

Aaron Jesse Fillo
Curriculum Vitae
Oregon State University
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Education

Oregon State University, Corvallis, OR Expected Graduation, June 2019
PhD Candidate & NSF Graduate Research Fellow Mechanical Engineering
Advised by Dr. Kyle Niemeyer

Dissertation: Assessing the importance of multicomponent transport properties in direct numerical simulations of premixed, turbulent flames using an efficient, dynamic memory algorithm.

GPA 3.93/4.00

Oregon State University, Corvallis, OR December 2016
Masters of Science in Mechanical Engineering
2017 OSU Distinguished Master's Thesis Award
Thesis: *The Global Consumption Speeds of Premixed Large-Hydrocarbon Fuel/Air Turbulent Bunsen Flames.*

Oregon State University, Corvallis, OR June 2014
Bachelors of Science in Mechanical Engineering
Graduated Summa Cum Laude

Communication Experience

Showrunner LIB LAB: The Library Laboratory February 2017-Present

- Host of YouTube science show LIB LAB, focused on teaching Science, Technology, Engineering, Arts, and Mathematics (STEAM) subjects to K-12 audiences.
youtube.com/LIBLABScience
- Directed and Produced interactive YouTube series in partnership with Corvallis Benton-County Public Library.
- Wrote scripts and developed on screen science demonstrations.
- Launched community engagement program distributing free science kits to children at Corvallis Benton-County Public Library.

Live science and maker demonstration talks 2014-Present

- Presented more than 100 public science demonstrations including invited talks at Corvallis Da Vinci days, Corvallis Makers, and Eugene Children's Film Festival.
- Designed and constructed demonstrations covering compressible flow dynamics, vortex dynamics, combustion, turbulent flames, and more.
- Developed hands-on interactive curriculum for demonstration topics to facilitate audience involvement and cultivate lasting learning outcomes.

Magician and Actor 2009-2014

- Performed for audiences ranging from 60-500.
- Wrote and produced original content including illusion design, and script development.
- Over 50 successful performances.

Research Experience

Graduate Research Fellow, Oregon State University September 2015-Present

- Numerically investigated turbulent premixed flame using direct numerical simulation code, NGA.
- Evaluated impact of chemical kinetic model reduction on turbulent premixed flame direct numerical simulations using NGA and reduction package MARS.
- Investigated turbulent flame speed of alternative jet fuels as part of Federal Aviation Administration (FAA) National Jet Fuel Combustion Program (NJFCP).
- Numerically investigated laminar burning parameter of FAA NJFCP fuels using Fortran OPPDIF and PREMIX codes.

Visiting Graduate Student Researcher, CalTech January 2017

- Developed and implemented efficient dynamic memory algorithm for full multi-component mass diffusion in direct numerical simulation code NGA.
- Verified multi-component mass diffusion algorithm against existing methods and literature.
- Collaborated with CalTech graduate students under advisement of Professor Guillaume Blanquart to study impact of multi-component mass diffusion on 3D premixed turbulent flames.

Graduate Research Assistant, Oregon State University 2014-2015

- Designed and build turbulent Bunsen burner for vaporized liquid jet fuels.
- Investigated turbulent flame speed of alternative jet fuels as part of Federal Aviation Administration National Jet Fuel Combustion Program.
- Participated in interdisciplinary field research at H.G. Andrews Research Forest with OSU College of Biological and Ecological Engineering.

Senior Design, Oregon State University Winter- Spring 2014

- Developed test apparatus for investigating potential uses for passively articulated hydrofoil in hydro-kinetic energy extraction.
- Worked with faculty sponsor and graduate student advisor to fulfill complex customer and engineering requirements.
- Wrote comprehensive design report, testing results, and drawing package for final deliverable.
- Served as project manager for team of three mechanical engineering seniors.

Undergraduate Research, Oregon State University Winter 2013

- Researched effect of quiescent cavitation formed by sudden acceleration of water filled bottles leading to catastrophic bottle failure.
- Numerically analyzed fluid dynamics to determine correlation between water depth and relative size of cavitation formation.
- Experimentally analyzed cavitation formation using high speed camera to verify numeric correlation.

