Jérémie O. Lumbroso, Ph.D
Practice Assistant Professor
`lumbroso@cis.upenn.edu`

DIVERSITY AND INCLUSION STATEMENT (shortened)

What I love about academia is that many different people can get together to talk and confront views as part of *the truth-seeking mission.* Investing in diversity, equity, and inclusion seems to me like the natural continuation of what academia is really about rather than a distinct value. This truth-seeking also involves teaching. Teaching is deeply connected to emotions, both those of the teacher and of the learner(s)[1]. On the one hand, the teacher's emotional intelligence conditions the quality of the communication with learners. On the other hand, only when learners are comfortable to be authentically themselves, without criticism, can they fully focus on learning, as learning involves making mistakes and allowing oneself to be vulnerable. For this reason, it is important to be concerned with how learners *feel* in the classroom, and to employ a number of broadly inclusive strategies that will appeal or benefit different learners.

But inclusiveness from the instructor is not enough! Despite recent gains in diversity—with several universities managing to achieve hard-won near gender-parity in introductory computer science courses (CS1)—there has generally been no concomitant evolution of CS majors. Recently, the percentage of women majors has been stagnating around a third[2]. Career and major decisions are complex and multi-faceted, but abundant evidence shows that identity plays a significant role[3]. Making courses inclusive is important, but not enough because this describes efforts in the curriculum, course and class mechanics. We now need to make the entire **computing *environment* inclusive** by reshaping norms of interactions among peers[4] and with staff through the lens of intersectionality:

> "*When African American women gain access to the coveted world of higher education and fail to perform at the same level as their White counterparts, inadequate academic preparation is often cited as the cause (Museus et al., 2011). Yet [in this study, several] participants recounted multiple instances in which peers refrained from inviting them to work on projects as a result of preconceived notions about their academic abilities.*"

We need to support **diverse computing *identities*** and expand both the **computing *culture* and *culture* compentency**[5]. The most impactful way is by recruiting diverse colleagues[6] to enrich our community and be role models to a new population of students—this is crucial, as the absence of diverse role models is one root cause of feelings of inadequacy[7]. An appreciation and *curiosity* for differences is also important.

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[1] Titsworth, Scott, Margaret M. Quinlan, and Joseph P. Mazer. "*Emotion in teaching and learning: Development and validation of the classroom emotions scale.*" Communication Education 59, no. 4 (2010): 431-452.

[2] Babeș-Vroman, Monica, Thuytien N. Nguyen, and Thu D. Nguyen. "*Gender Diversity in Computer Science at a Large Public R1 Research University: Reporting on a Self-study.*" ACM Transactions on Computing Education (TOCE) 22, no. 2 (2021): 1-31.

[3] Zarrett, Nicole R., and Oksana Malanchuk. "*Who's computing? Gender and race differences in young adults' decisions to pursue an information technology career.*" New directions for child and adolescent development 2005, no. 110 (2005): 65-84.

[4] Charleston, LaVar J., Phillis L. George, Jerlando FL Jackson, Jonathan Berhanu, and Mauriell H. Amechi. "*Navigating underrepresented STEM spaces: Experiences of Black women in US computing science higher education programs who actualize success.*" Journal of Diversity in Higher Education 7, no. 3 (2014): 166.

[5] Washington, Alicia Nicki. "*When twice as good isn't enough: The case for cultural competence in computing.*" In Proceedings of the 51st ACM technical symposium on computer science education, pp. 213-219. 2020.

[6] Gasman, Marybeth, Ufuoma Abiola, and Christopher Travers. "*Diversity and senior leadership at elite institutions of higher education.*" Journal of diversity in higher education 8, no. 1 (2015): 1.

[7] Jaremka, Lisa M., Joshua M. Ackerman, Bertram Gawronski, Nicholas O. Rule, Kate Sweeny, Linda R. Tropp, Molly A. Metz, Ludwin Molina, William S. Ryan, and S. Brooke Vick. "*Common academic experiences no one talks about: Repeated rejection, impostor syndrome, and burnout.*" Perspectives on Psychological Science 15, no. 3 (2020): 519-543.

