

Curriculum Vitae of
RACHEL (TUTMAHER) COX

TEACHING EXPERIENCE

University of Colorado Boulder

Boulder, CO

Associate Teaching Professor, Department of Applied Mathematics

Aug 2024 - Present

- Teach graduate level Statistical Methods and Applications I, covering concepts including theoretical distributions, maximum likelihood estimation, hypothesis testing, and probability.
- Teach graduate level Statistical Methods and Applications II, covering concepts including regression, ANOVA, generalized linear models, and statistical learning techniques.
- Teach Applied Mathematics undergraduate courses, including Differential Equations with Linear Algebra, covering concepts including analytical and numerical solving techniques, matrix algebra, eigenvalue and eigenvector computation, and linear stability analysis.
- Affiliate of the Master of Data Science program; member of the curriculum committee.

Lecturer, MS in Data Science Program, Department of Computer Science

Jan – Aug 2024

- Taught Statistical Methods and Applications II, covering concepts including regression, ANOVA, generalized linear models, and statistical learning techniques.
- Taught Computer Science (CS) undergraduate courses including Intro to Artificial Intelligence, and Algorithms
- Taught Computer Science post-baccalaureate online classes including Discrete Structures and Cognitive Science

Assistant Teaching Professor, Department of Computer Science

2018-2022

- Teach Computer Science (CS) undergraduate courses including Intro to Artificial Intelligence, Intro to Data Science with Probability and Statistics, Algorithms, Linear Algebra with CS Applications, and Discrete Structures
- Hired and helped manage Undergraduate Teaching Assistants; met weekly with these students to prepare them for teaching discrete structures workgroups.
- Collaborated with the CS department curriculum committee.
- Hired undergraduate Learning Assistants for the CS department.
- Coordinated between CU Boulder and Gradescope; organized workshops for faculty training.

Instructor, Tech Frontiers Executive Education Program

July 2021

- Co-taught two-day Data Science course designed for mid-level management tech professionals.
- Developed course materials and lectures on the following topics: Python basic syntax, utilizing NumPy, manipulating data with Pandas, and Regression techniques for model fitting.

Lecturer, Learning Center Coordinator, Department of Applied Mathematics

2016-2018

- Taught Applied Mathematics undergraduate courses including Pre-Calculus, Calculus 1, and Calculus 2.
- Course coordinator for Pre-Calculus; oversaw a team of instructors and teaching assistants.
- Hired and managed undergraduate Learning Assistants; met weekly with them to prepare them for teaching workgroups.
- Coordinated use of a department shared Learning Center; scheduled TA office hours, organized the Learning Center rooms to foster a conducive and collaborative learning environment.

Graduate Part-Time Instructor, Teaching Assistant, Dept. of Applied Mathematics

2013-2016

- Graduate Instructor for Calculus I for Engineers, Pre-Calculus for Engineers
- Instructor of record for Calculus I, II, and III Workgroups
- Teaching Assistant for Calculus I, II, III, and Differential Equations
- Participant in Peer Assisted Review research study

Front Range Community College

Westminster, CO

Adjunct Mathematics Instructor

2012-2013, 2016

- Taught Statistics, Calculus II, College Algebra, Trigonometry, Intermediate Algebra, Career Mathematics
- Lecture topics included Sequences, Series, Probability, Propositional Logic, and Set Theory
- Lead developer of online Calculus I course; created a learning management shell (Desire2Learn) for future instructors to use.
- Taught online Calculus I and College Algebra.
- Recorded supplementary mathematics lectures for online Calculus I course

Arapahoe Community College
Adjunct Mathematics Instructor

Littleton, CO
2012-2013

- Taught Calculus I, Liberal Arts Mathematics, College Algebra, and Trigonometry
- Tutored all levels of mathematics in the departments Math Center; a place for students to walk-in and receive one-on-one mathematics help.

RESEARCH EXPERIENCE

Maxar Technologies

Westminster, CO
2022-2023

Staff Research & Development Scientist

- Developed Machine Learning (ML) Models to support image processing of satellite imagery.
- Utilized PyTorch and scikit-learn to build a Convolutional Neural Network and train a classification model and to build a Global Convolutional Network and train a segmentation model.
- Invented a means to create synthetic data on which to train ML models.
- Served as the technical lead for a project involving 7 other scientists.

Applied Research Laboratory, Pennsylvania State University

State College, PA
2008-2012

Research & Development Engineer II

- Analyzed embedded flight control and flight guidance software for autonomously guided vehicles.
- Performed software-in-the-loop test and evaluation.
- Assessed overall performance of torpedo defense systems.
- Highly proficient with data processing, experience with code integration.
- Managed large parallel simulations and cluster queue usage for my unit, experience with high-performance computing.
- Utilized Excel and wrote MATLAB scripts to organize and present large amounts of data in a creative, meaningful manner.
- Wrote formal simulation study plans and technical reports.
- Created and gave PowerPoint presentations based on research study results both internally within the division and externally for project review panels.
- Team-oriented; taught new employees how to set up and execute their own studies.
- Promotion to Research & Development Engineer II within first year of employment.

TECHNICAL LANGUAGE SKILLS & SUBJECT EXPERIENCE

Deep understanding of machine learning, artificial intelligence, data science, probability, Bayesian networks, linear algebra, graph algorithms, statistics, and numerical analysis. Fluent in Python, R, MATLAB, and git. Experienced with Linux, docker containers, and VDIs. Skilled in both object-oriented and functional programming paradigms.

