# Emma J. Reid

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**Research Interests** Computational imaging, super-resolution, remote sensing, time series classification, explainability, vulnerability modeling, and biometrics applications

**Education**

**Ph.D, Applied Mathematics** (Aug 2021) — Purdue University

**B.S. Mathematics** (May 2015) — University of Nebraska - Lincoln

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**Professional Experience**

Oak Ridge National Laboratory — Oak Ridge, TN
**Associate R&D Staff Member** — Aug 2021 - present

- Lead projects and present progress to sponsors monthly.
- Collaborate with group members on research problems relevant to national security.
- Mentor junior staff members and interns

Purdue University — West Lafayette, IN
**Research Assistant** — August 2017 - August 2021

- Worked in tandem with the Mathematics and Electrical Engineering departments in researching methods in fluorescence microscopy and applications to neural networks.

Autonomy Technology Research Center — Fairborn, OH
**ATR Center Summer Program Intern** — May 2020 - Aug. 2020

- Continued development of algorithmic and deep learning strategies to accomplish super resolution on general microscopy images.

Autonomy Technology Research Center — Fairborn, OH
**ATR Center Summer Program Intern** — May 2019 - Aug. 2019

- Developed algorithmic and deep learning strategies to accomplish super resolution on bacterial biofilms.
- Collaborated with multiple branches of the Air Force Research Lab to fuse methodologies from biology and electrical engineering.

NASA Langley Research Center — Hampton, VA
**Langley Aerospace Research Student Scholars Program** — June 2014 - Aug. 2014

- Continued research from 2013, specifically towards model validation and verification.
- Performed error estimation of the National Transonic Facility test section temperature map using experimental test data.

NASA Langley Research Center — Hampton, VA
**Langley Aerospace Research Student Scholars Program** — June 2013 - Aug. 2013

- Developed methodology for multi-fidelity data fusion for use in the National Transonic Facility during model testing and tunnel characterization.
- Developed a composite temperature profile map to predict the state of the test section temperature distribution.

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## Academic Positions

Purdue University — West Lafayette, IN
**Teaching Assistant** — August 2015 - August 2017

- Instructed for Calculus I and II, Applied Calculus, and Differential Equations.
- Wrote quizzes and exams for the various courses, in addition to working in the help room.

University of Nebraska - Lincoln — Lincoln, NE
**Undergraduate Coordinator of All Girls All Math** — March 2015 - August 2015

- Planned 2 week-long summer camps for girls interested in mathematics.
- Served as a teaching assistant for a cryptography course, covering such topics as modular arithmetic and RSA.

University of Nebraska - Lincoln — Lincoln, NE
**Undergraduate Learning Assistant** — January 2014 - May 2015

- Assist in teaching college algebra curriculum to undergraduate students.
- Work collaboratively with a graduate instructor to develop strategies to improve the course.

University of Nebraska - Lincoln — Lincoln, NE
**Athletic Tutor** — January 2013 - May 2015

- Worked with student athletes to deepen their understanding of coursework.
- Completed CRLA's International Tutor Training Program Certification to become a Certified Tutor, Level 1.

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## Academic and Professional Honors

- FY25 LDRD Early Career award — Winter 2024
- Acceptance to FY25 Early Career Professional Development Cohort — Winter 2024
- Best Graduate Presentation at ATRC Summer Review — Summer 2020
- PEO Indiana Chapter Nominee for the PEO Scholar Award — Selected Fall 2019
- Best Graduate Poster at ATRC Summer Review — Summer 2019
- Accepted to Purdue's Computational Interdisciplinary Graduate Program — Spring 2019
- Received the Excellence in Teaching Award from the Department of Mathematics — Fall 2018
- PEO Indiana Chapter Nominee for the PEO Scholar Award — Selected Fall 2018
- Mervin L. Keedy Scholarship (Purdue) — Awarded Spring 2015
- Regents Scholarship (UNL) — Awarded Fall 2011
- D & F Eastmann Scholarship (UNL) — Awarded Fall 2013
- Dean's List, College of Arts & Sciences (UNL) — Fall 2012 - Spring 2015

