Sabbatical Report for Dr. Omayra Ortega

Department of Mathematics and Statistics Sonoma State University Academic Year 2024–2025

Summary of Sabbatical Activities

During the 2024–2025 academic year, I was on sabbatical leave from Sonoma State University to pursue two objectives: (1) to engage in advanced study and collaborative research in the emerging field of the Mathematics of Intelligences, and (2) to develop of a Data Science curriculum at SSU, including the preparation of a formal proposal for a new minor in Data Science and the initial groundwork for a future major program, both to be housed in the Department of Mathematics and Statistics.

IPAM Residency and Research Contributions

In Fall 2024, I was a resident scholar at the Institute for Pure & Applied Mathematics (IPAM) at the University of California Los Angeles (UCLA), participating in the semester-long program on the *Mathematics of Intelligences*. This interdisciplinary initiative brought together researchers from mathematics, computer science, cognitive science, neuroscience, and philosophy to explore the mathematical foundations of various forms of intelligence, both artificial and biological. During my residency, I collaborated with scholars from multiple institutions, attended and led working groups, and presented on topics using tools from data science to analyze the mathematics community. This experience deepened my understanding of cutting-edge techniques in machine learning and artificial intelligence, which will directly inform my teaching, future research, the development of a colloquium lecture series at SSU in related topics, and the development, my participation increased the visibility of Sonoma State University in national interdisciplinary research circles.

Development of the Data Science Minor at SSU

Over the full academic year, I also devoted significant time to the design and development of a new academic minor in Data Science at Sonoma State University. The minor is designed to provide students with a rigorous foundation in statistical analysis, computational thinking, and ethical data practices—skills that are increasingly essential across all disciplines. Data Science minor major accomplishments during the sabbatical included:

- **Curriculum Development**: I co-authored syllabi for several new courses, including *Introduction to Data Science (sole author)*, and assisted in the creation of a new *Ethics in Data Science*, and a *DataBases* course. These courses were designed to be accessible and attractive to students from a variety of majors, while maintaining mathematical rigor.
- Interdepartmental Collaboration: I coordinated with faculty from Computer Science, Economics, GEP, Physics, Biology, Chemistry, Business, and Philosophy to ensure the minor complements existing programs and serves a broad student population. This

included reviewing potential elective courses and exploring opportunities for coteaching and cross-listing.

• Administrative Preparation: I prepared the full proposal for the new minor, including learning outcomes, assessment strategies, enrollment projections, and justifications for resource allocation. I worked closely with the department chair and the Office of Academic Programs to align the proposal with campus curricular policies and timelines for review.

Preliminary Work Toward a Data Science Major at SSU

In addition to the minor, I initiated exploratory work toward the eventual establishment of a Data Science major. This included:

- Benchmarking peer institutions' programs in Data Science;
- Drafting a framework for the major, including different tracks based on existing elective courses throughout the university.
- Identifying future faculty needs and infrastructure considerations;
- Engaging stakeholders in long-term strategic planning.

While the development of the major will require a multi-year effort, including additional curriculum development, faculty hires, and formal review processes, this early groundwork provides a strong foundation for its future realization.

Future Work: This sabbatical year was both productive and transformative. My time at IPAM significantly advanced my scholarly development and positioned me to contribute meaningfully to SSU's efforts in data science education. The groundwork laid for the degrees in Data Science have been met with enthusiasm from colleagues and administrators. The minor has already been submitted for review and is continuing along in that process. I anticipate submitting the final proposal for the major for formal review in Fall 2025.

Dr. Omayra Ortega Associate Professor

Department of Mathematics and Statistics Sonoma State University