Conor Rowan

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Education

University of Colorado Boulder — Boulder, Colorado
Aerospace Engineering PhD Student (coadvised by Professors Alireza Doostan and Kurt Maute) — 08/2022 - Present

University of Colorado Boulder — Boulder, Colorado
Master of Science in Aerospace Engineering — 08/2022 - 12/2024

Dartmouth College — Hanover, New Hampshire
Bachelor of Engineering in Mechanical Engineering — 06/2016 - 06/2019

Bard College at Simon's Rock — Great Barrington, Massachusetts
Bachelor of Arts in Mathematics — 09/2014 - 06/2018

Research Interests

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

Professional Experience

Boeing Commercial Airplanes — Seattle, Washington
Liaison Engineer — 09/2019 - 07/2022

- 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 — Frederickson, Washington
Production Engineering Intern — 06/2018 - 09/2018

- 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 — Hanover, New Hampshire
Research Assistant — 03/2017 - 06/2017

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

Teaching, Mentoring & Service

Reviewer Boulder, Colorado
Journal of Computational Physics 03/2025 - Present
- Volunteer to review and provide feedback on submissions to the journal

Reviewer Boulder, Colorado
Engineering with Computers 03/2025 - Present
- Volunteer to review and provide feedback on submissions to the journal

Undergraduate research advisor Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering 05/2025 - Present
- Advising two undergraduate research assistants on ongoing physics-informed 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 how scientists can uphold principles of liberalism and democracy in light of current political developments

Undergraduate research mentor Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering 12/2024 - 05/2025
- Worked with undergraduate student on semester-long project to provide exposure to research in machine learning and computational mechanics

MS student application review Boulder, Colorado
University of Colorado Boulder, Aerospace Engineering 11/2024
- Volunteered to review and provide feedback on applications of prospective 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 understanding the societal impacts of digital technology

Partnership for informal science education in the community (PISEC) Boulder, Colorado
University of Colorado Boulder, Physics Department 10/2024 - Present
- Work with local high-school seniors on year-long engineering course projects 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 aerospace department aimed at cultivating an interdisciplinary approach to science and engineering

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 community members exploring the impacts of engineered systems on human flourishing from a philosophical perspective

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 administration of large sophomore level aerospace course

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

Projects & Talks

Interpretability in scientific machine learning

NREL Seminar Series, Invited talk 9/2025

Explicit constraint force method for solution reconstruction

USNCCM, Presentation 7/2025

Explicit constraint force method for solution reconstruction

CRUNCH group seminar, Invited talk 7/2025

Complexity & the limits of science

Complex Systems Summer School, Ongoing project 6/2025

- Conducting semi-structured interviews with graduate students and professors from a variety of scientific and humanistic backgrounds on the limits of scientific knowledge

Coarse graining and effective theories

Complex Systems Summer School, Presentation 6/2025

- Pedagogical presentation of coarse graining and effective theories in engineering and physics

Why myth?: tech's defense of stories

Tech & Myth Workshop, Presentation 10/2024

- 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 10/2024

- 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 08/2024

- 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 06/2024

- Investigated using neural network discretizations and energy formulation of the 2D phase field model for an edge-notched tensile specimen

The myth & science of weather

The ATLAS Institute, Final Project & Presentation 12/2023

- 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

What is a model?

Fluids, Structures & Materials Seminar, Presentation 11/2023

- 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 Boulder, Colorado

Herbst Program for Engineering, Ethics & Society, Presentation 05/2023

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

Plastic bending model of stringer forming

Boeing Commercial Airplanes, Research Project & Report 08/2021

- 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 04/2021

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

Clustering analysis of stringer thickness data

Boeing Commercial Airplanes, Project & Presentation 08/2020

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

Publications

- Rowan C., "Some remarks on optimal experimental design with the explicit constraint force method," In preparation.
- Rowan C., "Extending the explicit constraint force method to inverse problems," Preprint, 2025.
- Rowan C., "On the failure of ReLU activation for physics-informed machine learning," Preprint, 2025.
- Rowan C., "Finding geodesics with the Deep Ritz method," Preprint, 2025.
- Rowan C., "Nonlinear discretizations and Newton's method: characterizing stationary points of regression objectives," Preprint, 2025.
- Rowan C., Doostan, A., Maute, K., "Boundary condition enforcement with PINNs: a comparative study and validation on 3D geometries," Preprint, 2025. Submitted for publication.
- Norman, G., Rowan C., Doostan, A., "Learning gradient flow: using equation discovery to accelerate engineering optimization," In preparation.
- Rowan, C., Evans, J., and Maute, K., "Variational volume reconstruction using the Deep Ritz method," Preprint, 2025. Submitted for publication.
- Rowan, C., Evans, J., Maute, K., and Doostan, A., "Solving engineering eigenvalue problems with neural networks using the Rayleigh quotient," Internal Journal for Numerical Methods in Engineering, 2025.
- Rowan, C., and Doostan, A., "On the definition and importance of interpretability in scientific machine learning," Preprint, 2025. Submitted for publication.
- Rowan, C., Maute, K., and Doostan, A., "Physics-informed solution reconstruction in elasticity and heat transfer using the explicit constraint force method," Computer Methods in Applied Mechanics & Engineering, 2025.
- Rowan, C., "A thermoelastic plate model for shot peen forming metal panels based on effective torque," Journal of Manufacturing and Materials Processing, 2025.
- "The Untapped Value of Engineering Education," Colorado Engineer Magazine, 2024
- "A Treadmill Called Progress," Colorado Engineer Magazine, 2024
- "Human Systems and Complexity," Colorado Engineer Magazine, 2023
- "Danger of Deepfakes Extend Far Beyond Misinformation," Colorado Engineer Magazine, 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
- Graduate peer mentoring impact recognition award
- 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

- Attended month long 2025 complex systems summer school at the Santa Fe Institute
- 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
- Trained Single Pitch Instructor (SPI)
- Active in local recovery community
- Completed 1,000 mile unsupported bike tour around Iceland
- Proficient in Spanish
- Bassist and guitarist in Boulder-based bands, recorded three albums
- See personal website for blog, notes, personal projects, writing, music, and climbing photos