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## Journal Publications

- Ruddell, D., Alamleh, H., Ricanek, K., Reid, E.J., Powers, S., Hollifield, S.C. *Survey of Driver Behavior Modeling for Driver Profiling, Behavior Recognition, Identification, and Verification Systems* (In Preparation)
- Duba-Sullivan, H., Reid, E.J., Voisin, S., Bouman, C.A., and Buzzard, G.T. *ResSR: A Residual Approach to Super-Resolving Multispectral Images* (Submitted August 2024)
- Reid, E.J., Drummy, L.F., Bouman, C.A., Buzzard, G.T. *Multi-Resolution Data Fusion for Super Resolution Imaging of Biological Materials* in IEEE Transactions on Computational Imaging, vol. 8, pp. 81-95, 2022, doi: 10.1109/TCI.2022.3140551. (2022)

## Conference Proceedings

- Rogers, L.H., Reid, E.J., and Bridges, R. A. *Destabilizing a Social Network Model via Intrinsic Feedback Vulnerabilities* (Submitted January 2025)

**Miscellaneous Publications**

- Intrinsic Destabilizing Vulnerabilities in Dynamical Systems Textbook (In Preparation)

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**Presentations**

- Invited speaker at American Control Conference's Resilient Cyber-Physical-Human Systems Workshop Summer 2025
- Invited speaker and panelist at Purdue's Industrial Workshop Spring 2025
- Technical exchange in Berkeley with KTH Royal Institute of Technology and Stanford Linear ACcelerator National Laboratory Spring 2025
- Invited visitor at the Frost Institute for Data Science and Computing's Digital Twin Workshop Winter 2025
- Invited visitor at Air Force Institute of Technology and Autonomous Technology Research Center's summer review Summer 2024
- Technical exchange in Stockholm with KTH Royal Institute of Technology Summer 2024
- Invited panelist for Purdue's Career Path from Academics to Industry Panel Spring 2023
- Accepted as a Presenter for the 2022 SIAM Conference on Imaging Science Winter 2021
- Invited speaker at Oak Ridge National Lab seminar Spring 2021
- Invited speaker at the Air Force Research Lab's MachIne And Computational Learning Exploration (MIrACLE) seminar February 2021
- Invited speaker at Argonne National Lab seminar February 2021
- Accepted as a Presenter for the 2021 Electronic Imaging Conference Winter 2020
- Accepted as a Presenter for the 2020 SIAM Conference on Imaging Science Summer 2020
- Invited speaker at Air Force Research Lab's biweekly Bio-RT meeting Winter 2019
- Accepted as a Presenter for the 2020 Electronic Imaging Conference Winter 2019

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**Leadership and Involvement**

- Session Chair for IS&T's Computational Imaging Conference Winter 2025
- ORNL Early Career Development Program FY25 Cohort Winter 2025 - Winter 2026
- Girls INC Volunteer Winter 2025 - present
- ORNL Summer Internship Mentor Summer 2023, 2024
- Program Committee for IS&T's Computational Imaging Conference Winter 2023 - present
- Reviewer for IEEE Transactions on Geoscience and Remote Sensing Spring 2022 - present
- IEEE Member Fall 2020 - present
- IS&T Member Fall 2020 - present
- Reviewer for IEEE Transactions on Computational Imaging Summer 2019 - present
- Community Chair for IS&T's Electronic Imaging conference Winter 2021
- Graduate Student Representative for College of Science Appeals Fall 2019 - Summer 2021
- Department Senator in Purdue Graduate Student Government Fall 2018 - Spring 2019
- Graduate Representative for the Purdue Department of Mathematics Fall 2017 - Spring 2018
- Pi Mu Epsilon - Nebraska Alpha Chapter, President Fall 2014 - Spring 2015
- Math Club - President Fall 2014 - Spring 2015
- American Institute of Aeronautics and Astronautics, Student Chapter Member Fall 2012 - Spring 2015
- Alpha Delta Pi Sorority - Executive Committee Member Fall 2014

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**Skills**

- Programming Languages: Python, MATLAB, Julia, C
- Software: Git, LaTeX, Microsoft Office, Canva