Teaching Statement

1 Teaching Philosophy

The significance of teachers in all academic areas is profound. They inspire lifelong learning, equip students with vital critical thinking skills, and foster self-sufficiency and confidence in their education. Therefore, it's crucial for teachers to have a *strong grasp of the subject matter and adapt to individual learning styles*. In statistics, a logical and thorough analysis is essential for understanding the world around us. With the right approach, teachers can help students appreciate the value of statistical analysis in any area of interest. My teaching style emphasizes nurturing this intuition by highlighting the *motivation behind mathematics and demonstrating how its logic aligns with the common sense that every person already possesses*.

During my early undergraduate years, I had the opportunity to teach a group of curious young children in a rural part of West Bengal through a literacy and teaching campaign organized by the *National Service Scheme in India*. This was my first experience with teaching, and I quickly realized the joy of sharing knowledge and the interactive process of lateral learning. As a student myself, I firmly believe in Swami Vivekananda's quote that *"Education is the manifestation of perfection already in man"*.

As a UC Davis doctoral student, I served as a teaching assistant for graduate and undergraduate courses, honing my teaching skills and passion for education while engaging with a diverse academic community. Now, as a postdoctoral scholar at Penn State, I teach Introduction to Probability and Stochastic Processes, emphasizing practical application and collaborative learning. Simultaneously, I'm expanding my knowledge in Electrical Engineering, Computer Engineering, and Psychology alongside my students.

2 Teaching Experiences

- **Instructor (with full responsibility)**
  - **STAT 418**: Introduction to Probability and Stochastic Processes. Spring 2023, Department of Statistics, Penn State University.
    upper-division undergraduate level
  - **STA 131C**: Introduction to Mathematical Statistics. Fall 2021, Department of Statistics, UC Davis.
    upper-division undergraduate level
  - **STA 106**: Analysis of Variance. Fall 2019, Department of Statistics, UC Davis.
    upper-division undergraduate level
- **Teaching Assistant**, Department of Statistics, UC Davis.
  - STA 13 (Elementary Statistics)
  - STA 108 (Regression Analysis)
  - STA 145 (Bayesian Statistical Inference)
  - STA 231A (Mathematical Statistics- PhD level coursework)
  - STA 106 (Analysis of Variance)
  - STA 131AB (Introduction to Mathematical Statistics)
  - STA 200B (Mathematical Statistics) - Masters level coursework
- **Mentoring**, Department of Statistics, UC Davis.
  - Undergraduate thesis: *Functional data analysis on the remaining life expectancy of the older population over the years*. Advised by: Dr. Hans-Georg Müller on (2022).
  - Undergraduate thesis: *Inference on the dynamics of COVID-19 in India for the state of Kerala*. Advised by: Dr. Debashis Paul (2020-–2021).

3 Recognition

- Excellence in Graduate Student Teaching Service Award, Department of Statistics, UC Davis (2022)- *Recognition for overall excellence in teaching throughout graduate career.*
- Teaching Recognition Award, Department of Statistics, UC Davis (2019, 2021)-
  Excellence in graduate student teaching, either as a TA or AI.
- Alan Fenech Award for Outstanding Student Service, Department of Statistics, UC Davis (2020)- *Given to graduate students for their outstanding service to the department.*
- Student Rating of Teaching Effectiveness (SRTE) score, Penn State (2023): **Median 6.5 and 6 out of 7** for two sections, respectively. (Q. Rate how well the instructor promoted a meaningful learning experience for you.)
- Academic Course Evaluation (ACE) score, UC Davis (Fall 2021):**Mean 4.75 out of 5.00**. (Q. Please indicate the overall teaching effectiveness of the instructor.)

4 Teaching methods

Inquiry-based path: the motivation behind formulas before tackling complex calculations: I believe teaching requires empathy and bridging concepts with students' prior knowledge. I immerse myself in the beginner's perspective, using real-life examples to motivate the learning process. For instance, in an introductory statistics course, rather than giving a statistical model for regression straightaway, I make an effort to motivate each component step by step- how a predictor, say daily temperature could influence a response, say rainfall, what would be the easiest way to express this relationship, connecting the dots to visual geometry- if the relationship is linear, what "parameters" do we need to know, and finally from a given dataset, how do we compute the values of such parameters.
Cultivate intuition and demonstrate its cross-disciplinary applications: When teaching mathematical statistics, taking a step back and looking at the bigger picture of what we want to learn is crucial. This approach also *fosters logical thinking and confidence in confronting unfamiliar but related concepts.* It also allows flexibility in curriculum design. In terms of curriculum design, this strategy allows me to move freely through the topics covered in a class. For example, after introducing summary statistics in an intro class, I can jump right into linear regression, emphasizing interpretation and applications to scientific or economic questions. Teaching regression at the beginning of the quarter allows students to see the power and usefulness of just a few salient statistical concepts and typically stokes interest in the other course content to come.
Continuous learning and openness to students' diverse perspectives: I learn and grow alongside my students in and out of class through sincerity and authenticity. While my instinctive thought process may work for one type of thinker, others may need an entirely different kind of line of reasoning– without these conversations with students, my "teaching toolbox" would certainly have fewer instruments to pull from. I also find value in relating to teachers of entirely distinct topics. By talking to friends who teach seemingly very different subjects, like dance or yoga, I have gained valuable insights into new teaching techniques. For example, a dancer breaks choreography into smaller steps just like a statistics student might dissect a formula into its separate components.
Teaching approach: I employ diverse teaching methods for active and enjoyable learning, including in-class discussions, group projects, and student presentations. In upper-level courses, I encourage reasoning through abstraction and rediscovering concepts together. I prioritize asking "why" over memorizing "what" and strive to nurture students' inquisitive nature. I welcome interruptions and clarification requests in class to pinpoint gaps in understanding. I boost students' confidence in their existing knowledge before using probing questions to lead them to their own conclusions, fostering intuition, curiosity, and engagement.
Technology aids in student engagement and connectivity: For instance, employing shiny apps is an excellent way to visually illustrate essential concepts like the central limit theorem, frequently encountered in real-life data applications. Mastering abstract concepts through practical implementation is vital. I assign projects, conduct interactive coding sessions, and facilitate discussions to ensure comprehensive learning.
Course evaluation: I assess students through various activities like group discussions, research projects, assignments, and exams. Biweekly surprise pop quizzes or oral assessments ensure engagement and uncover understanding gaps, fostering creative thinking among high-achievers. The primary goal is to enhance critical thinking