Jérémie O. Lumbroso, Ph.D
Practice Assistant Professor
`lumbroso@cis.upenn.edu`

My background shapes my awareness of intersectionality. I reflect carefully about the different dimensions of my identity such as age, gender, race, social-economic class, international background, sexual orientation, personality type, neurotype, power dynamic, and belief system and how these have influenced my perceptions. I appreciate how each dimension of my identity and background can bring advantages or disadvantages.

- **Over the years, my identity has come into focus.** For instance, I identify today as neurodivergent. I have *Sensory Processing Sensitivity* (sometimes referred to as being a *Highly Sensitive Person*). This trait comes with advantages, such as a "*depth of processing*" and increased empathy, but also disadvantages, such as a tendency for "overstimulation" and difficulty in making decisions quickly. It has been important to learn strategies to operate in a world that is not designed for me, and how to advocate for myself and educate others so that they see how enriching it can be, to be in a community alongside people who are different.

- **Over the years, parts of my identity have changed.** My family's livelihood was tied to translation, and that was one of the first victims of the development of machine learning. As Google turned machine translation from a curiosity to reality, my parents went from being the heroes of globalization and the Information Age to becoming the serfs of algorithms. I can hardly explain the horror: Clients could save money by hiring my parents as rereaders rather than translators, but rereading a machine translation without the source text is immensely laborious and paid less than half as much. Because of this, although I was born in a middle class environment, we eventually descended into poverty.

- **My experiences have made me aware of the impact of luck.** In academia, the concept of equity was introduced in part to counter the damage done by our blind belief in meritocracy, recognizing that not everybody starts from the same place and adjustments should be made for imbalances. But we can't simply measure effort or outcome, we must acknowledge the impact of luck. For example, I am lucky that I had access to a computer when young, and that I obtained a Ph.D. scholarship from the French ministry of research. On the other hand, I am unlucky that my Ph.D. advisor died a year and a half into my thesis.

- **Some differences are visible, others are not—and sometimes it does not matter.** Most of the ways in which I can be identified as *different* can be hidden, by contrast to, say, the color of the skin. Therefore as uncomfortable as it may be, I always have the option to hide, which is itself a huge privilege. But there are aspects of my identity I refuse to hide. When I was 7 years old, we moved from Paris to a rural village. My mother gave me alfalfa sprouts and carrot sticks for a snack, and the other kids had chocolate and candy, and their mockery made me feel like an outcast. Despite this, I loved my Mom too much to be ashamed of her, so I ignored this uncomfortable feeling. As an adult, I stand up for my beliefs, even when it is hard. Someone's identity is who they are, but also who they choose to be and how they choose to act every day.

Because the current research on computing identities and intersectionality is very limited[8], reflecting on my identity, provides me some points of reference in trying to relate to my students. This is just a starting point to know what questions to ask, along which axes, as I make an effort not to project my experiences onto students. I also realize that some parts of our identities can be in flux, especially for the young adults we typically teach. When discussing this with students, I try to deconstruct my experiences for them and convey how I have made sense of my identity.

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[8] Rodriguez, Sarah L., and Kathleen Lehman. "*Developing the next generation of diverse computer scientists: the need for enhanced, intersectional computing identity theory.*" Computer Science Education 27, no. 3-4 (2017): 229-247.

Jérémie O. Lumbroso, Ph.D
Practice Assistant Professor
`lumbroso@cis.upenn.edu`

Highlights of my track-record

My background in analysis of algorithms makes me think in terms of *scaling*, and in turn, I often think in terms of *systems*. As a result, **I am particularly interested in *systemic* obstacles to diversity and inclusion**—in identifying those systems, and charting new courses to change them. Fairness is prerequisite to diversity and inclusion. Some systemic obstacles to fairness in academia are the many unwritten and implicit rules and how familiarity with such rules is its own social capital. For instance, research has shown that although first generation students work just as hard as middle-class students, the favored studying strategies of the former tend to be less visible and valued by faculty, yet by not spelling out what is valued, institutions perpetuate this gap[9].

