# Tyler J. Souders

*Curriculum Vitae* *Updated March 25, 2022*

## Education

2021–Present **Ph.D. Mechanical Engineering**, *University of Colorado Boulder*, Boulder, Expected Graduation: May 2026.
Advisor: Dr. Peter E. Hamlington

2020–2021 **M.S. Mechanical Engineering**, *Arizona State University*, Tempe, Combined B.S.E. and M.S. Program.
Thesis title: *Modernization of a Vortex Lattice Method with Aircraft Design Applications*
Co-Advisors: Dr. Timothy T. Takahashi and Dr. Marcus Herrmann

2016–2020 **B.S.E. Aerospace Engineering**, *Arizona State University*, Tempe.

## Honors and Awards

2022 David T. Spalding Graduate Teaching Fund Fellowship, University of Colorado Boulder

2021 Graduate School Travel Grant, University of Colorado Boulder

2021 Vogel Family Fellowship – Department of Mechanical Engineering, University of Colorado Boulder

2020 Ira A. Fulton Schools of Engineering IMPACT Awardee, Arizona State University

2020 Graduated *Magna cum Laude*, Arizona State University

2016 New American University Scholar - President's Award, Arizona State University

## Professional Experience

2021–Present **Graduate Student Researcher**, *University of Colorado Boulder*, Boulder, CO.
Turbulent Energy Systems Laboratory (TESLa). Research focuses on the simulation of bluff body stabilized flames using the adaptive mesh refinement framework AMReX.

2018-2021 **Lead Aerospace Engineering Tutor - FSE Tutoring Centers**, *Arizona State University*, Tempe, AZ.
Provided academic support to students in the aerospace engineering department. Ensured course competency among aerospace engineering tutors.

Summer 2019 **Mechanical Engineering Intern**, *SmithGroup*, Phoenix, AZ.
Designed and analyzed performance of heating and ventilation (HVAC) systems for commercial buildings.

## Teaching Experience

Spring 2022 **MCEN 3021 - Fluid Mechanics**, *University of Colorado Boulder*, Boulder, CO, Graduate Teaching Assistant.
Instructors: Dr. Jeremy Koch and Dr. Xiaoyun Ding

Fall 2021 **MCEN 3030 - Computational Methods**, *University of Colorado Boulder*, Boulder, CO, Graduate Teaching Assistant.
Instructor: Dr. Robert MacCurdy

Spring 2021 **AEE 468 - Aircraft Systems Design**, *Arizona State University*, Tempe, AZ, Graduate Course Grader.
Instructor: Dr. Timothy T. Takahashi

Spring 2021 **AEE 344 - Fundamentals of Aircraft Design**, *Arizona State University*, Tempe, AZ, Graduate Course Grader.
Instructor: Dr. Timothy T. Takahashi

Fall 2020 **MAE 563 - Aircraft Propulsion**, *Arizona State University*, Tempe, AZ, Graduate Course Grader.
Instructor: Dr. Werner J.A. Dahm

Fall 2020 **MAE 564 - Advanced Aerodynamics**, *Arizona State University*, Tempe, AZ, Graduate Course Grader.
Instructor: Dr. Timothy T. Takahashi

Fall 2020 **AEE 468 - Aircraft Systems Design**, *Arizona State University*, Tempe, AZ, Graduate Course Grader.
Instructor: Dr. Timothy T. Takahashi

Spring 2020 **AEE 344 - Fundamentals of Aircraft Design**, *Arizona State University*, Tempe, AZ, Undergraduate Teaching Assistant.
Instructor: Dr. Timothy T. Takahashi

Fall 2019 **MAE 215 - Introduction to Programming in MATLAB**, *Arizona State University*, Tempe, AZ, Undergraduate Course Grader.
Instructor: Dr. Abhinav Kshitij

Spring 2019 **FSE 104 - Engineering Projects in Community Service**, *Arizona State University*, Tempe, AZ, Undergraduate Teaching Assistant.
Instructor: Dr. Jared Schoepf

## Research Interests

Turbulence, Combustion, Flame Dynamics, Reacting Flows, Computational Fluid Dynamics (CFD), Adaptive Mesh Refinement (AMR), HPC Computing, Fuel Emissions.

## Computational Skills

Languages Expert: MATLAB; Comfortable: Python, Visual Basic for Applications, FORTRAN, C++

Programs Experienced: Vortex-Lattice CFD (*VORLAX*), AMReX, PeleC; Familiar: ANSYS Fluent

## Publications

### Conference Proceedings


[3] Souders, T.J., Heitmann, K., and Takahashi, T.T.. Life in the Fast Lane: Project-Based Learning of Advanced Aerodynamics Using a Rapid Potential Flow Code. *AIAA SciTech 2022*

[2] Souders, T.J. and Takahashi, T.T.. VORLAX 2020: Making a Potential Flow Solver Great Again, AIAA 2021-2458, 2021. *AIAA AVIATION 2021*

[1] Souders, T.J. and Takahashi, T.T.. VORLAX 2020: Benchmarking Examples of a Modernized Potential Flow Solver, AIAA 2021-2459, 2021. *AIAA AVIATION 2021*

## Conference Presentations

### Presentations by T.J. Souders

[P.6] Souders, T.J. and Takahashi, T.T.. VORLAX 2020: Making a Potential Flow Solver Great Again. *AIAA AVIATION 2021, Held Virtually*

[P.5] Souders, T.J. and Takahashi, T.T.. VORLAX 2020: Benchmarking Examples of a Modernized Potential Flow Solver. *AIAA AVIATION 2021, Held Virtually*

### Conference Presentations: Accepted

[P.4] Souders, T.J., Heitmann, K., and Takahashi, T.T.. Life in the Fast Lane: Project-Based Learning of Advanced Aerodynamics Using a Rapid Potential Flow Code. *AIAA SciTech 2022*

[P.3] Souders, T.J., Whitman, S.H.R., Ahmed, A., Hamlington, P.E.. Pressure Gradient Tailoring Effects on Simulated Flow Behind a Ballistic Bluff Body. *74th Annual Meeting of the APS Division of Fluid Dynamics - Reacting Flows: Turbulent Combustion*

### Conference Presentations: Submitted

[P.2] T.J. Souders, S.H.R. Whitman, M.A. Meehan, and P.E. Hamlington. Effects of Mean Pressure Gradient and Free-Stream Turbulence on a Bluff Body Stabilized Premixed Flame. *ASME 2022 International Mechanical Engineering Congress and Exposition*, Submitted, 2022

[P.1] S.H.R. Whitman, T.J. Souders, M.A. Meehan, J.G. Brasseur, and P.E. Hamlington. Pressure gradient tailoring effects on vorticity dynamics in the near-wake of bluff-body premixed flames. *Proceedings of the Combustion Institute*, Submitted, 2022.

## Conference, Symposium and Seminar Participation

2021 **Committee**, Rocky Mountain Fluid Mechanics Research Symposium.
August 10, *Held Virtually*, Boulder, CO

## Professional Service

2019–2021 **Member at Large**, *American Institute of Aeronautics and Astronautics at ASU*, Arizona State University, Tempe, AZ.

2019–2020 **Logistics Director**, *Society of Women Engineers*, Arizona State University, Tempe, AZ.

2016–2020 **Vice President**, *Fulton Ambassadors*, Arizona State University, Tempe, AZ.