in-person meetings with the NVIDIA team, I am confident that my influence was pivotal in these efforts.

Speaking against male-dominated conferences in engineering

Late in 2013, I was invited by an old grad-school classmate to propose a mini-symposium at a computational mechanics conference. His co-organizer reiterated the invitation, sending a link to the conference site, and mentioning that plenary speakers were announced. With dread, I saw that *all* 19 plenary and semi-plenary speakers were men, and I wrote back pointing out the problem. I said that it looks badly on the conference to have an all-male roster and they should add women. The co-organizer’s reply was emphatic: “I’m completely opposed to positive discrimination...” A long email chain ensued, in which I made patient arguments and cited various published works; it ended in a surprising reversal from the co-organizer who promised to strive for improvements. The next year, I was invited again to propose a mini-symposium, this time to the world conference of this community... and I found *again* a website listing an all-male roster of plenary speakers. I declined the invitation, and wrote this blog post:

- [I won’t go to your conference because the plenary speakers are all men](#), Lorena A. Barba on *Medium*, Oct. 10, 2015

Without naming persons or the event, the blog post still got attention from members of this community, and I later exchanged emails and had phone conversations with some of its leaders. Three years later, the organizers of this community’s world event included a “[Visionary Talks Series](#)” with the plenary sessions, featuring four leading women. (Although I did not help organize this event, I did speak on the phone with the conference chair about their ideas for welcoming more women speakers.) I believe my advocacy in this community has made a (slow) difference towards recognizing the contributions of women in computational mechanics.

Acting to increase participation of women in high-performance computing conferences

At the 2016 ISC High-Performance Computing Conference, I served as chair of the inaugural PhD Forum (a track for presentations of doctoral research). I set myself the goal of a gender-balanced committee (see tweet), and at the event, I made a point to explain my goal and my method to the person who would chair the event the next year. I also sent him a list of names of women in HPC. It was rewarding to see him follow my lead and recruit a gender-balanced committee in 2017.

In 2016–7, I called out on another HPC conference on Twitter:

- ▶ All-male conference chairs & technical committee—I don't think I'll be submitting here! @SIGHPC @TheOfficialACM <http://www.pasc17.org/organization/>

The @SIGHPC account replied: “We appreciate that you noticed that, we did too. We are working to encourage SIG-affiliated events to be more inclusive.”

The conference also featured a panel with an all-male line up. To the panel announcement on Twitter, I replied:

- ▶ You mean, PASC17 to feature #manel discussions on Moore's Law and computational science?

I met the moderator of this panel at another event months later, and he made a pointed note of my candid tweets. He requested that I not air publicly such objections, and send instead a private email. This is a man with a position of leadership in the HPC community, and his challenge to my speaking out was intimidating. The anecdote makes plain that advocating for diversity and inclusion demands *courage*. At this year's conference, they feature prominently women as keynote speakers⁷ and I congratulated them on Twitter.⁸

As Program Co-Chair of the SciPy Conference in 2017, and after a shaky start when selecting mini-symposium area chairs, I decided to apply a zipper quota. I wrote about this in:



Lorena Barba
@LorenaABarba

Here's the committee for the @ISChpc PhD Forum, which I'm chairing—notice anything special? isc-hpc.com/isc-committees...



PHD FORUM PROGRAM COMMITTEE

The PhD Forum Program Committee is an international committee of HPC experts. From all PhD Forum proposals submitted, the Committee selects the best ones for presentation at ISC and one contribution to receive the “ISC PhD Forum Award”.

- Lorena Barba, George Washington University, USA (Chair)
- Anshu Dubey, Argonne National Laboratory, USA
- Anne Elster, Norwegian University of Science & Technology, Norway
- Fernanda Foerster, Oak Ridge National Laboratory, USA
- Georg Hager, Friedrich-Alexander University Erlangen-Nuremberg, Germany
- Paul Kelly, Imperial College London, UK
- Kengo Nakajima, University of Tokyo, Japan
- Amanda Randles, Duke University, USA
- Michelle Mills Strout, University of Arizona, USA
- Ana Lucia Varbanescu, University of Amsterdam, The Netherlands
- Michela Taufer, University of Delaware, USA
- Richard Vuduc, Georgia Institute of Technology, USA
- Gerhard Wellein, Friedrich-Alexander University Erlangen-Nuremberg, Germany (Co-Chair)
- Felix Wolf, Technische Universität Darmstadt, Germany
- Rio Yokota, Tokyo Institute of Technology, Japan

10:43 AM - 16 Feb 2016

5 Retweets 7 Likes



Tweet from Feb. 2016, announcing a gender-balanced technical committee <https://twitter.com/LorenaABarba/status/699605000046190593>

- [How I get gender balance in tech-conference committees](#), Lorena A. Barba on *Medium*, June 18, 2017

I ended with the following pledge:

In my current and future roles of leadership in the academic and tech worlds, I hereby make a public commitment to keep pulling focus to increasing diversity, curtailing unconscious bias, and influencing community cultures towards inclusion. You can, too. Just make a decision.

