

# Kelly Yi-Chun Huang

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Jul 2021	Ph.D. Mechanical and Aerospace Engineering	Princeton University
Jan 2018	M.A. Mechanical and Aerospace Engineering	Princeton University
Dec 2015	B.S. Mechanical Engineering	Cornell University

## Research

### University of Notre Dame

2021 – present

As post-doctoral fellow working with Joe Fernando, I am designing a combo-probe that combines hot-film anemometers, nano-scale cold-wires, and a collocated sonic for high-resolution field measurements. Specifically, the combo-probe will be deployed to study the interaction between fog and turbulence.

### Princeton University

2016 – 2021

*Experimental Methods for Understanding Turbulence in the Lower Atmosphere*

As graduate student working with Marcus Hultmark, I

- fabricated nano-scale velocity and temperature sensors in the clean room,
- designed and tested data acquisition platforms for use in the field,
- analyzed near-surface atmospheric velocity and temperature data, and
- designed a low-cost active grid for studying mosquito tracking behavior.

### Cornell University

2015 – 2016

As undergraduate research assistant with Charles Williamson, I designed, fabricated, and tested 3D-printed innovative blades for a mini vertical-axis wind turbine for urban settings.

2012 – 2014

In AguaClara sustainable water treatment design, I built and analyzed a lab-scale rapid sand filter and an electric-free ram pump.

2014 – 2015

As member of Cornell University Sustainable Design, we

- conducted a wind power feasibility study for the Cornell NYC campus,
- formulated a proposal for local wind turbine implementation, and
- constructed a functioning demonstrative wind turbine for outreach.

### National Renewable Energy Laboratory

June – Aug 2015

As Science Undergraduate Laboratory Intern (SULI) to Dr. Katherine Dykes, I developed a Python toolbox coupled to OpenMDAO that optimizes the spar supporting structure of offshore wind turbines based on stability designs.

## Honors and Awards

2020	Engineering Council's Excellence in Teaching Award	<i>Princeton</i>
2019	The Luigi Crocco Award for Teaching Excellence	<i>Princeton</i>
2017	National Defense Science and Engineering Graduate Fellowship	<i>DoD</i>
2016	Francis Robbins Upton Fellowship in Engineering	<i>Princeton</i>
2015	Undergraduate Student of the Year	<i>Cornell Diversity Programs in Engineering</i>

## Teaching

### Princeton University

2017 – 2021 As Graduate Coordinator for the McGraw Learning and Tutoring Center, I manage the undergraduate tutoring program by interviewing, staffing, training, and providing feedback for 140+ tutors.

As assistant in instruction, I held weekly precepts/lab sessions for

- Fall 2019 ■ MAE 305/MAT 391 – Mathematics in Engineering I
- Spring 2019 ■ MAE 222 – Introduction to Fluid Mechanics
- Spring 2018 ■ MAE 224 – Integrated Engineering Science Laboratory
- Fall 2017 ■ MAE 335 – Fluid Dynamics

### Cornell University

As undergraduate teaching assistant, I held weekly recitations/lab sessions for

- Fall 2015 ■ MAE 3230 – Introduction to Fluid Mechanics
- Fall 2015 ■ MAE 6510 – Advanced Heat Transfer
- Spring 2015 ■ MAE 2250 – Mechanical Synthesis
- Fall 2014 ■ ENGRD 2020 – Statics and Mechanics of Solids

## Outreach

### Princeton University

2016 – 2021 As part of MAE department educational outreach efforts, I

- undertook coursework on effective science pedagogy for children,
- developed workshops on engineering concepts, and
- led demos for K-8 children from Princeton and New York City.

2017 – 2020 As representative, then Chair, of the MAE Graduate Student Council, I

- organized graduate student events (ie open-house and alumni panels),
- organized and hosted the annual MAE Research Day, and
- designed T-shirts and paraphernalia for such events.

## Publications

K. Y. Huang, and G. G. Katul “Profiles of high-order moments of longitudinal velocity explained by the random sweeping decorrelation hypothesis”, *Physical Review Fluids* (submitted).

K. Y. Huang, C. E. Brunner, M. K. Fu, K. Kokmanian, T. Morrison, A. O. Perelet, M. Calaf, E. Pardyjak, and M. Hultmark, “Investigation of the Atmospheric Surface Layer Using a Novel High-resolution Sensor Array”, *Experiments in Fluids* (2021).

K. Y. Huang, G. G. Katul, and M. Hultmark, “Velocity and Temperature Dissimilarity in the Surface Layer Uncovered by the Telegraph Approximation”, *Boundary-Layer Meteorology* (2021).

## Invited Presentations

- |      |   |
|------|---|
| 2021 | University of Notre Dame — Environmental Fluid Dynamics Seminar<br><i>Experimental Methods for Understanding Turbulence in the Lower Atmosphere.</i>              |
| 2021 | University of California, Davis — Environmental Dynamics Lab Seminar<br><i>Experimental Methods for Studying Turbulence in the Lower Atmosphere.</i>              |
| 2020 | Cooper Union — Albert Nerken School of Engineering Invited Lecture<br><i>From Mosquitos to Weather Models — Understanding Turbulence in the Lower Atmosphere.</i> |

## Select Presentations

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|-----------------------|---|
| 2022 [Talk]           | American Meteorological Society Annual Meeting<br><i>The Super Combo Probe for simultaneous high-resolution measurement of velocity and temperature fluctuations in atmospheric turbulence.</i> |
| 2020 [Poster]         | American Geophysical Union: Fall Meeting<br><i>Velocity and Temperature Dissimilarity in the Surface Layer Uncovered by the Telegraph Approximation.</i>  |
| 2018 [Poster]         | American Geophysical Union: Fall Meeting<br><i>Simultaneous and Well-resolved Velocity and Temperature Measurements in the Atmospheric Surface Layer.</i>                                       |
| 2018 [Talk]           | American Physical Society: Division of Fluid Dynamics<br><i>Mimicking Atmospheric Flow Conditions to Examine Mosquito Orientation Behavior.</i>   |
| 2015 [Pitch & Poster] | Cornell Atkinson Center: Creating a Sustainable Future<br><i>Novel Blade Designs for Urban Mini-Turbines.</i>   |