Therefore, to support fairness I strive **to make the implicit, explicit**:

- **Job descriptions for Undergraduate Course Assistants (UCAs).** My colleague Maia Ginsburg and I built the UCA program at Princeton from scratch. While initially there were a few well identified jobs for the larger, more organized courses, eventually, every course had some UCA positions available. However, when the responsibilities of the positions were not clear, there were few applicants. This limited the inclusiveness of our process, because we only captured applicants who felt confident either to reach out to faculty or to assume they would be able to handle whatever the job entailed. In 2023, I designed a standardized job description format and required any faculty advertising a job to build a job descriptions using standardized templates and answers to help faculty do so efficiently. The number of applicants increased by over 158% and the diversity of the pool increased among first generation applicants. When we clarified the responsibilities and the amount of hours, it was easier for applicants to see themselves in these positions and to understand whether they had the availability and skill set for them.

- **Due-process in hiring UCAs.** In building the UCA program at Princeton, which hired 457 jobs in the Spring of 2023, I worked to ensure clear due-process. For instance, I clarified to students how the allocation process works, and how their preferences relate to their job assignment. I built a communication campaign that ensured every applicant was updated regularly through the application and review process. I communicated clearly that sometimes applicants are not hired, not because they are not qualified, but because there are too many applicants. I encouraged faculty to create an interview or application process for their positions, and to have an assessment rubric for candidates. When notification emails did not provide detail on why they were not hired, I permitted applicants to review feedback on their applications, so that they could improve it in future semesters. I focused on this because I noticed in our past hiring campaigns that underrepresented students were not being hired and often internalized this rejection as reflective of their merits rather than the result of an arbitrary and broken hiring process. I have tried to make everything about this selection process explicit and the decisions appealable.

- **Code style deductions.** In several courses programming assignments were graded with style deductions, but we never discussed style in the course. I reasoned that students who did not incur the deductions had prior training, and novices were being penalized for having never been told. I authored a code style guide that makes all our expectations explicit. Furthermore I created infrastructure necessary to implement the policy that all style deductions are waived when incurred only once.

- **Course staff responsibilities.** In large courses with large staffs, it is important to share that all staff members do their fair share of the workload. To address this problem, my colleagues Soohyun Nam Liao, Dan Leyzberg and I created a standard spreadsheet for course staff responsibilities: Every column is a

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[9] Yee, April. "*The unwritten rules of engagement: Social class differences in undergraduates' academic strategies.*" The Journal of Higher Education 87, no. 6 (2016): 831-858.

Jérémie O. Lumbroso, Ph.D
Practice Assistant Professor
`lumbroso@cis.upenn.edu`

staff member, every row is a responsibility—some recurrent, others are one-time. Each cell indicates the number of hours assigned to a given staff member for a given responsibility. This transparently confirms everybody is working a fair workload. It also makes it easier and scalable, to customize each staff member's workload according to preferences, scheduling conflicts or other demands like paper submissions, and to identify and address non-compliance.

I strive to make students comfortable and to share my genuine interest, support, care, and esteem for them. Here is a non-exhaustive list of concrete ways that I seek to create an inclusive environment:

- **Learning students' names.** For my recitation groups (~60 students per semester) and academic advising groups (~20 students per year), I try my best to learn students' names proactively using flashcards, if possible before the first day of class. This helps me recognize students, but also it primes me to be able to remember information about them. I challenge myself to find the correct pronunciation of every name, and I ask students if I got it right and let them correct me. But I do try, and I give it my best shot!

