Conor Rowan

EDUCATION

University of Colorado Boulder Boulder, Colorado Aerospace Engineering PhD Student (coadvised by Professors Alireza Doostan and Kurt Maute) Philosophy coursework: Tech & Myth Seminar, History & Philosophy of Science University of Colorado Boulder

Master of Science in Aerospace Engineering

Dartmouth College

Bachelor of Engineering in Mechanical Engineering

Bard College at Simon's Rock

Bachelor of Arts in Mathematics

08/2022 - Present

Boulder, Colorado 08/2022 - 12/2024

Hanover, New Hampshire 06/2016 - 06/2019

Great Barrington, Massachusetts 09/2014 - 06/2018

Research Interests

- Physics-informed machine learning
- Data-driven modeling
- Engineering ethics
- Complexity science
- Philosophy of science

PROFESSIONAL EXPERIENCE

Boeing Commercial Airplanes

Liaison Engineer

- Attained Boeing Material Review Board (MRB) authority via nine-month rotation program through four fabrication and assembly facilities
- Liaison between manufacturing and design to troubleshoot production issues and ensure part compliance to engineering requirements for 737, 747, 767 and 777 airplane programs
- Learned theory and practice of fabrication, inspection, and repair of large monolithic aluminum airplane parts
- Lead a number of independent physics-based modeling and process improvement projects (see "Projects & Presentations")

Boeing Commercial Airplanes

Production Engineering Intern

- Statistically analyzed production data to predict CNC mill correction factors on wing structure
- Gained proficiency with Geometric Dimensioning and Tolerancing (GD&T) and complex engineering drawings

Metal alloy heat treatment research

Research Assistant

 Annealed samples and measured/calculated optical performance metrics for metal alloys to be used in solar energy applications

Seattle, Washington 09/2019 - 07/2022

Frederickson, Washington

Hanover, New Hampshire

06/2018 - 09/2018

03/2017 - 06/2017

Undergraduate research advisor University of Colorado Boulder, Aerospace Engineering	Boulder, Colorado 05/2025 - Present
 Advised two undergraduate research assistants on ongoing physics-inf 	ormed machine learning research projects
Graduate student reading group	Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering	2/2025 - Present
 Organized reading group for aerospace graduate students to discuss he ism and democracy in light of current political developments 	ow scientists can uphold principles of liberal-
Undergraduate research mentor	Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering	12/2024 - 05/2025
 Worked with undergraduate student on semester-long project to provi and computational mechanics 	de exposure to research in machine learning
MS student application review	Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering	11/2024
Volunteered to review and provide feedback on applications of prospec	ctive aerospace MS students
Tech & myth conference	Boulder, Colorado
University of Colorado Boulder, ATLAS Institute	10/2024 - Present
• Helped organize conference devoted to interdisciplinary approaches to technology	understanding the societal impacts of digital
Partnership for informal science education in the community (PISE	C) Boulder, Colorado
University of Colorado Boulder, Physics Department	10/2024 - Present
• Work with local high-school seniors on year-long engineering course pr	rojects and formation of STEM identity
Seminar on history, philosophy & ethics of science	Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering	09/2024 - 02/2025
• Founded and organized graduate student seminar series in the aerospa disciplinary approach to science and engineering	ace department aimed at cultivating an inter-
Philosophy of technology reading group	Boulder, Colorado
University of Colorado Boulder, Benson Center for Western Civilization	09/2024 - Present
• Founded and organized reading group for graduate students and con- engineered systems on human flourishing from a philosophical perspec-	mmunity members exploring the impacts of ctive
Guitar teacher	Boulder, Colorado
Self-employed	07/2024 - 10/2024
• Give guitar lessons on basics of music theory, improvisation, and song-	writing
Graduate student mentor	Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering	08/2023 - Present
• Mentor for incoming first-year aerospace masters and PhD students	
Teaching assistant	Boulder, Colorado
University of Colorado Boulder, "Statics, Structures & Materials"	08/2022 - 12/2022
• Lead problem sessions, graded assignments, and helped with admin course	istration of large sophomore level aerospace
Recovery mentor	Seattle, Washington & Boulder, Colorado
Local groups	06/2021 - Present
• Work with people new to 12 step recovery	
Tutor	Hanover, New Hampshire
Dartmouth College, Engineering prerequisite courses	03/2019 - 06/2019
• Ran a weekly help session for homework assignments in calculus, physics, and computer science	
Teaching assistant	Hanover, New Hampshire
Dartmouth College, "Engineering Systems"	01/2019 - 03/2019
• Lead problem sessions and graded assignments	

Why myth?: Tech's defense of stories

Tech & Myth Workshop, Presentation

• Use ideas from complexity science to show that reductionist accounts of social systems are neither plausible nor useful, and that narrative and stories are powerful tools in their stead

Data & modeling

Aerospace Engineering, Presentation

• Gave a talk for new history, philosophy and ethics graduate student seminar in aerospace on the precise differences between physics-based and data-drive models and how these differences influence potential applications

