

Claudia E. Brunner

Researcher in experimental fluid dynamics

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Princeton University

- 2022 (expected) PhD, Mechanical and Aerospace Engineering
Certificate in Science, Technology and Environmental Policy
from the School of Public and International Affairs
- 2019 M.A. Mechanical and Aerospace Engineering

Stanford University

- 2017 B.S. Mechanical Engineering
B.A. International Relations

Research experience

2017 – present Princeton University

As graduate research assistant to Prof. Marcus Hultmark,

- I conduct unsteady airfoil experiments in a pressurized wind tunnel to investigate dynamic stall at high Reynolds numbers and its impact on vertical axis wind turbines.
- I designed and deployed a data acquisition platform for hot-wire measurements in the atmospheric surface layer as part of a multi-university field campaign.

As environmental policy fellow advised by Prof. Alex Glaser, I study the role of offshore wind energy in decarbonization using the integrated assessment model WITCH.

Summer 2016 Stanford University

As undergraduate research assistant to Prof. John Dabiri, I designed an experiment to study the motions of tree branches in wind using image analysis software.

As undergraduate research fellow at the TomKat Center for Sustainable Energy, I assessed the potential for under-resourced California schools to reduce electricity bills by using state grants to install solar PV systems.

Honors & awards

United States Department of Defense

- 2018 National Defense Science and Engineering Graduate Fellowship

Princeton University

- 2019 High Meadows Environmental Institute - Science, Technology and Environmental Policy Fellowship
- 2019 Princeton Energy and Climate Scholars
- 2017 Upton First-Year Fellowship in Engineering

Stanford University

2016	Public Service Honor Society
2016	TomKat Energy Impact Fellowship
2016	Woods Institute Forum for Undergraduate Environmental Leadership

Peer-reviewed publications

J Kiefer, **C E Brunner**, M O L Hansen and M Hultmark. "Dynamic stall at high Reynolds numbers induced by ramp-type pitching motions" Under review.

C E Brunner, J Kiefer, M O L Hansen and M Hultmark (2021). "Study of Reynolds number effects on the aerodynamics of a moderately thick airfoil using a high-pressure wind tunnel" *Exp. Fluids* 62: 178.

K Y Huang, **C E Brunner**, M K Fu, K Kokmanian, T Morrison, A O Perelet, M Calaf, E Pardyjak and M Hultmark (2021). "Investigation of the atmospheric surface layer using novel high-resolution sensors" *Exp. Fluids* 62: 76.

C E Brunner, J Kiefer, M O L Hansen and M Hultmark (2020). "Unsteady effects on a pitching airfoil at conditions relevant for large vertical axis wind turbines" *J. Phys.: Conf. Ser.* 1618: 052065.

J Kiefer, **C E Brunner**, M Hultmark and M O L Hansen (2020). "Dynamic stall at high Reynolds numbers due to variant types of airfoil motion" *J. Phys.: Conf. Ser.* 1618: 052028.

Teaching experience

	Department of Mechanical and Aerospace Engineering, Princeton University
Spring 2021	Hultmark Lab I mentored two undergraduate students for their senior thesis "Sensor-integrated unmanned aerial vehicle: A pilot design for albedo monitoring".
Spring 2020	Integrated Engineering Science Laboratory - Fluid Mechanics As graduate teaching assistant, I taught a weekly three-hour lab session, prepared and delivered an hour-long lecture on airfoil aerodynamics, graded written lab reports and mentored students for their final project.
Fall 2019	Integrated Engineering Science Laboratory - Thermodynamics As graduate teaching assistant, I taught a weekly three-hour lab session, created a Github laboratory manual for a heat engine experiment, graded written lab reports and mentored students on their final project.
Spring 2019	Mechanics of Fluids As graduate teaching assistant, I prepared and taught a weekly hour-long problem session, provided individual homework assistance, developed exam questions, and graded homework and exams.
	McGraw Center for Teaching and Learning, Princeton University
2019 – 2021	Undergraduate Tutoring Program As graduate coordinator, I oversaw Princeton's undergraduate tutoring program two nights per week with up to 50 tutors and up to 100 students, and assisted in interviewing, hiring, training and mentoring undergraduate tutors.

Conference presentations

- 2021 Reduced frequency effects on dynamic stall at high Reynolds numbers. 2nd Annual National Defense Science and Engineering Graduate Fellowship Conference
- 2020 Dynamic stall on an airfoil pitching at very high amplitudes and Reynolds numbers. 73rd Annual Meeting of the APS Division of Fluid Dynamics
- Unsteady effects on a pitching airfoil at conditions relevant for large vertical axis wind turbines. The Science of Making Torque from Wind (TORQUE)
- 2019 Dynamic stall experiments on a sinusoidally pitching airfoil at high Reynolds numbers. 72nd Annual Meeting of the APS Division of Fluid Dynamics
- Unsteady airfoils at high Reynolds numbers. Thousand Islands Fluid Dynamics Meeting
- 2018 High-frequency simultaneous temperature and velocity measurements in the atmospheric surface layer. American Geophysical Union Fall Meeting
- Dynamic effects on airfoil performance under unsteady inflow conditions at high Reynolds numbers. 71st Annual Meeting of the APS Division of Fluid Dynamics

Other presentations

- 2021 Offshore wind energy in the United States – from burgeoning technology to competitive market force? Princeton Energy and Climate Scholars Seminar
- Offshore wind energy in the United States – from burgeoning technology to competitive market force? Science, Technology and Environmental Policy Student Seminar, School of Public and International Affairs
- 2020 Unsteady airfoil experiments relevant for vertical axis wind turbines. Princeton Energy and Climate Scholars Seminar
- 2019 Studying large wind turbines using small-scale models. Andlinger Center for Energy and the Environment meeting with the New Jersey Governor's Office

Service

- 2020 - 2021 **Princeton Energy and Climate Scholars**, Princeton University
- As student chair, I acted as liaison between administrators, students and faculty, represented the organisation at panels for prospective students and established donors, and participated in the selection of the new student cohort.
- 2019 - 2020 **Graduate Student Council**, Department of Mechanical and Aerospace Engineering, Princeton University
- As sustainability representative, I wrote an annual sustainability newsletter to the department, inquired with facility managers about possible energy efficiency improvements in the department, attended monthly council meetings and participated in the department's graduate student recruiting events.

Outreach

Princeton Energy and Climate Scholars, Princeton University

I prepared and taught sessions on climate science, international climate politics and environmental justice, and ran a climate negotiation simulation with high school students at the Princeton Day School.

Society of Women Engineers, Princeton University

I served on a panel for the High School Engineering Colloquium for girls interested in engineering, and participated in a Princeton Public Library Materials Science Day.

Department of Mechanical and Aerospace Engineering, Princeton University

I participated in a science education event for elementary school students at the French American School of Princeton, and a virtual reality exhibit at Community Park Elementary School, Princeton.

Leadership skills

Fall 2020 **Inclusive Leadership Learning Cohort**, Princeton Center for Career Development

I participated in seven sessions on inclusive leadership and anti-racism in the workplace.

Winter 2016 **Public Service Leadership Program**, Haas Center for Public Service, Stanford University

I participated in weekly sessions including skill-building workshops and coursework on inclusive leadership practice and ethical service.

Professional memberships

American Physical Society (APS)

American Geophysical Union (AGU)