

## Kyle Evan Niemeyer, Ph.D.

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School of Mechanical, Industrial, & Manufacturing Engineering, Oregon State University  
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### RESEARCH INTERESTS

Computational modeling of reacting and non-reacting fluid flows, fluid-structure interaction, chemical reaction mechanism reduction methods, GPU computing. Also interested in open access, open source, and open science in general; software citation.

### EDUCATION

**Case Western Reserve University** Cleveland, Ohio  
*Department of Mechanical and Aerospace Engineering* 2005–2013

Ph.D., Mechanical Engineering, August 2013  
Advisor: Chih-Jen Sung  
Dissertation Title: “[Reducing the Cost of Chemistry in Reactive-Flow Simulations: Novel Mechanism Reduction Strategies and Acceleration via Graphics Processing Units](#)”  
GPA: 4.0/4.0

M.S., Aerospace Engineering, January 2010  
Advisor: Chih-Jen Sung  
Thesis Topic: “[Skeletal Mechanism Generation for Surrogate Fuels](#)”  
GPA: 4.0/4.0

B.S., *summa cum laude*, Aerospace Engineering, January 2009  
GPA: 4.0/4.0

### PROFESSIONAL EXPERIENCE

**Oregon State University** Corvallis, Oregon  
School of Mechanical, Industrial, and Manufacturing Engineering  
*Assistant Professor* September 2015–  
*Assistant Professor (Senior Research)* 2014–2015  
*Postdoctoral Scholar* 2013–2014

**Case Western Reserve University** Cleveland, Ohio  
Department of Mechanical and Aerospace Engineering  
*Graduate Research Assistant* 2008–2013  
*Teaching Assistant* 2007–2010  
*Undergraduate Research Assistant* 2007

**United Technologies Research Center** East Hartford, Connecticut  
*Summer Research Intern, Combustion Group* 2011

**Ars Technica**  
*Associate Science Writer* 2011–2013

**NASA Glenn Research Center** Cleveland, Ohio

SUBMITTED  
ARTICLES

1. Christopher P. Stone and **Kyle E. Niemeyer**. 2016. “Accelerating finite-rate chemical kinetics with coprocessors: comparing vectorization methods on GPUs, MICs, and CPUs.” Under review. [arXiv:1608.05794](https://arxiv.org/abs/1608.05794) [physics.comp-ph]

REFEREED  
JOURNAL  
ARTICLES

\* or † indicates Oregon State graduate or undergraduate student, respectively, at time of publication.

20. Shyam Menon, Himakar Ganti\*, **Kyle E. Niemeyer**, and Christopher L. Hagen. 2017. “Effects of oil and water contamination on natural gas engine combustion processes.” *Journal of Natural Gas Science & Engineering*, 41:30–39. <https://doi.org/10.1016/j.jngse.2017.02.038> | <https://osf.io/h5dru/>
19. Nicholas J. Curtis, **Kyle E. Niemeyer**, and Chih-Jen Sung. 2017. “An investigation of GPU-based stiff chemical kinetics integration methods.” *Combustion and Flame*, 179:312–324. <https://doi.org/10.1016/j.combustflame.2017.02.005> | [arXiv:1607.03884](https://arxiv.org/abs/1607.03884) [physics.comp-ph]
18. **Kyle E. Niemeyer**, Nicholas J. Curtis, and Chih-Jen Sung. 2017. “pyJac: analytical Jacobian generator for chemical kinetics.” *Computer Physics Communications*, 215:188–203. <https://doi.org/10.1016/j.cpc.2017.02.004> | [arXiv:1605.03262](https://arxiv.org/abs/1605.03262) [physics.comp-ph]
17. Xin Hui, **Kyle E. Niemeyer**, Kyle B. Brady, and Chih-Jen Sung. 2017. “Reduced chemistry for butanol isomers at engine-relevant conditions.” *Energy & Fuels*, 31(1):867–881. <https://doi.org/10.1021/acs.energyfuels.6b01857>
16. Daniel S. Katz, Sou-Cheng T. Choi, **Kyle E. Niemeyer**, James Hetherington, Frank Löffler, Dan Gunter, Ray Idaszak, Steven R. Brandt, Mark A. Miller, Sandra Gesing, Nick D. Jones, Nic Weber, Suresh Marru, Gabrielle Allen, Birgit Penzenstadler, Colin C. Venters, Ethan Davis, Lorraine Hwang, Ilian Todorov, Abani Patra, and Miguel De Val-Borro. 2016. “Report on the Third Workshop on Sustainable Software for Science: Practice and Experiences (WSSSE3).” *Journal of Open Research Software*, 4:e37. <https://doi.org/10.5334/jors.118>
15. **Kyle E. Niemeyer**, Arfon M. Smith, and Daniel S. Katz. 2016. “The challenge and promise of software citation for credit, identification, discovery, and reuse.” *ACM Journal of Data and Information Quality*, 7(4):16. <https://doi.org/10.1145/2968452> | [arXiv:1601.04734](https://arxiv.org/abs/1601.04734) [cs.CY]
14. Arfon M. Smith, Daniel S. Katz, **Kyle E. Niemeyer**, and the FORCE11 Software Citation Working Group. 2016. “Software citation principles.” *PeerJ Computer Science*, 2:e86. <https://doi.org/10.7717/peerj-cs.86>
13. Shane R. Daly\*, **Kyle E. Niemeyer**, William J. Cannella, and Christopher L. Hagen. 2016. “Predicting fuel research octane number using Fourier-transform infrared absorption spectra of neat hydrocarbons.” *Fuel*, 183: 359–365. <https://doi.org/10.1016/j.fuel.2016.06.097> | [arXiv:1606.07122](https://arxiv.org/abs/1606.07122) [physics.chem-ph]

