Carly Sutter

suttercarlyg@gmail.com | Ph.D. Candidate at SUNY Albany | she/her

EDUCATION

Ph.D. in Atmospheric Science *(in progress),* SUNY University at Albany, Albany, NY *Exp. May 2026*
Advisors: Dr. Kara Sulia and Dr. Christopher Thorncroft

M.S. in Applied Mathematics, University of Missouri, Columbia, MO May 2015
Advisor: Dr. Carmen Chicone

B.S. in Mathematics Education, North Carolina State University, Raleigh, NC May 2013
North Carolina State University, Raleigh, NC

SKILLS & ACADEMICS

Coding: proficient in Python, SQL, Git, Bash, LaTeX, Excel; familiar with R, Docker, Singularity, Cron
Primary Packages & Platforms: TensorFlow, SciKitLearn, Pandas, Matplotlib, Weights & Biases MLOps
Graduate Coursework: atmospheric dynamics, atmospheric physics, general circulation, fundamentals of Earth's climate, data analysis for atmospheric and environmental sciences, mathematical modeling, probability theory, mathematical statistics, ordinary differential equations, partial differential equations
Actuarial Exams: Probability, Financial Mathematics, Investment and Financial Markets, Short-Term Actuarial Mathematics, Statistics for Risk Modeling
Master's Project: Proved the existence of a solution to the Prandtl boundary layer equations, a set of PDEs used to describe drag on objects

EMPLOYMENT

Graduate Research Assistant Aug 2021 – present
Atmospheric Sciences Research Center (ASRC), Albany, NY
NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography (AI2ES)

- Automate the classification of road conditions from NY State Dept. of Transportation (NYSDOT) camera images using convolutional neural networks; models trained on GPUs at ASRC's xCITE lab
- Responsible for project from ground-up, beginning with data archive creation, curating a hand-labeled dataset for model training, incorporating weather data, developing and tuning ML models such as CNNs and SVMs, and streamlining model inference pipeline
- Emphasis placed on model generalizability on unseen camera sites, achieving validation accuracy of ~80% in predicting severe snow, snow, wet, dry, poor visibility, and obstructed road surface conditions
- Prioritize co-design with end-users and cross-discipline collaboration with computer scientists and social scientist across different institutions

Senior Actuarial Analyst Aug 2020 – Aug 2021
Actuarial Analyst Nov 2018 – Jul 2020
Fidelis Care (Centene Corporation), New York, NY

- Quantified the financial impact of premium rate changes across Medicaid products
- Built and maintained a process for performance reporting including SQL queries and report summaries
- Modeled member-level risk scores using multi-linear regression; results used to inform business decisions such as exiting a market and meeting forecasted revenue

Programmatic Strategy and Optimization (PSO), Senior Specialist Aug 2018 – Nov 2018
PSO, Specialist Jun 2017 – Jul 2018
MediaMath, New York, NY

- Traded ~$7 million of media using MediaMath's real-time trading platform; optimized performance against client KPIs such as ROI and incremental cost per action
- Consulted directly with clients to provide analytical perspectives on test design, execution, and results of their marketing campaigns; primary focus was on lift measurement and A/B testing

International Mathematics Teacher Aug 2015 – Jul 2016

Nanjing Foreign Language School, Nanjing, China

- Taught AP Calculus and Precalculus to English-speaking Chinese students aiming to attend US colleges
- Played an integral role in the program's growth: developed curriculum, mentored new teachers, led teaching demonstrations, and assisted in college advising for students

Graduate Instructor Aug 2013 – May 2015

University of Missouri, Columbia, MO

- Primary instructor for Business Calculus and College Algebra; 9 sections as large as 40 students
- Received the Excellence in Teaching Award in 2015 – based on exceptional teaching evaluations
- Assisted precalculus coordinator in creating assignments, leading and coordinating across recitations during the Spring 2015 semester

DEPARTMENTAL SERVICE

Graduate Program Committee Member (GPC) Aug 2022 – Jul 2024

Department of Atmospheric & Environmental Sciences, SUNY University at Albany, Albany, NY

Responsibilities: attend meetings with faculty, voice student issues, and represent the ASRC