- **No humor!** Early on, I decided to avoid humor entirely in the context of teaching, as I find it too context sensitive. Even without risking offense to students, it is possible to frustrate or confuse them, or leave some feeling excluded from jokes. I also avoid self-deprecating humor because of the high prevalence of impostor phenomenon in academia, and its hypothesized link with negative self-talk[10].

- **Reducing friction to access.** Before the pandemic, I met several first generation students who had to drop out of our introductory course because they did not have a suitable laptop and could not obtain one. Although I initially tried to obtain laptops for these students, I eventually encouraged us to redesign our activities to be entirely accessible from a browser. I brought a new edtech tool to campus that allowed my colleagues to create online activities in our introductory courses. This not only addressed the issue of students without adequate laptops, it considerably simplified the transition to fully remote instruction.

- **Respect for autonomy.** I try to provide students with clear guidelines for what they need to do, clear intentions for what I do, and, as much as possible, I try to provide flexibility for their autonomy. For instance, as becoming common, I provide students with a number of free late days (which I can extend to accommodate special requests) that they can use to organize their deadlines and religious events. When I ask a question in class, I set a timer so it is clear how much time I would like students to think and I want to give everybody a chance to take the thought exercise seriously. I naturally accept special accommodations due to disabilities (for instance, I have reviewed subtitles for our CS1 video the semester in which we had a deaf student), and religious observance. As mentioned in my teaching statement, I try to provide multiple kinds of assessment (within the limits of what is possible in a given semester).

- **Culture of listening.** My teaching is student-centered, demands active participation, and I strive to be inclusive. I understand how non-verbal cues—like a sigh or a shrug or a grimace—can be perceived negatively when a question is asked, or an answer is given. I control non-verbal cues to communicate attentiveness, benevolence and kindness. When in small to mid-sized groups, I focus much of my time on taking questions directly from students. In larger groups, I use polls and Sli.do to receive questions electronically that are voted on by the class. I prefer to avoid attendance policies. I know students are young adults who need guidance in organizational skills, but I believe attendance issues come from students feeling like attendance is not worth their time. I work hard to convince students not just that attendance is worth their time, but also that the course is changed by their presence. *I do this by making ample time for class participation through questions.* I aim to create a culture where asking questions in

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[10] Hutchins, Holly M., and Hilary Rainbolt. "*What triggers imposter phenomenon among academic faculty? A critical incident study exploring antecedents, coping, and development opportunities.*" Human Resource Development International 20, no. 3 (2017): 194-214.

Jérémie O. Lumbroso, Ph.D
Practice Assistant Professor
`lumbroso@cis.upenn.edu`

class is easy, there are many ways to do it, and where the act itself is celebrated. I ensure students who ask questions feel treated with reverence and appreciation. I answer every question, or I explain my thought process if I do not. I earnestly work to ensure that nobody feels bad, or stupid, or demeaned for asking a question. I ensure my answers are relevant to the broader class, sometimes by answering more than strictly what the asker asked, if there is a need to provide context. I try to explain misunderstandings that students exhibit, and deconstruct them—to normalize misunderstandings and mistakes. I try to ensure the students' time with me is unique, incomparable, as it is customized to them.

Finally, **I seek to make students feel appreciated**, especially when helping each other:

- **Appropriate celebration of excellence.** I try to avoid excessive focus on top students. For instance, if nobody answers an active participation question, that most students should be able to answer, I don't ask a fallback top student; instead, I ask the class if I need to rewind, or what is the last notion that we have discussed that they can explain clearly. If a student has a question that seems too advanced, I have clear boundaries, and will gently reorient the discussion—for instance thanking the student for the question, noting it down for later, and promising to email the student (as one among several strategies). There is time to nurture top students outside the classroom, but if there is any behavior I try to proactively spotlight in the classroom, it is contributing to the community, helping others, explaining to others.

