Shayne Plourde

PhD (Expected Graduation Nov 2023) | shayne.plourde@outlook.com
https://www.linkedin.com/in/shayne-plourde/ | https://shayne-falco.github.io/

SUMMARY

I am an accomplished computational biologist with a decade of research experience in mathematics, data science, and biology. I have expertise in analyzing complex biological systems and designing mechanistic mathematical models to understand the hidden dynamics that control them. I am excited about a role where I can use all the modeling tools I have learned to bring cutting-edge research in mathematical biology.

SKILLS

- **Biology/Laboratory**: Fluorescent Microscopy (Time Series, 3D imaging, FRAP), Experimental Design & Collection, Scientific Writing (Grants, Publications), RNAseq, Data Analysis, Cell Signaling Pathways
- **Programming**: Python (Pandas, Numpy, SciKit-Learn), Matlab (Parallel Computing, Statistics & Machine Learning), R, Linux, GitHub, XMGrace, LaTeX, Parameterization, OOP, Debugging, AI/ML Models

EDUCATION

The Ohio State University - Columbus, Ohio
Ph.D. - Molecular, Cellular, Developmental Biology [Expected Graduation: Fall 2023]
M.M.S - Mathematical Biosciences [2017]
The University of Maine - Orono, Maine
B.A. - Mathematics, Minor: Computer Science, Magna Cum Laude with High Honors [2015]

EXPERIENCE

Laboratory Research Associate/Leader, Dawes Lab, the Ohio State University **[2016 - present]**
- Mentored five students in microscopy protocols, modeling concepts, and data analysis pipelines.
- Read and critically analyze literature to support writing/editing scientific publications and grants.
- Collaborated on mathematical modeling projects, including a **3D PDE model** of *Hydra vulgaris* regeneration and a **1D ODE model** of crossover patterning along homologous chromosomes.
- Leading independent and collaborative research projects with productive meetings of 2-20 participants.
- Responsible for determining damages and replacing equipment totaling over $10,000.

Research Associate - Image Analysis for AI Model Training, CompuMAINE Laboratory **[2013 - 2016]**
- Developed a quantified methodology to determine the fractal dimension of tissues in mammograms, potentially allowing earlier detection of the presence of cancer.

SELECTED PROJECTS

Elucidation of Cellular Patterning Dynamics with Modeling & Microscopy [2018 - present]
- Acquired and analyzed over 100 high-quality 4D microscopy images to parameterize the model.
- Developed a novel **3-compartment ODE model** of centrosome maturation combining the dynamics of 3 biological hypotheses, giving them a novel combined mathematical understanding.
- Built a **probability model** to understand paternal centriole inheritance in the early embryo.

Identified Two Novel Pollen Patterning Mutants *in silico* [2016 - 2019]
- Improved modeling and biological experiments by developing a **Turing model** to predict the behavior of novel *Arabidopsis thaliana* pollen mutants.
- Received competitive funding award to sponsor research totaling over $5,000.

Discovered Role of Tissue Composition to Calcification Growth in Breast Cancer [2013 - 2016]
- Built an **agent-based model** with 1024^2 agents that found the composition of the fatty and dense tissue in the tumor microenvironment impacts calcification growth and the chance of metastasis.

LEADERSHIP EXPERIENCE

Data Science Boot Camp Teaching Assistant, The Erdos Institute **[September 2023 - present]**

- Provided oversight and guidance to the Boot Camp attendees during problem-solving sessions.

President, VP, and other Elected roles, OSU Cycling Team **[2016 - present]**

- Increased membership by 25% during lockdowns and enhanced the activity of the members with innovative programs by securing sponsor discounts (15-25%) for our members.

CERTIFICATE

- Erdos Data Science Certificate Detecting Fake News: Python for Data Science [Spring 2023]
  - Achieved 67% accuracy by creating an AI/ML model without over-correlated features (Author/Source).

1st AUTHOR PUBLICATIONS

- **Plourde SM**, Dawes AT (in preparation) *Mathematical and biological exploration of cellular component maturation based on ground truths.*
- **Plourde SM**, Amom P, Tan M, Dawes AT, Dobritsa AA (2019) *Changes in morphogen kinetics and pollen grain size are potential mechanisms of aberrant pollen aperture patterning in previously observed and novel mutants of Arabidopsis thaliana*. PLOS CompBio. doi link
- **Plourde SM**, et al. (2016) *Computational growth model of breast microcalcification clusters in simulated mammographic environments*, CompBioMed, doi link

CONFERENCES / PRESENTATIONS

- SMB Annual Meeting 2023 - **Invited Speaker** - *Insights from Multi-scale Microscopy and Modeling*
- IGP Annual Symposium 2022 & 2023 - **Selected Speaker** - *in silico & in vivo centrosome dynamics*
- NIH July 202 - *Bridging multiscale modeling and practical clinical applications in infectious diseases*
- Flatiron Institute 2023 - **Invited & funded** - *Mechanics of Life 2: Models and Methods workshop*
- NIMBioS/MBI 2017 Summer Workshop - **Funded** - *Connecting Biological Data with Mathematical Model*