12. Fengquan Zhong, Sugang Ma, Xinyu Zhang, Chih-Jen Sung, and **Kyle E. Niemeyer**. 2015. “Development of efficient and accurate skeletal mechanisms for hydrocarbon fuels and kerosene surrogate.” *Acta Mechanica Sinica*, 31(5): 732–740. <https://doi.org/10.1007/s10409-015-0434-5>
11. Kyle B. Brady, Xin Hui, Chih-Jen Sung, and **Kyle E. Niemeyer**. 2015. “Counterflow ignition of n-butanol at atmospheric and elevated pressures.” *Combustion and Flame*, 162(10): 3596–3611. <https://doi.org/10.1016/j.combustflame.2015.06.017>
10. **Kyle E. Niemeyer**, Shane R. Daly\*, William J. Cannella, and Christopher L. Hagen. 2015. “Investigation of the LTC fuel performance index for oxygenated reference fuel blends.” *Fuel*, 155: 14–24. <https://doi.org/10.1016/j.fuel.2015.04.010> | <https://osf.io/f9tm8/>
9. **Kyle E. Niemeyer**, Shane R. Daly\*, William J. Cannella, and Christopher L. Hagen. 2015. “A novel fuel performance index for low-temperature combustion engines based on operating envelopes in light-duty driving cycle simulations.” *Journal of Engineering for Gas Turbines and Power*, 137(10): 101601. <https://doi.org/10.1115/1.4029948> | <https://osf.io/zd9tc/>
8. **Kyle E. Niemeyer** and Chih-Jen Sung. 2015. “Reduced chemistry for a gasoline surrogate valid at engine-relevant conditions.” *Energy & Fuels*, 29(2): 1172–1185. <https://doi.org/10.1021/ef5022126> | [arXiv:1410.0401](https://arxiv.org/abs/1410.0401) [physics.chem-ph]
7. Nicholas J. Curtis, **Kyle E. Niemeyer**, and Chih-Jen Sung. 2015. “An automated target species selection method for dynamic adaptive chemistry simulations.” *Combustion and Flame*, 162(4): 1358–1374. <https://doi.org/10.1016/j.combustflame.2014.11.004>
6. **Kyle E. Niemeyer** and Chih-Jen Sung. 2014. “Mechanism reduction for multicomponent surrogates: a case study using toluene reference fuels.” *Combustion and Flame*, 161(11): 2752–2764. <https://doi.org/10.1016/j.combustflame.2014.05.001> | [arXiv:1405.3745](https://arxiv.org/abs/1405.3745) [physics.chem-ph]
5. **Kyle E. Niemeyer** and Chih-Jen Sung. 2014. “Accelerating moderately stiff chemical kinetics in reactive-flow simulations using GPUs.” *Journal of Computational Physics*, 256: 854–871. <https://doi.org/10.1016/j.jcp.2013.09.025> | [arXiv:1309.2710](https://arxiv.org/abs/1309.2710) [physics.chem-ph]
4. **Kyle E. Niemeyer** and Chih-Jen Sung. 2014. “Recent progress and challenges in exploiting graphics processors in computational fluid dynamics.” *Journal of Supercomputing*, 67(2): 528–564. <https://doi.org/10.1007/s11227-013-1015-7> | [arXiv:1309.3018](https://arxiv.org/abs/1309.3018) [physics.flu-dyn]
3. **Kyle E. Niemeyer** and Chih-Jen Sung. 2011. “On the importance of graph search algorithms for DRGEP-based mechanism reduction methods.” *Combustion and Flame*, 158(8): 1439–1443. <https://doi.org/10.1016/j.combustflame.2010.12.010> | [arXiv:1606.07802](https://arxiv.org/abs/1606.07802) [cs.DS]
2. **Kyle E. Niemeyer**, Chih-Jen Sung, and Mandhapati P. Raju. 2010. “Skeletal mechanism generation for surrogate fuels using directed relation graph with error propagation and sensitivity analysis.” *Combustion and Flame*, 157(9): 1760–1770.