- **Encourage students to connect with each other.** I strive to encourage students to work together. I tell them they are each other's best assets. In all sizes of groups, I try to be the benevolent force that contrives two (or more) awkward people who don't know each other to take a chance—I realize this may be uncomfortable, but in my experience this is a discomfort that students who come to class enjoy having. Cross-class friendships seem to be a key to upward mobility[11]. And I know the literature on group projects, and on how to pro-actively limit conflicts and resolve them when they occur[12].

- **Pathways for growth in our UCA program.** Naturally, some students will work as UCAs for several semesters, perhaps sometimes going above and beyond. When our course staffs become very large and workloads are not fixed, it is hard to keep track of the individual contributions of each member, especially across semesters. Part of my research has been focused on building an econometric system to track contributions of UCAs in introductory courses, and rules translating performance into promotions—such as from grader to senior grader, to grading manager—and into awards. Without such tracking, it is easy to ignore the outsize contributions of select UCAs, or to promote based on homophily: A missed opportunity, as these jobs are great opportunities for first generation students to be in contact with faculty.

Beyond these discrete efforts, I seek to advance diversity and inclusion values in as many facets of my faculty work as I can. For instance, in student organizations for which I am faculty advisor, I focus less on content than on ensuring clear and transparent norms for recruitment, promotion, discussion—and on explaining why this is important, even if it seems bureaucratic. At a departmental-level, I have served on the teaching faculty hiring committee for eight years in a row (2014-2022) and interviewed every single candidate, and have advocated for making decisions according to some predetermined criteria to avoid shifting goalposts and implicit bias[13]. I also recognize *the central importance of mentorship*: When we recruit a new faculty, especially

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[11] Chetty, Raj, Matthew O. Jackson, Theresa Kuchler, Johannes Stroebel, Nathaniel Hendren, Robert B. Fluegge, Sara Gong et al. "*Social capital I: measurement and associations with economic mobility.*" Nature 608, no. 7921 (2022): 108-121.

[12] Chang, Yunjeong, and Peggy Brickman. "*When group work doesn't work: Insights from students.*" CBE—Life Sciences Education 17, no. 3 (2018): ar52.

[13] Leyzberg, Dan, Jérémie Lumbroso, and Christopher Moretti. "Nailing the TA interview: using a rubric to hire teaching assistants." In Proceedings of the 2017 ACM Conference on Innovation and Technology in Computer Science Education, pp. 128-133. 2017.

Jérémie O. Lumbroso, Ph.D
Practice Assistant Professor
`lumbroso@cis.upenn.edu`

when I do not work with them, I make a point to schedule at a minimum a weekly hour-long meeting in their first year and to make myself amply available through email and Slack—trying to understand their unique goals and how to support them in achieving them. I ensure that whatever course they end up in, there is space for them to contribute something new. I strive to ensure that the new recruits conserve their energy and ideas, feel connected, valued, supported, and like they have agency and room for error. In this way, I try to ensure we make space for, and nurture, diversity. In recent years, I realized it is essential to mentor staff as well, so I also make a point to be supportive and responsive with our existing staff and to help onboard new staff members. For example, when our department started using Slack, while my colleagues expected our staff would immediately be able to make use of this tool, I realized (naturally) that we needed to train the staff in its use. Although these efforts may sounds generous in time, I have found investments in people pay off!

Plans for advancing diversity, equity and inclusion

Our understanding of best practices for advancing diversity, equity and inclusion is still growing. The last few years have provided an urgency to academia that has made it easier to organize more ambitious projects, involving broader stakeholders than before.

I have several ideas on large themes I am excited about making strides in. But ultimately, what matters is the people we are trying to support, and in this sense, I am happy to collaborate on existing and new projects brought on by others.

Creating a Customer-Relationship Manager (CRM) for the university. In many industries that have customers, sales team use a CRM to create the illusion that they remember personal details about a large number of customers. I have often noticed that most modern higher-education institutions lack such a flexible system and this is often an obstacle in the way faculty get to know students better. For instance, currently, creating flash cards for my courses requires considerable effort that I could not imagine many colleagues taking on. I suspect that creating a modern CRM would help our colleagues manage their relationships with students over time and scale, and this effort would naturally help more marginalized students to be more connected to the department and faculty.

