Teaching Statement

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During my junior year of undergrad at IIT Kharagpur, I took a class called Social Computing. The instructor, professor Saptarshi Ghosh, discussed the (then) new finding by Propublica[1] about machine learning-based pretrial assessment algorithms being biased against black men. That one lecture sparked a passionate curiosity about technological injustices in my mind and started the beginnings of my research career. I hope that I can one day do the same for students.

Over the years through research and interpersonal networking, I have come to realize that the harms of technology in society are not necessarily obvious to the lay person outside of academic or tech circles, and it is my fervent belief that they should be, given how unbridled technology has the potential to shift and completely alter the fabric of society. To that end, I strive to propagate knowledge both inside and outside the classroom.

At Northeastern, I helped teach the course *Algorithmic Auditing*[2] as a teaching assistant for Dr. Piotr Sapiezynski, and the class was an unprecedented success. It was the first time the course was offered and we managed to get prominent researchers in the field—such as Deb Raji, Seda Gürses, Aaron Reike and others—to give guest lectures. The programming assignments taught students how to critically examine black box algorithms such as Amazon product search by learning web scraping and request logging techniques. Perhaps the crowning achievement of this class was when several undergrads expressed that they wanted to continue doing research in the area after the course since they enjoyed investigating algorithms for their term projects. One of them joined our lab full time as a PhD student this fall. I have also been a guest lecturer in other courses at Northeastern, with the most recent being Dr. Sina Fazelpour's *Technology and Human Values* class, which is cross listed for both Computer Science and Philosophy undergraduates.

Outside of classrooms, I have continued my theme of knowledge dissemination by regularly speaking at seminars, workshops, and reading groups. I co-run the Accountable Algorithms Reading Group at Northeastern, which is a weekly meeting for people inside and outside Northeastern who are enthusiastic about the latest literature about algorithmic bias. I also run a Twitter account by the same name that posts summaries of the group discussions. I have been an invited speaker at seminars—organized by nonprofits, government bodies and private companies—such as the Trustworthy ML Initiative, the UK Government Centre for Data Ethics and Innovation, and Arthur AI. I also volunteer my time to organize panels and invite speakers to workshops that are specifically designed to teach newcomers more about the field of responsible ML. For example, I have organized the QueerInAI workshop at SIGIR to discuss representational harms to queer people on online search platforms[3] and a CRAFT Bias Bounty workshop to detect online harms to queer communities at FAccT in collaboration with Twitter and QueerInAI[4].

Mentorship is important to me. I have been extremely lucky to have received excellent guidance throughout my research career from my numerous mentors. When I was applying to prospective PhD programs, I was

[1] https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing
[2] https://sapiezynski.com/cs4910.html
[3] https://sites.google.com/view/queer-in-ai/sigir-2021
[4] https://facctconference.org/2022/acceptedcraft.html#colab

explaining my motivations to my current advisor Dr. Christo Wilson, who then told me that research is a form of *academic activism*, and I took it to heart—it made me feel a sense of purpose and ended up being one of the major reasons that I chose to join Northeastern, and I hope to be that person for others too. Even during my undergrad, in 2016, I started a program called Kharagpur Winter of Code[5], which is a one month program where students code with mentors on Open Source Projects. The program was a huge success and it continues to be an annual event to this day. As a researcher, I enjoy working with undergraduate students and junior scholars on projects and often chat with prospective PhD students in the hopes that I can bring more young researchers into the fold to do this important work.

My teaching methodology is very simple: to meet people where they are. During my time as a TA, I tried to design the programming assignments with variable difficulties and bonus questions, so that students who were new to programming would get something out of them as well as students who would otherwise find the problem too easy. This philosophy goes beyond scholastic teaching as well. For instance, my partner's parents are corporate lawyers. When they asked me about my research, I tackled it from the angle of copyright law abuse and anti-competitive practices in online marketplaces to illustrate a tangible example of algorithmic harm that they could understand. In another case, I was talking to a process engineer who asked me why a model developer should care about anything but accuracy. I pointed out that a model being more accurate for one demographic and less for another is actually still an accuracy problem, one worthy of engineering attention by itself on top of the obvious ethical concerns. This seemed to spark immense curiosity in him, and at the end of our chat I felt like I had actually taught something interesting to a new person outside my field. Teaching brings these sparks of joy throughout my life, and I would like to continue to generate learning opportunities for people.

As a future professor, I look forward to offering a variety of interesting coursework to introduce ethics, transparency, and accountability from the ground up in Computer Science education:

- **Machine Learning/Data Science:** By far the most useful and interesting class I have taken at Northeastern was Dr. Paul Hand's Deep Learning class[6]. Machine Learning and Data Science are quintessential to my line of work, and I would be happy to offer foundational courses modeled after Dr. Hand's class in Machine Learning, Deep Learning, Data Mining, Information Retrieval and related areas.

- **Algorithm Auditing:** I would like to offer courses on Algorithmic Audits. Building on the coursework from Piotr's Class, I would like for students to walk away with knowledge of the different tools and technologies needed to study black box algorithms: Web scraping, Network Logging, using Developer Tools in browsers, and learning to identify dark patterns on the web. Students would also learn how to empricially evaluate collected data and best visualization practices to clearly convey audit findings to people outside the discipline. Additionally, a lot of my personal research is critical work on existing literature itself—so I would also teach students to focus on questioning and improving published work via term projects and assignments to improve on the existing trend of downloading and deploying black box models to solve tasks..

- **Responsible ML/AI Ethics :** Following the roadmap of my Accountable Algorithms reading group, I would also be keen to offer seminar-style ethics-focused classes to students to read and discuss the latest happenings in the responsible ML community. I would ideally utilize a mix of papers from computer science and related disciplines like law, philosophy, and economics.

[5] https://kwoc.kossiitkgp.org/

[6] https://khoury.northeastern.edu/home/hand/teaching/cs7150-spring-2021/index.html