Work Experience

Engineering Consultant, Long Haul Engines LLC. Summer 2014

- Developed comprehensive graphical user interphase for proprietary engine simulation model.
- Developed thermodynamic proofs for alternative internal combustion engine cycle.

- Aided in mechanical design on new alternative internal combustion engine.
- Met with investors to present thermodynamic justifications for alternative engine design and discuss applications in long haul trucking.

Computer Lab Coordinator, Oregon State University, Corvallis, OR 2012 – 2015

- Managed team of twenty students to clean and maintain all computer labs in the College of Engineering.
- Acted as a liaison between students, professional staff, and faculty.
- Organized hiring, technical and customer service training for all new employees.
- Maintained all training records, scheduling, and inventory, including managing and updating wiki with all information relevant to employee success.

Engineering Intern, ATI Wah Chang, Albany, OR March - September 2013

- Worked in Plant Engineering Department to maintain and improve both the ATI Albany Operations and ATI Wah Chang facilities in Albany, Oregon.
- Managed capital projects based on lean manufacturing principles.
- Led research and design projects for automated crucible cleaning system improvement and belt polishing system improvements.
- Provided day to day engineering support for ATI Albany Operations facility.

Publications/Presentations

A.J. Fillo, J. Schlup, G. Blanquart, K.E. Niemeyer, *Assessing the importance of multicomponent transport properties in direct numerical simulations of premixed, turbulent flames using an efficient, dynamic memory algorithm*,

<https://zenodo.org/record/1315028#.WIT129JKiUm>, *In Progress*

N. Schorn, J.M. Bonebrake, A.J. Fillo, D.L. Blunck, *Effect of Sub-Atmospheric Pressures on the Turbulent Flame Speed of Jet Fuel*, AIAA, Sci. Tech. (2019) *In Progress*

A.J. Fillo, J. Schulp, G. Blanquart, K.E. Niemeyer, *Assessing the importance of multicomponent transport properties using direct numerical simulation of premixed, turbulent flames*, 10th U.S. National Combustion Meeting, Combust. Inst. 2017, (Paper and Presentation).

A.J. Fillo, J.M. Bonebrake, D.L. Blunck, *Impact of fuel chemistry and stretch rate on the global consumption speed of large hydrocarbon fuel/air flames*, 10th U.S. National Combustion Meeting, Combust. Inst. 2017, (Paper and Presentation).

A.J. Fillo, K.E. Niemeyer, *Impact of chemical kinetic model reduction on premixed multi-dimensional flame characteristics*, SIAM Numerical Combustion Meeting, SIAM, 2017, (Oral Presentation).

A.J. Fillo, *The Global Consumption Speeds of Premixed Large-Hydrocarbon Fuel/Air Turbulent Bunsen Flames*, Master of Science Thesis, Oregon State University Scholars Archive, 2016, URL: <http://hdl.handle.net/1957/60072>

A.J. Fillo, D.L. Blunck, *Effects of fuel chemistry and turbulence intensity on turbulent consumption speed for large hydrocarbon fuels*, West. States Sect. Combust. Inst., 2015, (Paper and Presentation).

J.M. Bonebrake, A.J. Fillo, D.L. Blunck, *Effect of Turbulent Fluctuations on Radiation Emissions from a Premixed Flame*, West. States Sect. Combust. Inst. 2015, (Paper and Presentation).

Poster Presentations

- A.J. Fill , *LIB LAB the Library Laboratory: hands-on multimedia science communication*, ComSciCon National, 2018.
- A.J. Fillo, J.M. Bonebrake, D.L. Blunck, *Impact of fuel chemistry and stretch rate on the global consumption speed of large hydrocarbon fuel/air flames*, OSU COE Graduate Research Showcase, 2017.
- A.J. Fillo, J.M. Bonebrake, D.L. Blunck, *Sensitivity of jet fuel global consumption speeds to fuel chemistry and turbulence intensity*, Int. Combustion Symposium, WIPP, 2016.

