

# Ethan Pickering

## Personal Information

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## Education

- Aug 2016 – Present **California Institute of Technology Pasadena, California**  
Doctorate of Philosophy, Mechanical Engineering
- Aug 2016 – Jun 2018 **California Institute of Technology Pasadena, California**  
Master of Science, Mechanical Engineering  
Cumulative GPA: **3.8**
- Jan 2016 – Jul 2016 **Case Western Reserve University Cleveland, Ohio**  
Master of Science, Mechanical Engineering  
*Thesis: EDIFES 0.4: Scalable Data Analytics for Commercial Building Virtual Energy Audits*  
Cumulative GPA: **4.0**
- Aug 2011 – Dec 2015 **Case Western Reserve University Cleveland, Ohio**  
Bachelor of Science, Mechanical & Aerospace Engineering *summa cum laude*  
Cumulative GPA: **4.0**

## Research Interests

- FLUID DYNAMICS aeroacoustics, reduced-order modeling, turbulence, flow mechanisms/instabilities, energy  
DATA SCIENCE data-assimilation, machine learning, equation-free modeling  
CONTROL active and passive flow control, shape optimization

## Academic Awards

- International Conference of Theoretical and Applied Mechanics Travel Grant, 2020+1
- Caltech Data to Discovery Program - Proposal Winner: Visualizing Turbulence in Jets, 2018
- **National Defense Science and Engineering Graduate Fellowship** – Award Winner, 2017
- **National Science Foundation Graduate Research Fellowship Program** – Award Winner (Declined), 2017
- **National Science Foundation Graduate Research Fellowship Program** – Honorable Mention, 2016
- Data Science Symposium Travel Award – Tohoku & Case Western Reserve University, 2016
- **Clapp Memorial Graduate Scholarship**, 2016
- SOURCE Summer Research Funding Recipient, CWRU, 2015
- Case Alumni Association Scholarship, 2014
- **Michelson-Morley STEM Scholarship**, 2011

## Teaching

- Caltech Dimensional and Data Analyses in Engineering, undergraduate, (co-instructor/co-designer)

Case Western	Calculus II for Scientists and Engineers, undergraduate (TA)
Case Western	Calculus I for Scientists and Engineers, undergraduate (TA)

## Academic Service & Memberships

Paper Referee	Journal of Fluid Mechanics
Session Chair	AIAA/CEAS Aeroacoustics Conference (Jet Noise II-III), 2019
Member	American Institute of Aeronautics and Astronautics (AIAA), American Physical Society (APS), Acoustical Society of America (ASA), Tau Beta Pi

## Journal Articles

1. Pickering, E., Rigas, G., Schmidt, O. T., Sipp, D., and Colonius, T., Optimal eddy viscosity for resolvent-based models of coherent structures in turbulent jets, *arXiv preprint arXiv:2005.10964, In Review Journal of Fluid Mechanics*, 2020
2. Pickering, E., Rigas, G., Nogueira, P. A. S., Cavalieri, A. V. G., Schmidt, O. T., and Colonius, T., Lift-up, Kelvin–Helmholtz and Orr mechanisms in turbulent jets, *Journal of Fluid Mechanics*, Vol. 896, 2020, pp. A2
3. Pickering, E., Hossain, M. A., French, R. H., and Abramson, A. R., Building electricity consumption: Data analytics of building operations with classical time series decomposition and case based subsetting, *Energy and Buildings*, Vol. 177, 2018, pp. 184–196
4. Pickering, E., Hossain, M. A., Mousseau, J. P., Swanson, R. A., French, R. H., and Abramson, A. R., A cross-sectional study of the temporal evolution of electricity consumption of six commercial buildings, *PloS one*, Vol. 12, No. 10, 2017, pp. e0187129

## Conference Papers

1. Pickering, E., Towne, A., Jordan, P., and Colonius, T., Resolvent-based jet noise models: a projection approach, *AIAA Scitech Conference and Forum*, 2020
2. Pickering, E., Rigas, G., Sipp, D., Schmidt, O. T., and Colonius, T., Eddy viscosity for resolvent-based jet noise models, *25th AIAA/CEAS Aeroacoustics Conference*, 2019, p. 2454
3. Rigas, G., Pickering, E., Schmidt, O. T., Nogueira, P. A., Cavalieri, A. V., Brès, G. A., and Colonius, T., Streaks and coherent structures in jets from round and serrated nozzles, *25th AIAA/CEAS Aeroacoustics Conference*, 2019, p. 2597
4. Nogueira, P. A., Cavalieri, A. V., Schmidt, O. T., Jordan, P., Jaunet, V., Pickering, E., Rigas, G., and Colonius, T., Resolvent-based analysis of streaks in turbulent jets, *25th AIAA/CEAS Aeroacoustics Conference*, 2019, p. 2569