<https://doi.org/10.1016/j.combustflame.2009.12.022> |  
[arXiv:1607.05079](https://arxiv.org/abs/1607.05079) [physics.chem-ph]

1. Craig R. Slyfield, **Kyle E. Niemeyer**, Evgeniy V. Tkachenko, Ryan E. Tomlinson, Grant G. Steyer, Cameron G. Patthanacharoenphon, Galatia J. Kazakia, David L. Wilson, and Christopher J. Hernandez. 2009. “Three-dimensional surface texture visualization of bone tissue through epifluorescence-based serial block face imaging.” *Journal of Microscopy*, 236(1): 52–59. <https://doi.org/10.1111/j.1365-2818.2009.03204.x>

#### BOOK CHAPTERS

1. **Kyle E. Niemeyer** and Chih-Jen Sung. 2014. “GPU-Based Parallel Integration of Large Numbers of Independent ODE Systems.” In V. Kindratenko (Ed.), *Numerical Computations with GPUs*, Springer International Publishing, Switzerland, Ch. 8, pp. 159–182. [https://doi.org/10.1007/978-3-319-06548-9\\_8](https://doi.org/10.1007/978-3-319-06548-9_8)

#### REFEREED CONFERENCE PAPERS

3. Daniel S. Katz, **Kyle E. Niemeyer**, Arfon M. Smith, and the FORCE<sub>11</sub> Software Citation Working Group. “Software citation: Process, principles, and implementation.” *Proc. of the Fourth Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE<sub>4</sub>)*, University of Manchester, Manchester, UK. 12–14 September, 2016. CEUR-WS.org, online. [CEUR-WS.org/Vol-1686/WSSSPE4\\_paper\\_31.pdf](http://CEUR-WS.org/Vol-1686/WSSSPE4_paper_31.pdf)
2. **Kyle E. Niemeyer**. “PyTeCK: a Python-based automatic testing package for chemical kinetic models.” *Proceedings of the 15th Python in Science Conference (SciPy 2016)*, Austin, TX, USA. 11–17 July 2016. [http://conference.scipy.org/proceedings/scipy2016/kyle\\_niemeyer.html](http://conference.scipy.org/proceedings/scipy2016/kyle_niemeyer.html)
1. **Kyle E. Niemeyer**, Shane R. Daly\*, William J. Cannella, and Christopher L. Hagen. “A novel fuel performance index for LTC engines based on operating envelopes in light-duty driving cycle simulations.” ASME 2014 Internal Combustion Engine Division Fall Technical Conference (ICEF), Columbus, IN, USA. 19–22 October 2014. Paper no. ICEF2014-5478. <https://doi.org/10.1115/ICEF2014-5478>