Moving towards mastery or specification grading, and learning objectives. Grading remains a contentious subject in education for a number of reasons, including:
- The metrics are devoid of meaning, as exhibited when instructors routinely "grade on a curb" without understanding this propagates inequities; or students narrowly optimize their actions for their grade.
- Grading is generally a snapshot of a student's understanding at a given time, and doesn't account for the fact that learning is often through mistakes. If a student has acquired the skills of the course by the end of it, does it matter that they progressed at a slower pace than their peers?

The field of education has introduced several alternative grading schemes, including mastery grading and specification grading. The main difference between mastery grading and specification grading is the focus of the assessment. Mastery grading focuses on how well a student has achieved mastery of a certain subject or skill, while specification grading focuses on how well they meet a set of specific criteria. Mastery grading is often used in more individualized learning environments, such as one-on-one tutoring, while specification grading is often used in more structured environments, such as in a classroom setting—because as the learning objectives become broader and more complex, it is harder to isolate specific skills and easier to define criteria or learning objectives. Both these techniques require a lot of investment and careful planning, and there are few existing curricula available for inspiration. Both techniques involve allowing students to resubmit work, sometimes at arbitrary times, and it is important to plan for how these reassessments are going to take place, especially if it involves human labor.

Jérémie O. Lumbroso, Ph.D
Practice Assistant Professor
`lumbroso@cis.upenn.edu`

Within the limits of institutional constraints, I expect to use elements of these grading approaches to design my next courses, and I am particularly interested in applying this type of work to introductory software engineering.

Better peer review [in CS education]. Peer review's outsize role in governing academia is understated. I compare it to the "*Congress*" of academia, where ideas are voted into laws; as such its gatekeeping potential is enormous. The absurdity of the peer review process was a factor that motivated me to abandon a tenured research position in France, for a teaching position in the US, despite my love of research.

Following a working group I was part of at ITiCSE 2020 on the peer review process in the CS education community[14], I had been assigned by the steering committee to lead a taskforce for SIGCSE on defining metrics and building infrastructure to audit the peer review process in the community's conferences. This project sought to address high profile complaints by community members that the peer review process was biased, uncivil, gatekeeping and suppressed new voices—but also to address underlying causes that were less visible, such as the large proportion of authors who submitted multiple papers but reviewed none.

Refocus conference on community interactions and networking. The format of CS conferences has not changed much in the last five decades, despite the numerous evolutions, in terms of access to papers and even talks through the Internet. This format conserves old inequities, such as the relative isolation of graduate students compared to faculty, and creates new ones, such as difficulties of access brought on by the rising cost of flights but also the moral decision of some to avoid or limit flights.

To pilot some of these ideas, I co-organized an unconference-type event in November 2022, which was a regional event at Cornell Tech on Roosevelt Island and was a companion to the Human-Computer Interaction (HCI) conference CSCW. This event gathered 65 participants from the region, and featured panels which allowed those with papers accepted at CSCW to summarize their paper in 2-3 minutes without slides and answer cross-cutting questions. In addition, we had table discussions which allowed participants to propose conversation topics or sign up to topics proposed by others, without discriminating between faculty and graduate students. This event provided a unique opportunity for researchers to network explicitly, and I plan to continue to explore ways to make the rules of engagement more explicit for graduate students, as well as finding how to engage our regional academic communities better.

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[14] Petre, Marian, Kate Sanders, Robert McCartney, Marzieh Ahmadzadeh, Cornelia Connolly, Sally Hamouda, Brian Harrington *et al.* "*Mapping the landscape of peer review in computing education research.*" In Proceedings of the Working Group Reports on Innovation and Technology in Computer Science Education, pp. 173-209. 2020.