## Theses

Master's Thesis	Pickering, E., <i>EDIFES 0.4: Scalable Data Analytics for Commercial Building Virtual Energy Audits</i> , Master's thesis, Case Western Reserve University, 2016
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## Invited Talks

- Instituto Tecnológico de Aeronáutica (ITA), Brazil, Divisão de Engenharia Aeronáutica e Aeroespacial, Special Seminar, **Reduced-order modeling of turbulent jets** (2020)

## Research Projects

Jun 2017 - Present	<b>Next Generation Jet Noise Models for Complex Geometry Nozzles</b> <i>Computational Flow Physics Group, California Institute of Technology, Pasadena, CA</i>
	<ul style="list-style-type: none"> <li>- Produce numerous databases through Large Eddy Simulations of various geometry nozzles</li> <li>- Determine stochastically forced solutions through LES databases</li> <li>- Validate jet noise solutions of spatial marching technique, one-way Euler (OWE) equations</li> <li>- Extend OWE method to various complex geometries for noise reduction</li> </ul>

- Aug 2014 – Aug 2016 **Data Analytics for Virtual Energy Audits and Value Capture Assessments of Buildings - EDIFICE**  
*Great Lakes Energy Institute, Case Western Reserve University, Cleveland, OH*
- Formed basis for now startup company EDIFICES: <http://www.edificeanalytics.com/>
  - Funded through Department of Energy ARPA-E 2015 Selection
  - Project Funds Awarded: \$1,433,281
  - Conducted preliminary research used in project proposal and assisted in proposal development

## Non-Academic Employment History

- Jun 2014-Aug 2014 **NASA Glenn Research Center, Thermal Energy Branch, Mech. Eng. Test Analyst Intern Cleveland, OH**
- Fission Surface Power System Project (FSP) - Power System for Extra Terrestrial Colonies
  - Helped develop, run, and refine a thermal and fluid dynamic system model written in MATLAB
- Jun 2013 - Jan 2014 **Philips Healthcare, Cleveland, OH, GCX CT Engineering, Mechanical Co-Op**
- ATLAS Patient Table Project –First Multi-Modality Patient Table for CT applications
  - Lead Proto Build Engineer: Led two teams from Suzhou, China to build first 8 prototypes and develop production WI

## Community Service

- 2020 Caltech Y Pasadena LEARNs Program
- 2017-2019 Assistant Varsity Baseball Coach, Caltech
- 2013-2015 The Haley School Tutoring Program, Case Western

## Leadership Awards

- **International Balfour Award** – Most Outstanding Senior in the International Fraternity of Sigma Chi, 2016
- **Watson Founders/Bell Chapter Scholarship** - Top Overall Applicant, International Fraternity of Sigma Chi, 2014
- **Glenn Nichols Character of Distinction** - Exemplary Character and Dedication to challenging themselves & others, 2015
- Fraternity Chapter President of the Year - Most outstanding fraternity president, furthering chapter and the community, 2015
- Province Balfour Award - Most outstanding Sigma Chi in the Northern Ohio Province, 2016
- Chapter Balfour Award – Outstanding senior selected by CWRU Sigma Chi chapter, 2016

## Leadership Affiliations

- June 2020 – Present **Academics Chair, Graduate Student Council Caltech**
- Oversee institute wide academic programs/workshops, promote collaboration and communication among student researchers, and advocate for student concerns.
- Jun 2020 – Present **Diversity and Inclusion Commission, International Fraternity of Sigma Chi**
- Jun 2016 – Jun 2018 **Board of Directors, International Fraternity of Sigma Chi**
- One of 12 voting members overseeing the governance of 244 chapters of Sigma Chi in the United States and Canada
- May 2017 – Present **Mechanical Engineering Option Representative, Graduate Student Council Caltech**
- Represent mechanical engineering graduate student interests for the betterment of the campus and the graduate student experience at Caltech
- Dec 2014 – Dec 2015 **InterFraternity Congress, President, Case Western Reserve University**

- Mar 2015 – Jan 2016 **Greeks Against Sexual Assault (GASA), Co-Founder**, Case Western Reserve University  
- Organization created to fight against sexual assault on college campuses, both in and out of the Greek Community.
- Jan 2014 - Jan 2015 **Sigma Chi President**, Case Western Reserve University
- Aug 2011 – May 2014 **Varsity Baseball**, Case Western Reserve University