Mike Soltys, Ph.D

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I'm a leader in bringing engineering education research to practice, creating curriculum that uses engaging experiential education techniques, and passionate about creating equitable pathways and opportunities so that all students can succeed in engineering.

Education

Dec 2013 | **University of Colorado**, Boulder
Ph.D. in Civil Engineering, Fluid Dynamics — GPA: 3.91
Thesis: "Experimental Investigations on the Role of Structure in Turbulent Mixing of Initially Isolated Scalars" — Advisor: Prof. John Crimaldi
| Dissertation Excellence Award

Dec 2006 | **Clemson University**
Bachelors in Civil Engineering — GPA: 3.95
Emphasis: Applied Fluid Mechanics — *summa cum laude*

Positions

Current / Aug 2023 | Associate Director and Principal Instructor
Integrated Design Engineering Program at CU Boulder
Designed and taught hands-on, active learning curriculum in classes ranging from 9 to 108 students. Taught courses, including First-Year Engineering Projects, Engineering Design for the Community, Statics, Thermodynamics, and Engineering Explorations Through Physics. Acknowledged as a top teaching performer in the College of Engineering. Created engineering YouTube channel with over 250,000 views and almost 1,000 subscribers.

Aug 2020 | Senior Instructor at University of Colorado, Boulder
Aug 2014 | Instructor at University of Colorado, Boulder | FCQ summary
Integrated Design Engineering (formerly Engineering Plus) | YouTube Channel

Jun 2024 / Feb 2024 | Visiting Erskine Fellow in Industrial Product Design
University of Canterbury, Christchurch New Zealand
Redeveloped a thermofluids course taught to product designers to incorporate Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) elements.

Feb 2024 / Jan 2022 | Principal Investigator and Project Lead
TeachEngineering.org — *University of Colorado*
TeachEngineering provides free hands-on engineering curriculum for K-12 educators. Led new initiatives that have grew TeachEngineering.org to over 3 million annual users. Received over $4 million in grants. Managed a team of five staff that oversee the curriculum collection and conduct summer professional development workshops for teachers.

Dec 2021 | Co-Principal Investigator / Project Lead | NSF #1941701 $3,819,365

June 2014 | *TeachEngineering.org* | NSF #144495 $1,001,000

Jul 2014 – Jan 2014 | Professional Research Assistant
TeachEngineering Digital Library — *University of Colorado*
Developed curriculum and aligned existing curriculum to Common Core State Standards (CCSS). Augmented existing curriculum when possible to meet learning objectives in CCSS.

Dec 2013 – Jun 2011 | NSF Graduate Teaching Fellow
University of Colorado, Boulder
Developed and taught hands-on engineering curricula for 9-12 grade students. Performed engineering and science outreach activities targeting under-represented groups.

Dec 2013 – Aug 2007 | Research Graduate Student and Lab Manager
Environmental Fluid Mechanics Laboratory — *University of Colorado*
Designed a new experimental technique for studying interactions between multiple scalars in turbulent aqueous flows using laser-induced fluorescence. Manufactured experimental apparatuses including laser optics and machine vision systems. Developed data analysis and image processing algorithms using MATLAB and R.

Dec 2012 – Aug 2012 | Lecturer at University of Colorado, Boulder
Civil Engineering
Taught hydraulic engineering for a class of 96 students focusing on design applications of fluid dynamics related to water resources engineering.

Sept 2006 – May 2006 | Undergraduate Research Assistant
Clemson University Wind Load Test Facility — *Clemson University*
Constructed scale models and used them to gather structural loading data in a wind tunnel. Visualized flow using smoke machines. Acquired structural loading data through destructive testing in the field.

Aug 2005 – Jan 2004 | Engineer Diver Co-Op
Collins Engineers, Inc. — *Charleston, SC*
Performed more than 125 underwater inspections using SCUBA diving techniques. Wrote structural inspection reports, including AutoCAD drawings.

