Claudia E. Brunner

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Education

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**

Graduate research assistant, advised by Prof. Marcus Hultmark

- 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
- designed and deployed a data acquisition platform for hot-wire measurements in the atmospheric surface layer as part of a multi-university field campaign led by Prof. Eric Pardyjak

Environmental policy fellow, advised by Prof. Alex Glaser

- study the role of offshore wind energy in decarbonizing the electricity sector using the integrated assessment model WITCH

Summer 2016 **Stanford University**

Undergraduate research assistant, advised by Prof. John Dabiri

- designed an experiment to study the motions of tree branches in wind using image analysis software

Undergraduate research fellow, TomKat Center for Sustainable Energy

- 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

Princeton Energy and Climate Scholars

2017 Upton First-Year Fellowship in Engineering

Stanford University

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

2015 Haas African Service Fellowship

Peer-reviewed publications

In preparation

C E Brunner, J Kiefer and M Hultmark. "Comparison of an airfoil undergoing sinusoidal and VAWT-shaped pitch motions" In prep. for submission to *J. Phys.: Conf. Ser.*

C E Brunner, A Glaser. "The influence of siting restrictions for onshore wind energy on the deployment of offshore wind energy in the United States" In prep. for submission to *Energy*

Under review

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 at *J. Fluid Mech.*

Published

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

Princeton University, Department of Mechanical and Aerospace Engineering

Spring 2020 **Integrated Engineering Science Laboratory - Fluid Mechanics**
Graduate teaching assistant

- 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**

Graduate teaching assistant

- 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**

Graduate teaching assistant

- prepared and taught a weekly hour-long problem session
- provided individual homework assistance and graded homework and exams

Princeton University, McGraw Center for Teaching and Learning

2019 – 2021 **Undergraduate Tutoring Program**

Graduate coordinator

- oversaw Princeton's undergraduate tutoring program two nights per week with up to 50 tutors and up to 100 students
- assisted in interviewing, hiring, training and mentoring undergraduate tutors

Mentoring experience

Princeton University

2021 *Mentor* of two undergraduate students for their senior thesis "Sensor-integrated unmanned aerial vehicle: A pilot design for albedo monitoring"

Guest speaker, Research Q&A Series, Undergraduate Environmental Scholars Program

Conference presentations

2021 On the timescales of dynamic stall. 74th Annual Meeting of the APS Division of Fluid Dynamics

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

Seminars and invited talks

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

2022 - 2025	**Executive Committee**, Topical Group on the Physics of Climate, American Physical Society *Student Member-at-Large*
2020 - 2021	**Princeton Energy and Climate Scholars**, Princeton University *Student chair*
2019 - 2020	**Graduate Student Council**, Department of Mechanical and Aerospace Engineering, Princeton University *Sustainability representative*

Outreach

2021	*Guest lecturer*, "International Climate Policy" *Facilitator*, "World Climate Simulation" Princeton Day School
	Panelist, High School Engineering Colloquium Society of Women Engineers, Princeton Chapter
2020	*Guest lecturer*, "Environmental Justice and the Dakota Access Pipeline" Princeton Day School
2019	*Guest lecturer*, "Introduction to Climate Science" Princeton Day School

Professional development

Fall 2021	Rising Stars in Mechanical Engineering Workshop, Massachusetts Instit. of Technology
Fall 2020	Inclusive Leadership Learning Cohort, Princeton Center for Career Development
Winter 2016	Public Service Leadership Program, Haas Center for Public Service, Stanford University

Professional memberships

American Physical Society (APS)
American Geophysical Union (AGU)