

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 in collaboration with Prof. Martin O. L. Hansen
 - 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

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| | 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

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.

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.*

In preparation

C E Brunner, J Kiefer and M Hultmark. "Comparison of an airfoil undergoing sinusoidal and VAWT-shaped pitch motions" In prep.

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.

Teaching experience

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| | Princeton University, Department of Mechanical and Aerospace Engineering |
| Spring 2020 | Integrated Engineering Science Laboratory - Fluid Mechanics <i>Graduate teaching assistant</i> <ul style="list-style-type: none"> • 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

- 2021 **Princeton University**
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 GradFutures
- Winter 2016 Public Service Leadership Program, Haas Center for Public Service, Stanford University

Professional memberships

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