Honors & Awards

2022 Charles A. Hutchinson Memorial Teaching Award (Highest teaching honor at CU Engineering)
2018 College of Engineering and Applied Science Top 20 Teaching Performers
2017 College of Engineering and Applied Science Top 20 Teaching Performers
2015 Winner: QuickLeft Where Are Your Wearables Hackathon
2014 Top 1% of data analysts on data science site, kaggle.com
2013 Department of Civil, Environmental, and Architectural Engineering Dissertation Excellence Award

Service & Leadership

Current | **Associate Director: Integrated Design Engineering Program**
2023 | University of Colorado, Boulder

Current | **National Academy of Engineering EngineerGirl Steering Committee**
2018 | Elected as Co-Chair in 2022.

2023 | **Integrated Teaching and Learning Program Leadership Team**
2021 | University of Colorado, Boulder

May 2023 | **GEEN 1400: First Year Projects Coordinator**
Jan 2023 | University of Colorado, Boulder

May 2023 | **CEAS IT Governance Committee**
Jan 2023 | University of Colorado, Boulder

May 2023 | **Faculty Leadership Institute Fellow**
Aug 2022 | *University of Colorado, Boulder*

June 2022 | **CEAS Dean Search Committee**
Nov 2021 | *University of Colorado, Boulder*

2022 | **Integrated Design Engineering Faculty Search Committee**

2021 | **Integrated Design Engineering Faculty Search Committee**
2020 | *University of Colorado, Boulder*

2020 | **Remote Labs and Projects Courses Working Group**
University of Colorado, Boulder

2020 | **LA Program Department Liaison**
2016 | *University of Colorado, Boulder*

2019 | **Financial Futures Statics and Thermo Committee**
University of Colorado, Boulder

2017 | **CEAS Curriculum Committee**
University of Colorado, Boulder

2017 | **New Faculty Orientation**
2014 | Participated in instructor portion of new faculty orientation for CEAS.

2016 | **PHYS 1140 Transformation Committee**

Courses with Significant Development

- **GEEN 1010: Engineering Explorations Through Physics** Designed physics course in collaboration with the CU GoldShirt program to increase retention of underrepresented students. Course consisted of interactive lectures, labs, and recitations.
- **GEEN 2851: Statics for Engineers** Re-imagined a traditional statics course to include weekly projects and desktop learning modules. Also created a final design-build project where students measured material properties with a universal testing machine and used this data to construct a truss to meet a 1,000 pound design load.

Courses Developed in Collaboration

- **GEEN 2400: Engineering Design For the Community** Built upon a service-learning course where interdisciplinary teams find a client in the community with a unique need, set design constraints, determine project scope, design, and build a solution to meet the client's need.
- **GEEN 3852: Thermodynamics** Created a thermodynamics course with a final design project wherein students designed and built a device to transform heat into useful work. Used a partial flipped-classroom model to facilitate students' problem-solving in-class.
- **GEEN 3853: Measurements and Data Analysis** Team-taught a projects-based course covering experimental design, data acquisition, and data analysis. Projects included a model to theory project wherein students built a musical instrument, a controls project where students built a smart-home device, and a open-ended final project where students designed and executed their own experiment.

Other Courses Taught

- **GEEN 1400: First-Year Engineering Projects**
- **CVEN 3323: Hydraulic Engineering**
- **MCEN 2023: Statics**

Grants & Fellowships

Aug 2019 | TeachEngineering: Democratizing Engineering Education for PK-12 Teachers
J. Sullivan (PI), M. Soltys (PI), M. Zarske (Co-PI)
National Science Foundation award #1941701 *$3,819,365*

Mar 2018	TeachEngineering Digital Library YouTube Video Production M. Soltys (PI) *CU Engineering Excellence Fund*	*$3,000*
Oct 2017	Raspberry Pi: Low Cost Computing for Engineering Plus Design Courses and ITLL Checkout M. Soltys (PI) *CU Engineering Excellence Fund*	*$2,000*
Mar 2016	Additional Laptops for Active Learning in Any Classroom M. Soltys (PI) *CU Engineering Excellence Fund*	*$2,860*
Sept 2015	TeachEngineering: Expanding & Sustaining Curriculum Access for K-12 Teachers J. Sullivan (PI), M. Soltys (Co-PI), M. Zarske (Co-PI) *National Science Foundation award #1544495*	*$900,556*
Oct 2014	Laboratory Equipment, Sensors and Measurement Tools to Enhance Hands-On and Design-Based Courses in the General Engineering Plus Degree Program M. Soltys (PI), D. Reamon (PI) *CU Engineering Excellence Fund*	*$3,000*
Dec 2011 Aug 2007	Departmental Graduate Student Fellowship M. Soltys *Civil, Environmental, and Architectural Engineering*	

Peer-Reviewed Publications

Google Scholar

[1] M. Zarske and **M. Soltys**. Engagement in Practice: Practicing Empathy in Engineering for the Community Course. In *ASEE Annual Conference and Exposition, Montreal*, 2020.

