

Jennifer Colborn

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EDUCATION

The Pennsylvania State University, State College, PA
Doctor of Philosophy in Mechanical Engineering July 2024

University of Dayton, Dayton, OH
Master of Science in Aerospace Engineering May 2020
Bachelor of Mechanical Engineering, Concentration in Aerospace Engineering December 2018

RESEARCH EXPERIENCE

The University of Texas at San Antonio, San Antonio, TX
Post-Doctoral Fellow August 2024 – Present

The Pennsylvania State University, State College, PA
Graduate Research Assistant June 2020 – July 2024

Air Force Research Laboratory, Wright-Patterson AFB, Dayton, OH
Undergraduate/Graduate Research Assistant September 2017 – May 2020

TEACHING EXPERIENCE

The University of Texas at San Antonio, San Antonio, TX
Guest Lecturer, Advanced Optics Fall 2024
Guest Lecturer, Engineering Instrumentation Spring 2025

The Pennsylvania State University, State College, PA
Teaching Assistant, Thermodynamics Spring 2024

University of Dayton, Dayton, OH
Teaching Assistant, Engineering Analysis Spring 2020
Teaching Assistant, Aerodynamics Summer 2019
Teaching Assistant, Aerodynamics Spring 2018

PEER-REVIEWED PUBLICATIONS

Published

- Denman, J.C., Zhao, X., **Colborn, J.**, O'Connor, J., "Heat transfer characteristics of a backward-facing step combustor," *Applications in Energy and Combustion Science*, vol. 24, 2025, p. 100373.
- Strasser, N.S., Murakami, D.D., **Colborn, J.**, Hand, L.A., Combs, C.S., "Photodegradation in porous, fast-response pressure-sensitive paint under varying pressures," *Optics Continuum*, vol. 4, no. 8, 2025, pp. 1916-1930.
- Colborn, J.**, Denman, J., Zhao, X., O'Connor, J., "Flame Heat Transfer Measurements and Simulations in a Backward-Facing Step Combustor," *AIAA Journal*, 2025, article in advance.
- Colborn, J.**, O'Connor, J., Tricard, N., Denman, J., Zhang, P., Zhao, X., "Interpreting heat flux measurements in a vitiated backward-facing step flow," *AIAA Journal*, vol. 62, no. 2, 2024, pp. 2967-2978.

5. Boehm, R.C., **Colborn, J.**, Heyne, J.H., “Comparing alternative jet fuel dependencies between combustors of different size and mixing approaches,” *Frontiers in Energy Sciences*, vol. 9, 2021, p. 701901.
6. **Colborn, J.G.**, Heyne, J.S., Stouffer, S.D., Hendershott, T.T., Corporan, E., “Chemical and physical effects on lean blowout in a swirl-stabilized single-cup combustor,” *Proceedings of the Combustion Institute*, vol. 38, no. 4, 2021, pp. 6309-6316.
7. McConney, M.E., Glavin, N.R., Juhl, A.T., et al., “Direct synthesis of ultra-thin large area transition metal dichalcogenides and their heterostructures on stretchable polymer surfaces,” *Journal of Materials Research*, vol. 31, no. 7, 2016, pp. 967-974.

In Progress

1. **Colborn, J.**, Zhao, X., O’Connor, J., “Gas turbine combustor heat transfer: Challenges and research methods,” in progress for submission to *Journal of Propulsion and Power*.
2. Steavenson, B.S., et al., “Multi-species thermochemistry with multi-variable Boltzmann regression laser absorption spectroscopy,” in progress for submission to *Measurement Science and Technology*.

INVITED PRESENTATIONS

1. University of Virginia, Charlottesville, VA, “Measurements in extreme environment: From combustion heat transfer to shock wave boundary layer interactions,” October 2025.
2. AIAA Aerodynamic Measurement Technology Rising Stars, Orlando, FL, “Measurement of heat flux in gas turbine scenarios,” January 2025.
3. Sandia National Laboratories, Albuquerque, NM, “Improving combustor durability: The impact of convective and radiative heat transfer,” May 2024.
4. The Air Force Research Laboratory, Wright-Patterson AFB, OH, “Improving combustor durability: The impact of convective and radiative heat transfer,” April 2024.
5. The University of Texas at San Antonio, San Antonio, TX, “Improving combustor durability: The impact of convective and radiative heat transfer,” April 2024.
6. Gordon Research Seminar on Laser Diagnostics in Combustion and Energy Sciences, Newry, ME, “Relative impact of convective and radiative heat transfer a backward-facing step,” July 2023.
7. The Pennsylvania State University, State College, PA, “Relative impact of convective and radiative heat transfer in a backward facing step combustor,” February 2023.

