

Aaron Jesse Fillo
Curriculum Vitae
Oregon State University
204 Rogers Hall, Corvallis OR, 97330
(573) 303-2188 filloa@oregonstate.edu
www.ajfillo.com

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
Masters of Science in Mechanical Engineering December 2016
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
Bachelors of Science in Mechanical Engineering June 2014
Graduated Summa Cum Laude

Research Experience

Graduate Research Fellow, Oregon State University September 2015-Present

- Numerically investigated turbulent premixed flame using direct numerical simulation.
- 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 to accurately and efficiently model molecular diffusion in three-dimensional combusting flow simulations.
- 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 built industrial scale turbulent Bunsen burner to investigate vaporized liquid jet fuels for application in jet engine combustion.
- Developed inhouse optically based ultraviolet chemiluminences technique for measuring the turbulent flame speed of liquid jet fuels.
- Investigated turbulent flame speed of alternative jet fuels as part of Federal Aviation Administration National Jet Fuel Combustion Program.
- Results of this ongoing work are being used by the FAA and jet engine manufacturers to influence aviation policy and aircraft design.

Work Experience

Mechanical Engineering Consultant, Long Haul Engines LLC.

Summer 2014

- Developed comprehensive graphical user interface 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.

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.

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.

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](https://www.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. Over 2,000 kits distributed.

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.

Teaching Experience

Instructor, Oregon State University

September 2015-Present

- Taught courses including Introduction to Thermal and Fluid Science, and Dynamics
- Developed in-class demonstrations to strengthen student engagement and support course learning outcomes.
- Produced multi-media video aids to support student engagement outside of class.
- Serve as substitute lecturer for Heat Transfer, Gas Dynamics, Thermodynamics, and Introduction to Combustion.
- Managed lecture size of over 180 students.

Publications/Presentations

- A.J. Fillo, J. Schlup, G. Blanquart, K.E. Niemeyer, *A fast, low cost, stable memory algorithm for implementing multicomponent transport in direct numerical simulations*, <https://zenodo.org/record/1315028#.WIT129JKiUm>, (In progress)
- A.J. Fillo, J. Schlup, G. Blanquart, K.E. Niemeyer, *Assessing the impact of multicomponent transport on premixed, high Karlovitz, turbulent premixed flames*, (In progress)
- A.J. Fillo, K.E. Niemeyer, *Assessing the impact of multicomponent transport on the vorticity and flame structure of premixed, high Karlovitz, turbulent premixed flames*, (In progress)
- A.J. Fillo, K.E. Niemeyer, *Assessing the impact of chemical kinetic model reduction on the accuracy of premixed turbulent flame simulations*, (In progress)
- A.J. Fillo, J.M. Bonebrake, D.L. Blunck, *Impact of Fuel chemistry and stretch rate on large hydrocarbon fuel/air, turbulent, Bunsen flames*, (In progress)
- A.J. Fillo, Sheryl Hosler, *Using multimedia Tools for self-guided learning*, SxSWedu, Austin TX, 2019 (Interactive workshop)
- 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.

Video Production

- A. J. Fillo and the Corvallis-Benton County Public Library, *How do jet engines work?*, <https://youtu.be/H96Xr0Efelk>, 2017. (Writer, Director, Host)
- A. J. Fillo and the Corvallis-Benton County Public Library, *The Great American Eclipse: Echoing Carl Sagan - Lib Lab Episode 2*, <https://youtu.be/yTN3BRoxY00>, 2017. (Writer, Director, Host)
- A. J. Fillo and the Corvallis-Benton County Public Library, *Snake robot? How does that work?*, <https://youtu.be/WD69JmuNT7k>, 2017. (Writer, Director, Host)
- A. J. Fillo and the Corvallis-Benton County Public Library, *How do smoke rings work? The science of vortex rings!*, <https://youtu.be/0odYvE4k9Eg>, 2017. (Writer, Director, Host)
- A. J. Fillo and the Corvallis-Benton County Public Library, *5 ways to watch the Eclipse Safely! - LIB LAB Episode 5*, <https://youtu.be/oS6cxcqFGsw>, 2017. (Writer, Director, Host)
- A. J. Fillo, FYFD, and Corvallis-Benton County Public Library, *What is the science of water pressure? (LIB LAB/FYFD Crossover)*, <https://youtu.be/tFpzwaxn4ps>, 2018. (Writer, Director, Host)

- A. J. Fillo, FYFD, and Oregon Coast Aquarium, *Under Pressure at the Aquarium (FYFD/LIBLAB Crossover)*, <https://youtu.be/LUCGrpNwQKs>, 2018. (Writer, Director, Host)
- A. J. Fillo, and Oregon State University School of Mechanical, Industrial, and Manufacturing Engineering, *Can you 3D print solid metal?*, <https://youtu.be/fwziJJPwMs>, 2018. (Writer, Director, Host)
- SciShow, *Where Are All the Electric Airplanes?*, <https://youtu.be/XqirlIJmYB0>, 2018, (Writer, Reseracher)
- SciShow, *How We Fixed the Most Radioactive Place on Earth*, <https://youtu.be/v3Wj4MTPZdc>, 2018 (Writer, Reseracher)
- SciShow Space, *New Evidence for Planet 9! | SciShow News*, <https://youtu.be/kxJd6RbcsgU>, 2018 (Writer, Reseracher)
- Journal of Fluid Mechanics and FYFD, *Water Walking, Exploding Droplets, and Colliding Vortex Rings*, https://youtu.be/tiLzI7hm8M0?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Skiing, Avalanches and Freezing Bubbles*, https://youtu.be/EveX5DTTRQI?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Bouncing, Floating, and Jetting*, https://youtu.be/ops3Wsdth8M?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Bees, Squid and Oil Plumes*, https://youtu.be/RmOHEDrbr_I?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Tornadoes, Fire and Ice*, https://youtu.be/AQ_wq7fz168?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Getting Water Out of Your Ears, Cycling in Echelons, and Sailing Physics*, https://youtu.be/grpdn5ZxIK8?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Flying Beetles, Stinging Nettles and Jellyfish*, https://youtu.be/g8bTUnJv4v4?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Bioinspiration, Underwater Sniffing, & Mixing Toothpaste*, https://youtu.be/QFH3hwMaSwc?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Dinosaurs, Propellers and Hiding Objects*, https://youtu.be/3wE72O_d1Js?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)
- Journal of Fluid Mechanics and FYFD, *Underwater Snakes, Gusty Flying, and Microswimmers*, https://youtu.be/Wp8W5aSTELE?list=PLMcS_6ekd586uRs34jE8aD8pF26nPvPi, 2018, (Production and Lighting)

Professional service

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

Invited talks

- | | |
|---|------------------|
| Portlan Science Festival | May 15, 2019 |
| GRADx OSU | Feb 28, 2019 |
| 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

Instructor of Record ENGR-212 Dynamics, Oregon State University	Fall 2018
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 Developing Partnership between OSU and Hillsboro High School	On going 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 OSU Chapter, Corvallis, OR	Fall 2011 - Spring 2012
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. McInally, <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. David L. Blunck, Assistant Professor in Mechanical Engineering, Oregon State University,
David.Blunck@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