[2] S. Hug and **M. Soltys**. Engineering Outreach: Ambassador Girls Empowering Girls in the Field. In *ASEE Annual Conference and Exposition, Montreal*, 2020.

[3] R. Reitsma, J. Sullivan, and **M. Soltys**. TK-12 Engineering and the Next Generation Science Standards: A Network Visualization and Analysis. In *ASEE Annual Conference and Exposition, Montreal*, 2020.

[4] **Soltys, M. A.** and J. P. Crimaldi. Joint probabilities and mixing of isolated scalars emitted from parallel jets. *J. Fluid Mech*, 769:130–153, 2015.

[5] C. Samson, J. Sullivan, **M. Soltys**, and R. Reitsma. The Relevance of K-12 Engineering Curricula to NGSS: An Analysis of TeachEngineeringNGSS Alignments. In *ASEE Annual Conference and Exposition, Seattle, Washington*, 2015.

[6] **Soltys, M. A.** and J. P. Crimaldi. Special Issue Cover Image: The role of structured stirring and mixing on gamete dispersal and aggregation in broadcast spawning. *Journal of Experimental Biology*, 215(6):Cover, 2012.

[7] **Soltys, M. A.** and J. P. Crimaldi. Scalar interactions between parallel jets measured using a two-channel PLIF technique. *Experiments in Fluids*, 50(6):1625–1632, 2011.

Presentations & Workshops

[1] **Mike A. Soltys**, Dua Chalker, and Jackie Sullivan. Transforming the role of engineering in science education: A demonstration, conversation and action plan. In *NSF EEC Washington, DC*, 2019.

[2] **Mike A. Soltys** and Mindy Zarske. Using teachengineering to bring design thinking and ngss engineering standards into your classroom. In *ASEE PCEE Tampa*, 2019.

[3] **Mike A. Soltys** and Janet Tsai. Incorporating active learning into first-year engineering project courses. In *ACTIVE Faculty Development and Leadership Intensive*, 2018.

[4] Farrokh Shoaei, **Mike A. Soltys**, Aaron True, and John Crimaldi. The Effect Of Obstacle Wakes On Reaction Enhancement Between Two Initially Distant Scalars. In *APS Division of Fluid Dynamics Gallery of Fluid Motion*, 2014.

[5] **Mike A. Soltys** and John P. Crimaldi. Turbulent generation of scalar covariance between two initially distant scalars: Implications for enhanced mixing and reaction. Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA, November 25, 2013.

[6] **Mike A. Soltys**. The effect of structured stirring and mixing on scalar covariance of initially distant scalars. Dynamical and Chaotic Systems Seminar, Boulder, CO, September 5, 2013.

[7] **Mike A. Soltys**. Interactions between isolated scalars in turbulent flows. Boulder Fluid Dynamics Seminar, Boulder, CO, June 25, 2013.

[8] **Mike A. Soltys**. Joint probabilities of two scalars emitted from parallel jets using planar laser induced fluorescence. University of Colorado Water Resources Seminar, Boulder, CO, December 12, 2012.

[9] **Mike A. Soltys** and John P. Crimaldi. Interactions between turbulent mixing and coral reproduction. TOS/ASLO/AGU 2012 Ocean Sciences Meeting. Salt Lake City, UT, February, 2012.

[10] **Mike A. Soltys**. Turbulence, lasers, and coral sex: What turbulence can teach us about broadcast spawning (and visa versa). Fluids Connections. Boulder, CO, October 10th, 2010.

[11] **Mike A. Soltys**. Laser induced fluorescence. Fluids Connections. Boulder, CO, October 27, 2009.

