

# 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

	<b>Stanford University</b>
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

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

**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

**C E Brunner**, J Kiefer and M Hultmark. "Comparison of dynamic stall on an airfoil undergoing sinusoidal and VAWT-shaped pitch motions" Under review.

### In preparation

**C E Brunner**, A Glaser. "Understanding the Roles of Onshore and Offshore Wind Energy in Future Energy Scenarios" In prep.

## Teaching experience

	Princeton University, Department of Mechanical and Aerospace Engineering
Spring 2020	<b>Integrated Engineering Science Laboratory - Fluid Mechanics</b> <i>Graduate teaching assistant</i> <ul style="list-style-type: none"> <li>• taught a weekly three-hour lab session</li> <li>• prepared and delivered an hour-long lecture on airfoil aerodynamics</li> <li>• graded written lab reports and mentored students for their final project</li> </ul>

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| Fall 2019   | <p><b>Integrated Engineering Science Laboratory - Thermodynamics</b></p> <p><i>Graduate teaching assistant</i></p> <ul style="list-style-type: none"> <li>• taught a weekly three-hour lab session</li> <li>• created a Github laboratory manual for a heat engine experiment</li> <li>• graded written lab reports and mentored students on their final project</li> </ul> |
| Spring 2019 | <p><b>Mechanics of Fluids</b></p> <p><i>Graduate teaching assistant</i></p> <ul style="list-style-type: none"> <li>• prepared and taught a weekly hour-long problem session</li> <li>• provided individual homework assistance and graded homework and exams</li> </ul> <p>Princeton University, McGraw Center for Teaching and Learning</p>                                |
| 2019 – 2021 | <p><b>Undergraduate Tutoring Program</b></p> <p><i>Graduate coordinator</i></p> <ul style="list-style-type: none"> <li>• oversaw Princeton's undergraduate tutoring program two nights per week with up to 50 tutors and up to 100 students</li> <li>• assisted in interviewing, hiring, training and mentoring undergraduate tutors</li> </ul>                             |

## Mentoring experience

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|------|---|
|      | <p><b>Princeton University</b></p>  |
| 2021 | <p><i>Mentor</i> of two undergraduate students for their senior thesis "Sensor-integrated unmanned aerial vehicle: A pilot design for albedo monitoring"</p> <p><i>Guest speaker</i>, Research Q&amp;A Series, Undergraduate Environmental Scholars Program</p> |

## Conference presentations

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| 2021 | <p>On the timescales of dynamic stall. 74th Annual Meeting of the APS Division of Fluid Dynamics</p> <p>Reduced frequency effects on dynamic stall at high Reynolds numbers. 2nd Annual National Defense Science and Engineering Graduate Fellowship Conference</p>   |
| 2020 | <p>Dynamic stall on an airfoil pitching at very high amplitudes and Reynolds numbers. 73rd Annual Meeting of the APS Division of Fluid Dynamics</p> <p>Unsteady effects on a pitching airfoil at conditions relevant for large vertical axis wind turbines. The Science of Making Torque from Wind (TORQUE)</p>       |
| 2019 | <p>Dynamic stall experiments on a sinusoidally pitching airfoil at high Reynolds numbers. 72nd Annual Meeting of the APS Division of Fluid Dynamics</p> <p>Unsteady airfoils at high Reynolds numbers. Thousand Islands Fluid Dynamics Meeting</p>  |
| 2018 | <p>High-frequency simultaneous temperature and velocity measurements in the atmospheric surface layer. American Geophysical Union Fall Meeting</p> <p>Dynamic effects on airfoil performance under unsteady inflow conditions at high Reynolds numbers. 71st Annual Meeting of the APS Division of Fluid Dynamics</p> |

## 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 PhD Seminar, School of Public and International Affairs, Princeton University
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	<b>Executive Committee</b> , Topical Group on the Physics of Climate, American Physical Society <i>Student Member-at-Large</i>
2020 - 2021	<b>Princeton Energy and Climate Scholars</b> , Princeton University <i>Student chair</i>
2019 - 2020	<b>Graduate Student Council</b> , Department of Mechanical and Aerospace Engineering, Princeton University <i>Sustainability representative</i>

## Outreach

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

## Professional development

January 2022	Financial Markets for Policy Professionals, Julis-Rabinowitz Center, Princeton University
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)