

# Matt Reichenbach

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<https://mpreichenbach.github.io>

## Research Interests

- **General:** Combining mathematical and computational tools to solve challenging, real-world problems.
- **Biological and Earth Sciences:** Machine learning applied to remote sensing data, fisheries management, systems ecology.
- **Mathematics:** Applied functional analysis, mathematical modeling, numerical analysis, optimization, and dynamical systems.

## Education

- **University of Nebraska-Lincoln** Lincoln, NE  
*Ph.D. in Mathematics (GPA: 3.8)* Dec. 2020
  - Dissertation: *Spectral Properties of a Non-compact Operator in Ecology*
  - Advised by Dr. Richard Rebarber and Dr. Brigitte Tenhumberg
- **University of Nebraska-Lincoln** Lincoln, NE  
*M.S. in Mathematics* May 2017
- **University of Colorado Boulder** Boulder, CO  
*Post-Baccalaureate Teacher Licensure in Secondary Mathematics* Dec. 2013
- **University of Colorado Boulder** Boulder, CO  
*B.A. in Mathematics (GPA: 3.86)* May 2012

## Skills

**Python:** Developed convolutional neural networks using **Keras** and the **Tensorflow** backend, and processed satellite imagery using the **NumPy**, **SciPy**, **OpenCV**, **GDAL**, and **Rasterio** libraries as an NSF Intern at the Geospatial Research Laboratory.

**R:** Analyzed publicly available data for a fish (*esox lucius*) population for my Ph.D. dissertation. Implemented a nonlinear model incorporating density-dependent somatic growth, and plotted results using the **ggplot2** package.

**Additional Languages:** MATLAB, L<sup>A</sup>T<sub>E</sub>X.

**Applications:** QGIS, Anaconda, Microsoft Office, Google Docs.

**Operating Systems:** Windows, Linux (Ubuntu), MAC OS.

**Soft Skills:** Motivated self-starter, effective communicator, productive independently and on a team.

## Selected Employment

- **US Army Corps of Engineers - Geospatial Research Laboratory** Alexandria, VA  
*NSF Mathematical Sciences Graduate Intern* Jun. 2020 – Aug. 2020
  - Developed denoising tools for the Enhanced Terrain Processing project
  - Trained convolutional neural networks on synthetic data using Keras and Tensorflow, and applied them to SAR imagery
  - Acted as the technical lead, and worked with minimal oversight from mentors
  - Presented results at seminars to technical and non-technical audiences

- **University of Nebraska-Lincoln** Lincoln, NE  
*Graduate Teaching Assistant* Aug. 2015 – Present
  - Taught courses as the instructor-of-record, directed recitation sessions, and tutored in the Mathematics Resource Center
- **Center for Science, Mathematics & Computer Education** Lincoln, NE  
*Instructor for MATH 806T: Number Theory and Cryptography* Jul. 2019
  - Co-taught this Master’s-level course for in-service secondary teachers
- **Daewoo Elementary School** Geoje-si, Republic of Korea  
*Head Elementary English Teacher* Feb. 2014 – Feb. 2015
  - Taught four English lessons daily to 1<sup>st</sup> through 6<sup>th</sup>-grade students
  - Organized English-language initiatives and acted as the liaison between English teachers and school administrators
- **Laboratory for Atmospheric and Space Physics** Boulder, CO  
*Student Procurement Assistant VI* Mar. 2010 – May 2013
  - Maintained parts lists for NASA-funded projects, including instruments on the GOES-R, MAVEN, and TSIS satellites

## Publications

## Awards

- **Linda Bors Fellowship** UNL Math Dept.  
*Awarded to three graduate students annually for excellence in research* Fall 2018
- **Steven Hataaja Award** UNL Math Dept.  
*Awarded for excellent exposition by a graduate student* Spring 2018
- **Robert Noyce Teacher Scholarship** CU Boulder Dept. of Education  
*NSF-funded merit scholarship* Spring 2013 & Fall 2013
- **Dean’s List** CU Boulder  
*Awarded to students with semester GPA greater than 3.75* Spring 2010, Sp. 2013, & Fall 2013

## Invited Presentations

6. **Math Club (remote), University of Nebraska-Kearney** Kearney, NE  
*“Modeling Ecological Populations” (50 mins)* Oct. 2020
5. **Final Presentation (remote), Geospatial Research Laboratory** Alexandria, VA  
*“Denoising Synthetic Aperture Radar Using Convolutional Neural Networks”* Aug. 2020
4. **STAMP Meeting (remote), Geospatial Research Laboratory** Alexandria, VA  
*“Integral Projection Models in Mathematical Biology” (50 min.)* Jun. 2020
3. **Math Department Colloquium, Creighton University** Omaha, NE  
*“Integral Projection Models in Mathematical Biology” (50 min.)* Dec. 2019
2. **Augustana University Math Club** Sioux Falls, SD  
*“Population Models in Mathematical Biology” (50 min.)* Nov. 2018
1. **Colorado Council of Teachers of Mathematics Annual Conference** Denver, CO  
*“The Impact of Inquiry-Based Teaching in Two High School Math Classrooms”* Oct. 2013

## UNL Math Department Seminar Presentations

9. **Graduate Student Seminar (remote)** Lincoln, NE  
*“What Can Math Say About Conspiracy Theories?” (50 min.)* Oct. 2020
8. **Math Bio Seminar**  
*“Asymptotic Convergence to a Stable Stage Distribution” (50 min.)* Feb. 2020

7. **Graduate Student Seminar**  
*"Conway & Kochen's Free Will Theorem" (50 min.)* Oct. 2019
6. **Math Bio Seminar**  
*"A Positive Eigenvalue for a New Integral Projection Model" (50 min.)* Oct. 2019
5. **SPiDERS Graduate Seminar**  
*"Compactness Criteria in Infinite-Dimensional Spaces I, II, & III" (50 min.)* Feb. 2019
4. **Graduate Student Seminar**  
*"Learnability Can be Undecidable" (50 min.)* Jan. 2019
3. **MathBio Seminar**  
*"Cannibalism & Stunting in an IPM for Fish" (50 min.)* Sep. 2018
2. **Graduate Student Seminar**  
*"Continuous-Time Population Models" (50 min.)* Sep. 2017
1. **Graduate Student Seminar**  
*"An Exploration of the Calculus of Variations" (50 min.)* Nov. 2016

## Service and Involvement

- **Chapter President** Sep. 2019 to Sep. 2020  
*UNL Graduate Chapter of the American Mathematical Society*
- **Tutor for Native American high-school students** Aug. 2019 to Mar. 2020  
*Lincoln Public Schools*
- **Project mentor** Aug. 2019 to May 2020  
*UNL Math Dep. Directed Reading Program*
- **STAAR Seminar Co-organizer** Aug. 2019 to Aug. 2020  
*University of Nebraska-Lincoln Math Dept.*
- **Volunteer** Jan. 2017 to Jan. 2020  
*National Conference for Undergraduate Women in Mathematics*
- **Mentor to First-Year Graduate Students** Aug. 2018 to May 2020  
*University of Nebraska-Lincoln Math Dept.*
- **Representative to Graduate Student Advisory Board** May 2016 to May 2018  
*University of Nebraska-Lincoln Math Dept.*
- **UNL Math Day Volunteer** Nov. 2015 to Dec. 2020  
*University of Nebraska-Lincoln Math Dept.*