[12] John P. Crimaldi and **Mike A. Soltys**. A two-color planar laser induced fluorescence technique for two-scalar mixing and reaction experiments. Turbulence, Heat and Mass Transfer 6, Rome, IT, September 14, 2009.

[13] **Mike A. Soltys**. Environmental fluid mechanics. University of Colorado Water Resources Seminar, Boulder, CO, November 12, 2008.

Outreach Activities

Apr 2019	**Admitted Student Day** Manned booth advertising engineering plus to admitted students.
Jul 2018	**BOLD CAMPOS Camp** Taught week-long design project for 50 rising 12th grade students.
Jul 2017	**Goldshirt Physics/Math Summer Bridge** Designed and taught two-week physics and math component of Goldshirt Summer Bridge program.
Jul 2017	**BOLD CAMPOS Camp** Taught week-long design project for 50 rising 12th grade students.
Nov 2016	**Girls Explore Engineering Day** Presented Flash-talk to Girls interested in Engineering.
Jul 2016	**BOLD CAMPOS camp** Taught week-long design project for 50 rising 12th grade students.
Jul 2016	**I Have A Dream Design Camp** Organized and lead one-month design camp for 60 rising 9th grade students.
Apr 2016	**Admitted Students Day Open House** Participated in Admitted Students Day presentation.
Feb 2016	**Boettcher Finalist Day** Presented recruitment materials to Boettcher Scholarship finalists.
Aug 2015	**Academic Expectations Session** Served on faculty panel addressing new University of Colorado students and parents.
Aug 2015	**Sparkfun Microntrollers for Education** Collaborated with Sparkfun Education in hands-on workshop on integrating microcontrollers into K-12 classrooms.
Jun 2015	**EngiNEAR me** Designed and led one week hands-on design project for 40 high school seniors.
Apr 2015	**DSST Visit Day** Led a hands-on activity and gave a presentation to recruit students to University of Colorado Engineering.
Feb 2015	**Boettcher Finalist Day** Presented recruitment materials to Boettcher Finalists.
Feb 2015	**Gold Shirt Panel** Participated in GoldShirt Faculty Panel answering questions for incoming GoldShirt Students.
Nov 2014	**Talented Scholars Day** Led a hands-on activity and gave a presentation to recruit students to University of Colorado Engineering.
May 2014	**Gates Expo Judge** Served as a judge for the Graland's Gates Invention and Innovation Competition.

Mar 2014 **DSST Visit Day** Led a hands-on activity and gave a presentation to recruit students to University of Colorado engineering.

Feb 2014 **DSST-Green Valley Ranch/CU-Boulder STEM Visit** Led a hands-on activity and gave a presentation to recruit students to CU engineering.

July 2013 **Goldshirt and Aspire summer bridge** Helped plan and implement new design project: search and rescue assistants (SARAs) for Goldshirt and Aspire summer bridge.

Undergraduate Students Mentored

TeachEngineering Video Project

- Alissa Mastronardi (2017-2019)
- Nahum Tariku (2017-2019)
- Fernanda Villalobos (2018-2019)
- Colin Soguero (2019)
- Conner Mcleod (2019)
- Sarah Macdonald (2019)
- Erin Ruby (2019)
- Amelia Wigton (2019)
- Jack Marty (2019)
- Joshua Sun (2019)
- Patrick Gibbs (2017-2018)
- Annabel Lee (2017-2018)
- Alex Carrasco (2018)
- Cadence Speelman (2018)
- Grant Lewis Stewart (2018)
- Millicent Gabriel (2017)
- John Roach (2017)

Independent Studies

- Krish Desai (2017)

You'RE@CU mentoring program

- Allie Banks (2011)

Personal Interests & Skills

Physical computing (Arduino, RaspberryPI, C++, ATMEL microcontrollers, circuits)
Product development and prototyping (Solidworks, OnShape, 3D printing, manufacturing)
Data analysis (R, MATLAB, Python, LaTeX)
Web development (HTML, Javascript, CSS)
Skiing
Mountain and gravel cycling
Trail running
Youth soccer coach

Professional Organizations

American Society of Engineering Education
American Physical Society
American Society of Civil Engineers
Tau Beta Pi