and problem-solving, evident in both exams and assignments. Exams typically feature a mix of multiple-choice and elaborating questions to gauge thought processes, and grading follows established criteria for fairness.

5 Inclusive classroom environment

I actively promote diversity in the classroom through regulated peer discussions and individual support. Using online platforms like Canvas and Piazza, students with diverse backgrounds learn from each other and engage in healthy collaborations. I have worked with students of different ethnicities and disciplines, finding these experiences enriching. I'm particularly proud of a student from an ethnic minority who, with personalized support, achieved academic growth and secured a prestigious Statistical Analyst job after graduation.
Mentoring: I mentored undergraduates on COVID-19 dynamics and functional data analysis, some of whom pursued graduate studies. I trained them in research, programming, and data analysis, and assisted with graduate school applications.
Academic participation: Growing up in a multicultural environment and studying in the United States, I value the challenges and importance of pluralistic organizations. I co-organized a student seminar in 2019-2020, earning Teaching Recognition Awards in 2019 and 2021, and the Alan Fenech Award for Outstanding Student Service in 2020. From 2020 to 2022, I served as the student representative for the Department of Statistics' Educational Policy and Curriculum Committee at UC Davis. Currently, in my postdoctoral career, I represent the Climate and Diversity Committee in the Department.

Teaching allows me to appreciate the interactive process of lateral learning and experience the joy of sharing knowledge with young minds. The thrill of seeing students' eyes light up with comprehension after explaining a difficult concept is the best reward a teacher can get, and this joy motivates me to improve myself as a teacher and as a human being.

6 Some encouraging comments from the students

- "I loved the stat modeling portion of the class at the end. Having the notes on Canvas helped so I could just pay attention in class as opposed to worrying about writing everything down. The professor was extremely polite and encouraging to students." *(STA 418, Spring 2023, Penn State - Instructor)*

- "Course content was very good and very well structured. The instructor was very helpful and really helped me improve during the course. Made coming to class enjoyable." *(STA 418, Spring 2023, Penn State - Instructor)*

- "Having one homework a week is my preferred way of learning in a university setting. Courses which slam you with multiple assignments per week tend to take more of my time while teaching me less. It was very apparent that Professor Bhattacharjee was concerned first with whether or not we were learning the content, rather than slamming us with assignments. She gave us knowledge checks about once a week which were low stakes, low pressure, and mostly served as a useful diagnostic for us to know how we are doing and what we need to work on. Great Professor. " *(STA 418, Spring 2023, Penn State - Instructor)*

- "Bhattacharjee was very enthusiastic and helpful during this course. She explained each topic thoroughly and had many opportunities for additional office hours. I enjoyed this course and would take a class of hers again!" *(STA 106, Fall 2019- Instructor)*

- "Satarupa is extremely knowledgeable with the material. Additionally, she was responsive to questions outside of office hours (via email, etc.) and this was very helpful to me. I appreciate the time and effort Satarupa put towards helping me and she definitely contributed to a better understanding of the material in the class for me. She is a great TA!"*(STA 231A, Fall 2018 - Teaching Assistant)*

- "She is an intelligent and friendly person. There are always a big smile on her face. She helps us with our homework problems in the office hours and helps us to understand the importance concepts in the course materials. Thank you so much!" *(STA131B, Summer Session - TA)*

- "Satarupa is an outstanding TA. She continuously went above and beyond to explain subject material, and would stay past her office hours to assist students. Satarupa truly indicated her passion for the subject and

students. Her teaching and explanation of subject content was phenomenal. Also she was always prepared, encouraging, and very kind to speak to! One of the BEST TA's I ever had. Without her guidance I would not have been successful in the course. Thank You Satarupa!!" *(STA 106, Winter 2019 - TA)*

- "Excellent TA. I learned probably 80% of what I took away in this class by going to office hours and discussions. She organizes everything very clearly and provides excellent explanations to everything. I could not be more thankful for the help Satarupa provided in me passing this class." *(STA 131B, Winter 2021- TA)*

- "You have been my lifesaver in this class! I honestly don't think I could've passed without you. Thank you for being so patient and kind during your office hours and discussions. You always make sure our questions are answered even if it means that you'll go over time. I also appreciate the attention you give to your students because the interactive aspect of your teaching definitely helps us learn the material. Once again thank you so much and thank you for being such a great TA for this course" *(STA 131B, Winter 2021- TA)*

- "Satarupa has been one of the strongest instructors I have had in the Statistics department. She really ensures that a lot of her students understand the content through active participation in lectures and during office hours (she was also my TA for STA 131B Winter Quarter 2021, so it's no surprise that her quality of teaching is still really strong)" *(STA 131C, Fall 2021- Instructor)*

- "Satarupa is very passionate about what she teaches. She always does above and beyond to see her students successful, not only for her class but to see us successfully continue higher education in Stats or even career in Stats. I have much appreciation and admiration for her endless efforts, encouragement, and support. I wish her all the very best of luck in her life." *(STA 131C, Fall 2021- Instructor)*