Aaron Jesse Fillo

Curriculum Vitae

Oregon State University
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Education

Oregon State University, Corvallis, OR — Expected Graduation, June 2018
PhD Candidate & NSF Graduate Research Fellow — Mechanical Engineering
Advised by Dr. Kyle Niemeyer
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

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#.W1T129JKiUm, 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 Boarders 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, *Corvallis Gazette-Times* — July 9, 2018
Library releases new science video, A. Rimel, *Corvallis Gazette-Times* — March 16, 2018
Roses and Raspberries, M. Mclnally, *Corvallis Gazette-Times* — December 8, 2017
Library science videos do a deep dive on pressure, A. Rimel, *Corvallis Gazette-Times* — December 7, 2017
Video: Diving Deep for Pressure, J. Habjan, *Albany Democrat-Herald* — December 6, 2017
5 Interesting Fluid Dynamics Concepts Explained Brilliantly, K. Vyas interestingengineering.com — August 24, 2017
Eclipse Viewing Alternatives, C. Bonitez, *KVAL News 13* — August 20, 2017
Library's science guy, A. Rimel, *Corvallis Gazette-Times* — 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@oregonsate.edu