At the SciPy Conference, I also worked with the diversity chair to craft [Chair and Reviewer Guidelines](#) that addressed specifically unconscious bias and proposed tactics to interrupt it during the review process. We complemented with a campaign to educate our reviewers and chairs, and moved to a double-open peer-review process. I wrote about this in:

- [How to be a SciPy reviewer](#), Lorena A. Barba on *Medium*, January 25, 2018

Speaking against gender bias

At the 2018 SciPy Conference, I was invited to give the Diversity Luncheon keynote. With recent public furor about the Google “anti-diversity manifesto” and a controversial essay by a computer-science instructor at University of Washington on “why women don’t code,” I set out to dispel many myths about gender bias. I wrote the following essay to accompany my speech:

- [Bias, Diversity, Backlash, Manifestos, and Rebuttals](#), Lorena A. Barba on *Medium*, July 12, 2018

The video of my keynote is available at <https://youtu.be/vQH3ZGJ2mvY>.

Mentoring students, outreach and advocacy

I have mentored four PhD students to graduation (two from Chile, one from Britain, and one from India), and one post-doctoral researcher (from Japan)—all of them are male. They have gone on to excellent positions, including dev-tech engineer at Nvidia, staff scientist at the Swiss Supercomputing Center, and two faculty positions (in Chile and Japan). See the [People](#) section of my website.



Lorena Barba
@LorenaABarba

With [@ncclementi](#), we taught a [#Jupyter](#) tutorial for talented high-school students of the “Caminos” [@gwcisneros](#) program. Wiped out! go.gwu.edu/caminos



3:33 PM - 17 Jul 2018

2 Retweets 19 Likes



Tweet sharing the end of a successful workshop for high-school students of Hispanic background <https://twitter.com/LorenaABarba/status/1019289106008956928>

At this time, I'm mentoring four PhD students: one from France, one from China, one from Taiwan (all male), and my first female student, from Argentina. With her, we taught a 3-hour tutorial for high-school students⁹ during the 2017 and 2018 Summer program "Caminos al Futuro," of the GW [Cisneros Hispanic Leadership Institute](#). (It was a hands-on tutorial titled "Data Science for a Better World," and it guided the students through the basics of using Python with data.)

Given my vocal interest in gender parity and counter-acting bias, all my graduate students become aware of the issues, and we often have lengthy discussions about concerns raised in our local setting, and in broader circles (e.g., conferences). I am deliberate that my mentoring of the male students will make them better colleagues and allies to women professionals in their networks.

Undergraduate teaching

In the last few years, I have been adding to my course syllabi a Code of Conduct, modeled after those by Software Carpentry, PyCon and Ada Initiative.¹⁰ I take time in one of the early classes to explain what it means to have a Code of Conduct, and why we have it. Thus, I provoke reflection on treating classmates professionally.

In my recent undergraduate classes, I have worked with Learning Assistants (LAs) in the classroom (supporting active learning via live coding). I invest extra work (with the coordinating office) to ensure that the LA teams are gender balanced (in one case the LA team was all-female: see tweet from 11 Dec. 2017).

My courses also attend to inclusivity concerns via instructional design and content selection. For example, the Engineering Computations course I wrote in 2017 was designed to teach programming *in context*. Context-based computing has been associated with reducing the success gender gap and increasing participation of women in computing.¹¹ To make the course more relevant to students, I use varied contexts and real data; for example:

- ▶ A lesson on linear regression uses real data of earth temperature over time,



<https://twitter.com/LorenaABarba/status/940255678878371841>

making plain the warming of the earth, and the faster warming in the last decades.

- Lessons on exploratory data analysis use two contexts: the first, analyzes a real data set of US craft beers, the second analyzes the lead content in lipstick from published FDA studies.
- A lesson focusing on data visualization uses real data of life expectancy and wealth of 140 countries over the years.

In sum, I consistently invest in various ways to create learning environments where women will feel more at ease and supported. Although my efforts have not been explicitly directed at other minority groups, it is often the case that initiatives to effect more inclusive environments for some underrepresented group benefit everyone in the larger group.