Conference Reviewer

- 69th Annual Meeting of the APS Division of Fluid Dynamics Reviewer
- ASME International Mechanical Engineering Congress and Exposition 2016 Reviewer

Invited talks

- Summer Experience in Science and Engineering for Youth Camp July 19, 2018
- DaVinci Days STEAM Series Technology Talk May 8, 2018
- 4-H Wildlife Stewards Summit – Corvallis school district May 3, 2018
- The Corvallis Makers Fair April 28, 2018
- Oregon State Salmon Bowl Research Talk February 3, 2018
- Eugene Children’s Film Festival Keynote Speaker August 19, 2017
- O’Hara Catholic School June 5, 2016
- SPARK Engineering Event, Oregon State University April 14, 2017
- OSU Material Research Society guest speaker October 20, 2016
- Hillsboro High School Guest Lecturer, Hillsboro, OR Spring 2014

Teaching Experience

- Substitute Lecturer, Oregon State University Ongoing
- Graduate Teaching Assistant, Oregon State University 2014-2015 Academic Year
- Undergraduate Teaching Assistant, Oregon State University 2013-2014 Academic Year

Outreach Experience

- Creator, Writer, Director, Host of Lib Lab: Library Laboratory Educational YouTube Series in Partnership with Corvallis Benton-County Public Library On Going
- Founder and President of OSU Outreach Organization Project X On Going
- Developing Partnership between OSU and Hillsboro High School 2014-2015
- OSU SESEY Mentor, Oregon State University, Corvallis, OR Summer 2014 & 2015
- Hillsboro High School Guest Lecturer, Hillsboro, OR Spring 2014
- Grant Coordinator, Engineers Without Borders Fall 2011 - Spring 2012
- OSU Chapter, Corvallis, OR
- Eagle Scout Project, BSA Troop 77, Geneva Switzerland January 2008 – May 2009
- Habitat for Humanity Construction Crew, Braga, Portugal September 2007 – June 2008

Honors and Awards

- 2017 OSU Distinguished Master’s Thesis Award October 2017
- First place poster OSU COE Graduate Research Showcase March 2017
- NSF Graduate Research Fellowship September 2015 to Present
- OSU College of Engineering GTA Fellowship 2014 Academic Year
- Honor Roll, Oregon State University Fall 2011 – Spring 2014

Mechanical Engineering Scholarship Fund, Oregon State University	September 2013
Anita Aitkenhead Memorial Scholarship	August 2013
Honor Roll, University of Missouri Columbia	Fall 2009 – Spring 2011
Eagle Scout, BSA Troop 77, Geneva Switzerland	May 2009

Press coverage of Aaron

OSU grad student debuts new science video on 3-D metal printer, A. Rimel, <i>Corvallis Gazette-Times</i>	July 9, 2018
Library releases new science video, A. Rimel, <i>Corvallis Gazette-Times</i>	March 16, 2018
Roses and Raspberries, M. McNally, <i>Corvallis Gazette-Times</i>	December 8, 2017
Library science videos do a deep dive on pressure, A. Rimel, <i>Corvallis Gazette-Times</i>	December 7, 2017
Video: Diving Deep for Pressure, J. Habjan, <i>Albany Democrat-Herald</i>	December 6, 2017
5 Interesting Fluid Dynamics Concepts Explained Brilliantly, K. Vyas interestingengineering.com	August 24, 2017
Eclipse Viewing Alternatives, C. Bonitez, <i>KVAL News 13</i>	August 20, 2017
Library's science guy, A. Rimel, <i>Corvallis Gazette-Times</i>	May 25, 2017

References

Dr. Kyle Niemeyer, Assistant Professor in Mechanical Engineering, Oregon State University, Kyle.Niemeyer@oregonstate.edu

Dr. Joshua Gess, Assistant Professor in Mechanical Engineering, Oregon State University, Joshua.Gess@oregonstate.edu

Dr. Bryony DuPont, Assistant Professor in Mechanical Engineering, Oregon State University, Bryony.DuPont@oregonstate.edu

Dr. David L. Blunck, Assistant Professor in Mechanical Engineering, Oregon State University, David.Blunck@oregonstate.edu