KRISTEN A WINDOLOSKI

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EDUCATION

Ph.D. Applied Mathematics – North Carolina State University (Raleigh, NC) *Dec 2023 (Expected)*
Ph.D. Thesis: Mathematical modeling of experimentally induced inflammation and sepsis

M.S. Applied Mathematics – North Carolina State University (Raleigh, NC) *2020*
B.S. Mathematics (Minors: International Studies, Social Science) – Fitchburg State University (Fitchburg, MA) *2018*
Colorado Summer Institute in Biostatistics – University of Colorado, Denver (Denver, CO) *2017*

TECHNICAL SKILLS

Modeling:	Predictive modeling, ordinary differential equations (ODEs), optimization, parameter estimation, uncertainty quantification, sensitivity analysis, numerical methods, bifurcation analysis
Data/Statistical:	Exploratory data analysis, data visualization, hypothesis testing, confidence and prediction intervals
Languages:	MATLAB, Python, R
IDEs and Libraries:	Visual Studio, NetLogo, MATLAB Optimization Toolbox, Pandas, NumPy
Applications:	Maple, Office (Word, PowerPoint, Excel), LaTeX, WordPress, cloud computing (AWS)

RESEARCH & INDUSTRY EXPERIENCE

Graduate Researcher, *North Carolina State University – Raleigh, NC* *Jan 2020 – Present*

- Developed and critically analyzed mathematical models of inflammation using systems of 7-18 ODEs with 43-108 parameters and experimental data from 4 studies consisting of 9-20 human subjects.
- Coupled and calibrated an immune, cardiovascular, and hormone model to predict multi-system inflammation dynamics.
- Constructed and analyzed a cytokine model of inflammation to hypothesize inflammation mechanisms through model optimization to experimental data and statistical analysis of data and model results.
- Lead the design and analysis of a sepsis model to study clinical inflammation scenarios and potential treatment impact.
- Collaborated with internal and external researchers and clinicians on all projects.
- Presented work at 9 scientific conferences and seminars.

Systems Biology Modeling & Simulation Intern*, Axcella Therapeutics – Cambridge, MA* *May – July 2022*

- Identified potential product candidate demographic impacts by analyzing pharmacokinetic data in Visual Studio using Python.
- Enhanced company knowledge of their product candidate's mechanisms by creating a biological and mathematical breakdown of a 500+ equation system (ODEs) describing non-alcoholic steatohepatitis and executed model code using AWS.
- Collaborated with and presented intermediate findings to multidisciplinary STEM teams.
- Presented graduate research and final internship work with drug development overview and PK/PD modeling basics to STEM and business/law internal audiences.

Mathematics Research Assistant*, Fitchburg State University – Fitchburg, MA* *June – July 2018*

- Collaborated with principal investigator to design and simulate matrix and agent-based models of turtle population dynamics using Maple and NetLogo, which led to the work's publication in a scientific journal.

ADMINISTRATIVE EXPERIENCE

Graduate Administrator*, Math/Statistics REU program, North Carolina State University – Raleigh, NC* *May – Aug 2021 & 2023*

- Planned, coordinated, and lead weekly meetings, workshops, and social events for 34 program participants and mentors.
- Coordinated weekly program supply needs with administrative and business staff.
- Mentored 20 undergraduate participants and created and managed the public (WordPress) and private program websites.

TEACHING EXPERIENCE

Instructor of Record - Mathematics, *North Carolina State University – Raleigh, NC* *May 2020 – Present*

- Prepared and delivered class lectures, supervised 1-3 teaching assistants/graders per semester, created and managed course website, created and administered course assessments, and assigned final grades.
- Courses include precalculus, business calculus, calculus I, and calculus III for class sizes of 30 – 230 students.

Mathematics Graduate Teaching Assistant, *North Carolina State University – Raleigh, NC* *Aug 2018 – May 2020*

- Recitation leader for calculus II & III (20-40 students) and lecture assistant for precalculus and applied differential equations.
- Prepared and delivered biweekly problem sessions, assisted instructor and students, graded, and tutored.

Mathematics Tutor and Writing Tutor, *Fitchburg State University – Fitchburg, MA* *Jan 2016 – May 2018*

- Served as a one-on-one (math and writing) and group math tutor (3-5 students at a time).

PUBLICATIONS

1. **Windoloski, K.A.**, Berg, R.M.G., Olufsen, M.S. Modeling complex inflammation dynamics during infection and sepsis. In progress.
2. **Windoloski, K.A.**, Janum, S., Berg, R.M.G., Olufsen, M.S. (2023) Characterization of differences in immune responses during bolus and continuous infusion endotoxin challenges using mathematical modeling. Submitted. [Preprint] arXiv:2308.01495
3. **Windoloski, K.A.,** Bangsgaard, E.O., Dobreva, A., Ottesen, J.T., Olufsen, M.S. (2023). A unified computational model for the human response to lipopolysaccharide-induced inflammation. *Springer*. *Mathematics Online First Collections.* DOI: 10.1007/16618_2022_39
4. **Windoloski, K.A.**, Ottesen, J.T., Olufsen, M.S. (2022). In Silico modeling of immune-cardiovascular-endocrine interactions. *J Cardiovasc Med Cardiol*. DOI: 10.17352/2455-2976.000186
5. Levy, B., **Windoloski, K.**, Ludlam, J. (2021). Matrix and agent-based modeling of threats to a diamond-backed terrapin population. *Math Biosci*. DOI: 10.1016/j.mbs.2021.108672
6. **Windoloski, K.**, Olufsen, M.S. (2021). Coupling vascular and inflammatory dynamics. *SIAM News Blog*.

HONORS AND AWARDS

SIAM Annual Meeting AWM Poster Session Winner, *Association of Women in Mathematics* *2022*
Griggs-Franke-Norris Teaching Award, *North Carolina State University* *2022*
Valedictorian and Commencement Speaker, *Fitchburg State University* *2018*
Outstanding Mathematics Student of the Year, *Fitchburg State University* *2018*
Pi Mu Epsilon National Mathematics Honor Society, *Fitchburg State University* *2017*

PROFESSIONAL DEVELOPMENT

ICERM Mathematical and Computational Biology Week-Long Workshop, *Brown University* *2023*
Teaching and Communication Certificate (100 hours), *North Carolina State University* *2018 – 2022*
Inclusive Teaching Certificate*, North Carolina State University* *2021 – 2022*
Leadership Development Program (10 weeks), *North Carolina State University* *2021*

SERVICE AND OUTREACH

Secretary, *NCSU Chapter of AWM* *Sept 2021 – Aug 2022*
Treasurer, *NCSU Chapter of SIAM* *Sept 2020 – Aug 2022*
SK Day Organizer, *NCSU AWM* *April 2022*
AMS Graduate Student Peer Mentor, *North Carolina State University* *Aug 2021 – May 2022*
Computational Math Guest Speaker, *Bugg Magnet Elementary School* *May 2021*
Student Representative, *Fitchburg State University Math Curriculum Committee* *Sept 2017 – May 2018*
Yearly Day-Of Volunteer, *Special Olympics Massachusetts* *April 2015-2016, 2018*