CONFERENCE PROCEEDINGS & PRESENTATIONS

1. **Colborn, J.**, Stegmeier, N.W., LaLonde, E., Andrade, A., Combs, C.S., “Investigation of Roughness Effects on Shock-wave Boundary-Layer Interactions using Planar Laser Scattering, AIAA Aviation Forum 2025-3875, Las Vegas, NV, 2025.
2. Andrade, A. e. al., “Study of a Hypersonic Far Wake Using Laser Diagnostics,” AIAA Aviation Forum 2025-3847, Las Vegas, NV, 2025.
3. **Colborn, J.**, O’Connor, J., “Application of Multispectral Imaging to Understand Combustor Heat Transfer in a Vitiated Backward-Facing Step Flow,” AIAA SciTech 2025-2247, Orlando, FL, 2025.
4. **Colborn, J.**, O’Connor, J., “Measurement of heat flux in reacting flow in a backward-facing step combustor,” Eastern States Section of the Combustion Institute Spring Meeting, Athens, GA, 2024.

5. **Colborn, J.**, O'Connor, J., "Measurement of heat flux in reacting flow in a backward-facing step combustor," AIAA SciTech 2024-1246, Orlando, FL, 2024.
6. **Colborn, J.**, and O'Connor, J., "Variation in convective and radiative heat transfer with Reynolds number and temperature in a backward-facing step combustor," AIAA SciTech 2023-0923, National Harbor, MD, 2023.
7. **Colborn, J.**, Snelling, E., O'Connor, J., "Characterization of a new backward-facing step combustor," Advanced Instrumentation, Diagnostics and Controls for Application in Turbomachinery Conference, State College, PA, 2022.
8. Toumey, J., Zhang, P., Zhao, X., **Colborn, J.**, O'Connor, J., "Assessing the wall effects of backwards-facing step flow in tightly coupled experiments and simulations," AIAA SciTech 2022-0822, San Digo, CA, 2022.
9. **Colborn, J.G.**, Heyne, J.S., Stouffer, S.D., Hendershott, T.T., Corporan, E., "Chemical and physical effects on lean blowout in a swirl-stabilized single-cup combustor," 38th International Symposium on Combustion, Adelaide, Australia, 2021.
10. **Colborn, J.G.**, Heyne, J.S., Stouffer, S.D., Hendershott, T.T., Corporan, E., "Chemical and physical effects on lean blowout in a swirl-stabilized single-cup combustor," Eastern State Section of the Combustion Institute Spring Meeting, Columbia, SC, 2021.
11. **Colborn, J.G.**, Heyne, J.S., Hendershott, T.H., Stouffer, S.D., Peiffer, E.E., Corporan, E., "Fuel and operating condition effects on lean blowout in a single-cup swirl stabilized combustor," AIAA SciTech 2020-1883, Orlando, FL, 2020.
12. Stouffer, S.D., Hendershott, T.H., **Colborn, J.G.**, Monfort, J.R., Corporan, E., "Lean blowout and ignition performance studies of F-76 marine diesel fuels," AFRL-RQ-WP-TR-019-0057.
13. **Colborn, J.**, Heyne, J., Hendershott, T., Stouffer, s., Corporan, E., "Chemical and physical effects on lean blowout in a single-cup swirl-stabilized combustor," DESS2019-057, 15th Dayton Engineering Sciences Symposium, Dayton, OH, 2019.
14. **Colborn, J.**, Hendershott, T., Stouffer, S., Corporan, E., Caswell, A., "Lean blowout of a swirl-stabilized single-cup combustor under low temperature conditions," DESS2018-094, 14th Dayton Engineering Sciences Symposium, Dayton, OH, 2018.
15. **Colborn, J.**, Hendershott, T., Stouffer, S., Corporan, E., Caswell, A., "Ignition study of a swirl-stabilized single-cup combustor under altitude conditions." DCASS2018, 43rd Dayton-Cincinnati Aerospace Sciences Symposium, Dayton, OH, 2018.

HONORS AND AWARDS

Zonta International Amelia Earhart Fellowship – May 2023

NASA Pennsylvania Space Grant Consortium Graduate Fellowship – May 2023

PROFESSIONAL MEMBERSHIP

- Member of the American Institute of Aeronautics and Astronautics (AIAA)
- Member of the American Society of Mechanical Engineers (ASME)
- Member of the AIAA Aerodynamic Measurement Technology Technical Committee
- Reviewer for ASME Turbo Expo, Optics Express, and AIAA Journal