Aaron Jesse Fillo

Curriculum Vitae

Oregon State University
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(573) 303-2188 *filloa@oregonstate.edu*

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 2014

Oregon State University, Corvallis, OR
Bachelors of Science in Mechanical Engineering — June 2014
Graduated Summa Cum Laude (with highest honors)

Research Experience

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.
- Demonstrated improved performance and reduced computational cost of multi-component mass diffusion algorithm against existing methods.
- 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 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.
- Managed laboratory operations and coordinated lab resources across multiple projects.
- Trained incoming graduate students on operation of Turbulent Bunsen Burner.
- 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 fuel using Fortran OPPDIF and PREMIX codes.
- Collaborated on the development of Sub-Atmospheric combustion chamber for liquid jet fuel Bunsen Burner.
- Working on investigation of high Karlovitz number premixed jet fuel combustion through direct numerical simulation using NGA.

Graduate Research Assistant, Oregon State University — 2014-2015 Academic Year

- 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.
- Trained and managed undergraduate assistants in lab.
- Developed laboratory safe operating procedures.

CO_2 Diffusion from Streams, Oregon State University Summer 2014

- Developed technique for visualizing CO_2 diffusion from fresh water under standard conditions.
- Developed numerical analysis technique with graphical user interphase to enable ease of collaboration.
- 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.

Research and Design, Intern ATI Wah Chang, Albany, OR Spring - Summer 2013

- Researched alternative high precision cleaning system, to retrofit and improve existing apparatus.
- Investigated alternative brush design to withstand highly corrosive environment and high speed application.
- Designed and implemented new cleaning system and brush design.
- Benchmarked design based on exist systems to verify improved cleaning metrics.

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.
- Presented research and results as part of honor course, Introduction to Fluid Mechanics.

Work Experience

Engineering Consultant, Long Haul Engines LLC. July 2014 – Present

- Working to develop comprehensive 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.

Computer Lab Coordinator, Oregon State University, Corvallis, OR February 2012 - Present

- 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 cleaning system improvement and belt polishing system improvements.
- Provided day to day engineering support for ATI Albany Operations facility.

Publications/Presentations

J.M. Bonebrake, A.J. Fillo, D.L. Blunck, AIAA, Sci. Tech. (2017) *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. 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

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 — On Going
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, 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

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

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@oregonsate.edu

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

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