#### CONFERENCE PAPERS/TALKS

26. Bryan W. Weber and **Kyle E. Niemeyer**. “ChemKED: A human- and machine-readable data standard for chemical kinetics experiments.” 10th National Combustion Meeting, College Park, MD, USA. 23–26 April 2017. <https://doi.org/10.6084/m9.figshare.4818448>
25. **Kyle E. Niemeyer**, Morgan Mayer†, Sai Krishna Sirumalla, and Richard West. “Assessing the impact of reaction rate variation on autoignition model performance: butanol.” 10th National Combustion Meeting, College Park, MD, USA. 23–26 April 2017. <https://doi.org/10.6084/m9.figshare.4924760>
24. Aaron J. Fillo\*, Jason Schlup, Guillaume Blanquart, and **Kyle E. Niemeyer**. “Assessing the importance of multicomponent transport properties using direct numerical simulations of premixed, turbulent flames.” 10th National Combustion Meeting, College Park, MD, USA. 23–26 April 2017.
23. Andrew Alferman\* and **Kyle E. Niemeyer**. “Investigating stiffness detection metrics for chemical kinetics.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017.

22. Matthew F. Zaiger<sup>\*</sup>, David L. Blunck, and **Kyle E. Niemeyer**. “Simulating interactions of detonation, ionization chemistry, and magnetohydrodynamics.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017.
21. Aaron J. Fillo<sup>\*</sup> and **Kyle E. Niemeyer**. “Impact of chemical kinetic model reduction on premixed multi-dimensional flame characteristics.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017.
20. Parker Clayton<sup>†</sup> and **Kyle E. Niemeyer**. “pyMARS: An open software package for chemical kinetics model reduction.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017.
19. Matthew F. Zaiger<sup>\*</sup>, David Blunck, and **Kyle E. Niemeyer**. “Simulating interactions of detonation, ionization Chemistry, and magnetohydrodynamics.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017.
18. Nicholas J. Curtis, Chih-Jen Sung, Christopher P. Stone, and **Kyle E. Niemeyer**. “Performance of stiff and non-stiff integrators on heterogeneous architectures.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017. <https://doi.org/10.6084/m9.figshare.4816708>
17. Bryan W. Weber and **Kyle E. Niemeyer**. “Introducing ChemKED: a new human- and machine-readable data standard for chemical kinetics experiments.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017. <https://doi.org/10.6084/m9.figshare.4818448>
16. **Kyle E. Niemeyer**, Raymond L. Speth, Bryan W. Weber, and Richard West. “Encouraging modern software development practices for combustion.” 2017 SIAM International Conference on Numerical Combustion, Orlando, FL, USA. 3–5 April 2017. <https://doi.org/10.6084/m9.figshare.4813984>
15. Daniel Magee<sup>\*</sup> and **Kyle E. Niemeyer**. “An initial investigation of the performance of GPU-based swept time-space decomposition.” AIAA SciTech 2017, Grapevine, TX, USA. 9–13 January 2017. [arXiv:1612.02495](https://arxiv.org/abs/1612.02495) [physics.comp-ph]
14. **Kyle E. Niemeyer**. “An autoignition performance comparison of chemical kinetics models for *n*-heptane.” Spring 2016 Meeting of the Western States Section of the Combustion Institute, Seattle, WA, USA. 21–22 March 2016. Paper 139KI-0028. <https://doi.org/10.6084/m9.figshare.3120724.v1>
13. **Kyle E. Niemeyer**, Nicholas J. Curtis, and Chih-Jen Sung. “Initial investigation of pyJac: an analytical Jacobian generator for chemical kinetics.” Fall 2015 Meeting of the Western States Section of the Combustion Institute, Provo, UT, USA. 5–6 October 2015. Paper 134CK-0019. <https://doi.org/10.6084/m9.figshare.2075515.v1>
12. Shyam Menon, Himakar Ganti<sup>\*</sup>, **Kyle Niemeyer**, and Christopher Hagen. “Effect of natural gas conditions on combustion characteristics and overall performance of a novel bimodal internal combustion engine.” 9th U.S. National Combustion Meeting, Cincinnati, OH, USA. 17–20 May 2015. Paper 114IC-0407.