Faculty Hiring Committee (Student Representative) Dec 2022 - May 2023

Department of Atmospheric & Environmental Sciences, SUNY University at Albany, Albany, NY

Departmental faculty hire as a part of the UAlbany AI Institute

Responsibilities: reviewing applications, interviewing, directing and planning student roundtables

Graduate Student Recruitment Co-Chair Sep 2021 - Jun 2022

Department of Atmospheric & Environmental Sciences, SUNY University at Albany, Albany, NY

Responsibilities: plan and direct multi-day recruitment events for visiting prospective students

PUBLICATIONS AND CONFERENCE PROCEEDINGS

[In preparation] **Sutter, C.**, Sulia, K., Bassill, N. P., Wirz, C. D., Przybylo, V., Cains, M. G., Radford, J., Evans, D. A, Rothenberger, J., Thorncroft, C. D. (2024) *Automated Classification of Road Surface Conditions using New York State Department of Transportation Camera Images and Weather Forecast Data with Machine Learning Methods.*

Wirz, C. D., **Sutter, C.**, Demuth, J. L., Mayer, K. J., Chapman, W. E., Cains, M. G., et al. (2024). *Increasing the reproducibility and replicability of supervised AI/ML in the Earth systems science by leveraging social science methods*. Earth and Space Science, 11, e2023EA003364. https://doi.org/10.1029/2023EA003364

Sutter, C., Sulia, K.J., Bassill, N.P. , Thorncroft, C.D., Przybylo, V., Wirz, C.D., Cains, M.G., Radford, J.T., Evans, D.A. (2024) *Improving Generalizability of Road Condition Classification Models for Department of Transportation Camera Images*, 104th AMS Annual Meeting, Baltimore, MD, Jan 2024. https://ams.confex.com/ams/104ANNUAL/meetingapp.cgi/Paper/438154 *[presented by Dr. Kara Sulia]*

Sutter, C., Sulia, K.J, Bassill, N. P., Thorncroft, C. D., Wirz, C. D., Przybylo, V., Cains, M. G., Radford, J., & Evans, D. A. (2023). *Quantitative Content Analysis Data for Hand Labeling Road Surface Conditions in New York State Department of Transportation Camera Images* (1.0.0) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.8370665

Bostrom, A., Demuth, J., Wirz, C., Cains, M., Schumacher, A., Madlambayan, D., Bansal, A. S., Bearth, A., Chase, R., Crosman, K.M., Ebert-Uphoff, I., Gagne II, D.J., Guikema, S., Hoffman, R., Johnson, B.B., Kumler-Bonfanti, C., Lee, J.D., Lowe, A., McGovern, A., Przybylo, V., Radford, J., Roth, E., **Sutter, C.**, Tissot, P., Roebber, P., Stewart, J.Q., White, M., & Williams, J.K. (2023). *Trust and trustworthy artificial intelligence: A research agenda for AI in the environmental sciences***.** Risk Analysis, online first, https://doi.org/10.1111/risa.14245

Sutter, C., Sulia, K.J., Przybylo, V, Bassill, N.P., Thorncroft, C.D., Wirz, C.D., Cains, M.G., (2023) *Automated Detection of Road Conditions from Department of Transportation Camera Images* [Conference presentation].

American Meteorological Society 103rd Annual Meeting, Denver, CO, 8-12 January 2023
https://ams.confex.com/ams/103ANNUAL/meetingapp.cgi/Paper/418646

Przybylo, V., **Sutter, C.**, Wirz, C.D., Cains, M.G., Sulia, K.J. (2023) *Detecting the Presence of Precipitation in New York State Mesonet Imagery at Night using Convolutional Neural Networks* [Conference poster]. Artificial Intelligence Conference, American Meteorological Society 103rd Annual Meeting, Denver, CO, 8-12 January 2023

Ferrera, V., Rothenberger, J.C., Wilson Reyes, M., **Sutter, C.**, Fagg, A.H., Diochnos, D.I. (2023) *Classifying Road Surface Conditions with Self-Trained Artificial Intelligence* [Conference presentation]. American Meteorological Society 103rd Annual Meeting, Denver, CO, 8-12 January 2023