

# Andrew Alferman

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## Experience

2016–Present **Graduate Research Assistant** Oregon State University, Corvallis, OR

Developing methodologies for accelerating detailed reactive flow simulations (CFD) with an emphasis in combustion chemistry. Specifically working on methodologies for quantifying numerical stiffness in combustion mechanisms.

- Investigated stiffness quantification methods to determine use in estimating either the computational cost of a simulation or the tendency for the simulation/numerical integration method to destabilize a given mechanism.
- Developed a scheduler select optimal numerical integration methods at each subdomain of the simulation based on local conditions, especially numerical stiffness.
- Implemented scheduler and stiffness quantification routines using C programming utilizing open-source software.
- Utilized parallelization techniques in programming to improve performance of the scheduler and solver implementation.

2016–2018 **Graduate Teaching Assistant** Oregon State University, Corvallis, OR

Facilitated undergraduate class instruction by creating and grading student homework, tests, and term project.

2010–2016 **Senior Engineer (Fluid Systems)** General Dynamics Electric Boat, Groton, CT

Technical lead in the auxiliary and life support systems group on VIRGINIA class submarines. Responsible for implementation of piping systems during construction, including the diesel exhaust, water cooling, lube oil, and fuel oil systems.

- Identified an issue on in-service ships then resolved the issue by leading an initiative to identify and evaluate novel high temperature gasket materials for use in US Navy vessels. Obtained customer approval of the novel gasket material.
  - Requested and obtained funding of project and managed expenditures.
  - Coordinated testing to demonstrate performance of novel gasket materials and evaluation of results.
  - Developed implementation plans to incorporate best identified materials onto applicable ships.
- Developed operating instructions, test procedures, and emergency procedures for a newly designed system supplying pure oxygen to injured navy divers on board submarines.
- Prevented delays in submarine deliveries, key events, and milestones by ensuring that all required system diagrams, construction drawings, part information, and associated documentation conformed to customer specifications, and presented major deviations to customer for approval.

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## Computer Skills

### Languages:

Python, Matlab, C/C++, Shell, LaTeX, HTML/CSS

### General Use:

Microsoft Office (Word, Excel, PowerPoint), Microsoft Project, comfortable with Windows, MacOS, and Linux-like operating systems.

### Other:

Solidworks, Engineering Equation Solver (EES), CFD Software (OpenFOAM), basic OpenMP and OpenCL

## Licenses/Clearances

Engineering Intern (EI), OSBEELS

DoD Secret Clearance  
2010–2016 (Currently inactive)

## Honors/Awards

Pi Tau Sigma Honor Society (Webmaster)

BSA Eagle Scout

## Personal Interests

Recreational weightlifting, running, skiing, hiking and camping, kayaking, birding, craft beers

## Experience (continued)

2010–2016 **Senior Engineer (continued)**

General Dynamics Electric Boat, Groton, CT

- Enabled continued use of as-built material and conditions by conducting collaborative evaluations using standard techniques and procedures in materials, welding, electrical, and other engineering disciplines.
- Resolved shipyard issues by conducting in-person troubleshooting, interfacing with test engineers and tradespeople as appropriate, to perform root-cause analysis.
- Developed concepts and implemented system redesigns that resolve reliability issues associated with diesel support systems on VIRGINIA Class submarines.
- Trained and mentored engineers in the auxiliary systems group.

## Education

2016–2018 **MS Mechanical Engineering**

Oregon State University, Corvallis, OR

*GPA: 3.48 Advisor: Kyle Niemeyer*

Concentration in Thermal-Fluid Sciences with research in combustion simulations.

Thesis: Evaluating Stiffness Metrics for Predicting the Cost of Chemical Kinetics Integration.

**Graduating June 15, 2018.**

2006–2010 **BS Mechanical Engineering**

Rensselaer Polytechnic Institute, Troy, NY

*GPA: 3.22*

## Relevant Coursework

- Intermediate Fluid Mechanics
- Measurements of Fluid Mechanics and Heat Transfer
- Numerical Solutions of Ordinary Differential Equations
- Intermediate Thermodynamics
- Introduction to Parallel Programming
- Numerical Analysis and Uncertainty Quantification
- Introduction to Combustion
- Applied Heat Transfer

## Publications

- [1] C. P. Stone, A. T. Alferman, and K. E. Niemeyer, Accelerating finite-rate chemical kinetics with coprocessors: comparing vectorization methods on GPUs, MICs, and CPUs, (2017), arXiv: 1608.05794, URL: <http://arxiv.org/abs/1608.05794>.
- [2] A. Alferman and K. E. Niemeyer, Evaluating metrics for detecting stiffness in chemical kinetics integrators. Presented at the Fall 2017 Technical Meeting of the Western States Section of the Combustion Institute, Laramie, WY. (2017).
- [3] A. Alferman and K. E. Niemeyer, Investigating stiffness detection metrics for chemical kinetics. Presented at the 10th US National Combustion Meeting, College Park, MD. The Combustion Institute, Pittsburgh, PA., (2017).