EDUCATION

University of Colorado Boulder

Boulder, CO
2013-2016

M.S. in Applied Mathematics

- Awarded Teaching Assistantship

Florida State University

Tallahassee, FL
2006-2008

M.S. in Applied & Computational Mathematics

- Awarded Teaching Assistantship

Bucknell University

Lewisburg, PA
2002-2006

B.S. in Mathematics | Minor in Physics

- Fulfilled requirements for a B.A. in Classics
- Winner of the Herbert Goodman Barrows Prize; excellence in Latin

TECHNICAL REPORTS & PRESENTATIONS

* All technical reports and presentations are classified. The meaning of the acronyms is also classified. The research involved developing and testing torpedo software. The research studies performed were system level studies that analyzed vehicle performance in combination with a larger defense system.

Technical Reports

1. "EDM-1 Baseline Study": Prepared for the CAT Systems Engineering Working Group. **R.S. Tutmaher**, M.A. Moreland, H.B. Miska. 2010
2. "EDM-1 Performance": Prepared for PMS-415. **R.S. Tutmaher**, M.A. Moreland, H.B. Miska, D. Brown, M.L. Perini. 2010
3. "EDM-1 Baseline Study Report": Prepared for CAT/TWS Team. **R.S. Tutmaher**. 2010
4. "EDM-2 GCS Baseline Study Plan": Prepared for CVLWT-ATT Team. **R.S. Tutmaher**, B.L. Zoebisch, M.A. Moreland, H.B. Miska. 2010
5. "CVLWT-ATT EDM-1 Minimum Launch Range": Prepared for CVLWT-ATT System Requirements Review. **R.S. Tutmaher**, M.A. Moreland. 2009
6. "EDM-1 Baseline Simulation Study Test Plan": Prepared for CVLWT-ATT Team. **R.S. Tutmaher**. 2009
7. "ATT Maximum Speed Simulation Study Plan": Prepared for the CVLWT-ATT Team. **R.S. Tutmaher**. 2009

Presentations by R.S. Tutmaher

1. "EDM-1+ ATT Capability Analysis": Prepared for N8 Torpedo Defense Technical Review Panel. 2011
2. "ECAT Effectiveness Study": Prepared for the CAT Systems Engineering Working Group. 2010
3. "EDM-1 CAT Maximum Speed Study Results": Prepared for CAT Systems Engineering Working Group. 2010
4. "Launcher Position Study": Prepared for CAT Systems Engineering Working Group. 2010
5. "Launcher Position Study": Prepared for SWDG. 2010
6. "Launcher Position Study": Prepared for CAT/TWS Ready Stow Group. 2010
7. "Launcher Position Study": Prepared for the CAT/TWS Systems Engineering IPT. 2010
8. "Compact Finite Difference Methods with Spectral-like Resolution" by Sanjiva K. Lele: Prepared for Florida State University Graduate Committee as a Master's Research Presentation.

Presentation Collaborator

1. "Technology Requirements Model (TRM) Support of CAT/TWS": Prepared for COMPOTEVFOR Undersea Warfare Division. 2011
2. "Nixie "Footprint" on EDM-1 Performance": Prepared for N8 Torpedo Defense Technical Review Panel. 2011
3. "Technology Requirements Model (TRM) Study of ATT Launcher Position on CVN": Prepared for Captain Edward J. Lester, Captain Jeff Griffen, Dr. Teresa McMullen (ONR33), Dan Godfrey (PMS-415). 2010

4. "Bearing Only Launches": Prepared for CAT/TWS. 2010
5. "CVLWT-ATT TRM Baseline Study" Prepared for the CVLWT-ATT Team. 2009
6. "Technology Requirements Model (TRM): Modeling and Simulation Support of ATTDS": Prepared for PMS-415 ONR. 2009
7. "Technology Requirements Model (TRM): Modeling and Simulation Support of ATTDS": Prepared for NMAWC, N86B, OPNAV, N86A, Surface Warfare Magazine, ONR333. 2009
8. "Bearing Error Sensitivity Study": Prepared for the System Engineering IPT. 2009
9. "CVLWT-ATT Minimum Launch Range": Prepared for CVLWT-ATT System Requirements Review. 2008

PROFESSIONAL DEVELOPMENT

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| 1. Online Teaching Certification – Front Range Community College | 2017 |
| 2. Peer Assisted Review (PAR) research study participant – University of Colorado | 2015 |
| 3. D3+DS: A Data Visualization Workshop with Twitter Data Science Team | 2014 |
| 4. Introduction to Research Seminar – University of Colorado Boulder | 2014 |
| 5. Teaching Excellence Seminar – University of Colorado Boulder | 2013 |
| 6. Teaching and Learning Online – Arapahoe Community College | 2012 |
| 7. Heated Hatha Yoga Teacher Training – Hayward's Yoga in State College | 2011 |
| 8. Women's Leadership Conference – Pennsylvania State University | 2009 |
| 9. Employee Benefits Association Committee Member | 2009 |
| 10. Sea, Air & Space Expo Attendee | 2009 |
| 11. TRM Software Training – as a trainer | 2009 |
| 12. Structural-Acoustics Computations Seminar – Penn State University | 2009 |
| 13. Teaching Assistant Training – Florida State University | 2007 |