Coarse-graining & homogenization

Aerospace Engineering, Notes & Presentation

• Bridged gap between related ideas of emergence in complex systems research and homogenization in engineering mechanics through a philosophical and technical exposition of the mathematics involved in systems governed by dynamics on multiple scales (given as two-part presentation)

Deep Ritz method for phase field model of fracture

Engineering Mechanics Institute Conference, Presentation

• Investigated using neural network discretizations and energy formulation of the 2D phase field model for an edgenotched tensile specimen

Dynamics of rotating structures

Civil Engineering, Final Project

• Derived governing equations in rotating frame and implemented numerical solution to an elastic disk with nonlinear constitutive behavior and prescribed angular velocity

The myth & science of weather

The ATLAS Institute, Final Project & Presentation

• Constructed 2D incompressible Navier-Stokes solver in MATLAB using Chorin's method to generate data and visualizations for a philosophy of science themed project exploring the relationship between technology and storytelling

Two-way coupled viscoelastic torsion and heat conduction

Civil Engineering, Final Project

• Implemented custom two-way coupled MATLAB solver for torsional vibrations of viscoelastic rod which is heated by dissipated mechanical energy

What is a model?

Fluids, Structures & Materials Seminar, Presentation

• Talk designed to introduce aerospace engineering graduate students to canonical topics in the philosophy of science such as model construction, the problem of induction, falsification, the Duhem-Quine thesis, and Kuhn's critique of scientific progress

Working in industry

Herbst Program for Engineering, Ethics & Society, Presentation

• Gave a talk and moderated a discussion about working in engineering industry for undergraduates in an engineering leadership program

Classical and computational fracture mechanics literature review

Aerospace Engineering, Notes

• Compiled survey of history of fracture mechanics including extensive literature review of modern damage and fracture models

Asymptotic homogenization & machine learning

Aerospace Engineering, Research Project & Report

• Implemented 2D linear elastic homogenization code in MATLAB to compute microstructural stress fields and effective properties, used simulation data to build machine-learning surrogate models with PyTorch

Plastic bending model of stringer forming

Boeing Commercial Airplanes, Research Project & Report

10/2024

10/2024

08/2024

06/2024 an edge-

05/2024

12/2023

12/2023

11/2023

Boulder, Colorado

05/2023

09/2023 age and

06/2023

• Initiated step towards automation of manual stringer forming by using plastic bending theory to compute the relationship between applied forces and permanent bending displacements

Beam bending model of rib chord shot peen rework

Boeing Commercial Airplanes, Research Project & Report

• Created physics-based model of shot peen straightening process to improve accuracy and efficiency of reworking beam-like wing structure

04/2021

08/2020

Clustering analysis of stringer thickness data

Boeing Commercial Airplanes, Project & Presentation

• Lead process improvement project using clustering algorithms to refine machine performance and devised more robust part variability metrics

Publications

- Rowan, C., Evans, J., and Maute, K., "Variational volume reconstruction using the Deep Ritz method," In preparation.
- Rowan, C., Evans, J., Maute, K., and Doostan, A., "Solving engineering eigenvalue problems with neural networks using the Rayleigh quotient," *In preparation*.
- Rowan, C., and Doostan, A., "On the definition and importance of interpretability in scientific machine learning," Preprint, 2025.
- Rowan, C., Maute, K., and Doostan, A., "Physics-informed solution reconstruction in elasticity and heat transfer using the explicit constraint force method," Preprint, 2025. Submitted for publication.
- Rowan, C., "A thermoelastic plate model for shot peen forming metal panels based on effective torque," Preprint, 2025.
- The Untapped Value of Engineering Education, Colorado Engineer Magazine, Fall 2024
- A Treadmill Called Progress, Colorado Engineer Magazine, Spring 2024
- Human Systems and Complexity, Colorado Engineer Magazine, Fall 2023
- Danger of Deepfakes Extend Far Beyond Misinformation, Colorado Engineer Magazine, Spring 2023

Honors and Awards

- June Harper PhD Fellowship through Benson Center for Western Civilization
- National Defense Science and Engineering Graduate (NDSEG) fellowship
- "Introduction to Complexity" certificate through Santa Fe institute
- Working toward college teaching certificate
- Second place in annual interdisciplinary tech ethics competition hosted by the Wolf Law School at CU Boulder
- Colorado Engineer Magazine writer's scholarship
- KD Woods scholarship for past academic achievement
- Boeing "Material Review Board" (MRB) certification
- High honors for undergraduate thesis "Role of Dimensionality in Physics"
- Merit scholarship from Bard College at Simon's Rock

Miscellaneous

- Participated in regular meetings of Herbst program reading group and "tech & myth" salon
- EMT, Wilderness EMT, and AIARE I avalanche certifications
- Avid rockclimber and mountaineer
- Active in local recovery community
- Completed 1,000 mile unsupported bike tour around Iceland
- Fluent in Spanish
- Bassist and guitarist in Boulder-based bands, released three albums
- See personal website for blog, notes, personal projects, writing, music, and climbing photos