Plans and vision

My public commitment made in the July 2017 *Medium* post (see page 4) remains true. Pulling focus to diversity concerns and working actively through leadership and outreach are generally unrewarded labor, and I'm looking forward to being in an environment where it is better valued. I plan to continue using my position as tenured faculty as an instrument for increasing diversity and inclusion in the following ways:

1. Structuring equality in my classroom—Cathy Davidson proposes¹² that we start with pedagogy to structure a classroom for equal participation. Active-learning methods are essential: I have used flipped classroom for about 10 years¹³ (before it was widely talked about), and now also use live coding, exit tickets, and think-pair-share. I will continue to learn, reflect, adopt and share strategies for total participation in my classroom.
2. Urging for institutional change—How is our institution tackling implicit bias? For example, are student teaching evaluations used for promotion and tenure decisions? Student evaluations are rife with gender, race and other biases. I've been tweeting¹⁴ about this since 2012 and have shared a three-page list of references on gender bias in student evaluations,¹⁵ but they are still used at my current and previous institutions to inform promotion decisions. The evidence on implicit-bias trainings, on the other hand, is that they affect awareness but do not change behavior.¹⁶ We as a faculty need to discuss the subject more deeply and not ignore the research.
3. Creating new programs—Here's an idea: in engineering education, universities and accrediting bodies emphasize the need for including an ethics component. At my current institution, this is satisfied via an ethics course delivered by the philosophy department, which students don't find relevant. I would like to work with colleagues to develop a short module focusing on implicit bias framed in social-justice arguments, and on becoming better allies. Women with engineering degrees leave the profession (nearly 40% of them do¹⁷) often due to unsupportive workplaces, so I believe we should educate *all* engineering students about these subjects and ensure our graduates will be part of the solution.

Notes

¹ Gerardo N. Arellano, Oscar Jaime-Acuña, and Olivia A. Graeve (2018). Latino engineering faculty in the United States, *MRS Bulletin*, Vol. 43, Issue 2 (Materials for Heat-assisted Magnetic Recording), February 2018 , pp. 131–147. <https://doi.org/10.1557/mrs.2018.23>

² The number of tenured or tenure-track faculty in engineering was 27,907 in 2016, according to: Yoder, B. “Engineering by the Numbers,” <https://www.asee.org/documents/papers-and-publications/publications/college-profiles/16Profile-Front-Section.pdf>

³ My project was funded by the Alpha Phase-II Programme (2000-2006), whose webpage is no longer live. A snapshot is available on the Internet Archive: https://web.archive.org/web/20130416172014/https://ec.europa.eu/europeaid/where/latin-america/regional-cooperation/alfa/detail_en.htm The website of my project is still live: <https://www.scot.bris.ac.uk>

⁴ See: <http://www.bu.edu/pasi/>

⁵ See: <http://www.bu.edu/pasi-tsunami/>

⁶ <https://www.nvidia.com/en-us/gtc/>

⁷ <https://pasc19.pasc-conference.org/program/keynote-presentations/>

⁸ <https://twitter.com/LorenaABarba/status/1104088062857019392>

⁹ lorenabarba.com/news/tutorial-for-high-school-students-at-gw/

¹⁰ See: Barba, Lorena A. (2017): Course Syllabus: Engineering Computations (MAE 2117). figshare. Paper. <https://doi.org/10.6084/m9.figshare.5709748.v1>

¹¹ Guzdial, M. (2013). Exploring hypotheses about media computation. In Proceedings of the ninth annual international ACM conference on International computing education research (pp. 19-26). ACM. <https://doi.org/10.1145/2493394.2493397>

¹² <https://www.hastac.org/blogs/cathy-davidson/2017/11/15/active-learning-kit-rationale-methods-models-research-bibliography>

¹³ See <http://lorenabarba.com/news/flipped-class-energizes-cfd/>

¹⁴ <https://twitter.com/search?src=typd&q=evaluations%20from%3ALorenaABarba>

¹⁵ <https://docs.google.com/document/d/1oOSyKqEsp-zD99azNK0CGJtJGy0LW0rQsp8su2PLo4/edit>

¹⁶ Joy-Gaba, J. (2017, August 27). From Learning to Doing: The Effects of Educating Individuals on the Pervasiveness of Bias. <https://doi.org/10.31237/osf.io/vpd8b>

¹⁷ Nearly 40 percent of women leave engineering, by Xochitl Rojas-Rocha (2014), *Science*, <http://doi.org/10.1126/science.cared-it.a1400210>