11. **Kyle E. Niemeyer**, Christopher L. Hagen, and William J. Cannella. “A new fuel index for LTC engines based on operating envelopes in light-duty driving cycle simulations: primary reference fuels.” 2014 Western States Section of the Combustion Institute Spring Meeting, Pasadena, CA, USA. 24–25 March 2014. Paper 14S-20.
10. **Kyle E. Niemeyer** and Chih-Jen Sung. “Reduced mechanisms for gasoline surrogates valid at engine conditions.” 10th US National Combustion Meeting, Park City, UT, USA. 19–22 May 2013. <https://doi.org/10.6084/m9.figshare.3384967>
9. **Kyle E. Niemeyer** and Chih-Jen Sung. “Accelerating reactive-flow simulations using graphics processing units.” 51st AIAA Aerospace Sciences Meeting, Grapevine, TX, USA. 7–10 January 2013. <https://doi.org/10.2514/6.2013-371>
8. **Kyle E. Niemeyer** and Chih-Jen Sung. “Recent Progress and Challenges in Exploiting Graphics Processors for Aeropropulsion Simulations.” Fourth International Symposium on Jet Propulsion and Power Engineering, Xi’an, China. 10–12 September 2012. <https://doi.org/10.6084/m9.figshare.3384970>
7. **Kyle E. Niemeyer**, Chih-Jen Sung, Catalin G. Fotache, and Jeremiah C. Lee. “Turbulence-chemistry closure method using graphics processing units: a preliminary test.” 7th Fall Technical Meeting of the Eastern States Section of the Combustion Institute, Storrs, CT, USA. 9–12 March 2011. Paper Co2. <https://doi.org/10.6084/m9.figshare.3384964>
6. **Kyle E. Niemeyer** and Chih-Jen Sung. “Mechanism reduction strategies for multi-component gasoline surrogate fuels.” 7th National Combustion Meeting, Atlanta, GA, USA. 20–23 March 2011. Paper 1A15. <https://doi.org/10.6084/m9.figshare.3384973>
5. **Kyle E. Niemeyer** and Chih-Jen Sung. “DRGEP-based mechanism reduction strategies: graph search algorithms and skeletal primary reference fuel mechanisms.” 49th AIAA Aerospace Sciences Meeting, Orlando, FL, USA. 4–7 January 2011. AIAA 2011-508. <https://doi.org/10.2514/6.2011-508>
4. Chih-Jen Sung and **Kyle E. Niemeyer**. “Skeletal mechanism generation of surrogate jet fuels for aeropropulsion modeling”. 2nd International Symposium on Computational Mechanics in conjunction with the 12th International Conference on the Enhancement and Promotion of Computational Methods in Engineering and Science, Hong Kong, China. 29 November–3 December 2009. *AIP Conference Proceedings*, 1233 (2010): 1412–1417. <https://doi.org/10.1063/1.3452113>
3. **Kyle E. Niemeyer**, Mandhapati P. Raju, and Chih-Jen Sung. “Skeletal Mechanism Generation of Surrogate Fuels Using Directed Relation Graph with Error Propagation and Sensitivity Analysis”. 45th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Denver, CO, USA. 2–5 August 2009. AIAA 2009-5495. <https://doi.org/10.2514/6.2009-5495>
2. **Kyle E. Niemeyer**, Mandhapati P. Raju, and Chih-Jen Sung. “Skeletal Mechanism Generation for Surrogate Fuels Using Directed Relation Graph with Error Propagation and Sensitivity Analysis”. 6th National Combustion Meeting, Ann Arbor, MI, USA. 17–20 May 2009. Paper 11F1. <https://doi.org/10.6084/m9.figshare.3384976>



1. Craig R. Slyfield, Ryan E. Tomlinson, Evgeniy V. Tkachenko, **Kyle E. Niemeyer**, Grant J. Steyer, David L. Wilson, and Christopher J. Hernandez. “Sub-micron 3D Fluorescent Imaging and Visualization of Remodeling Cavities in Cancellous Bone”. ASME Summer Bioengineering Conference, Marco Island, FL, USA. 25–29 June 2008. <https://doi.org/10.1115/SBC2008-193099>

#### CONFERENCE PRESENTATIONS

6. Andrew Alferman\* and **Kyle E. Niemeyer**. “Investigating stiffness detection metrics for chemical kinetics ODEs.” 2017 SIAM Conference on Computational Science and Engineering (CSE17), Atlanta, GA, USA. 27 February–3 March 2017. <https://doi.org/10.6084/m9.figshare.4729321>
5. Nicholas J. Curtis, Chih-Jen Sung, and **Kyle E. Niemeyer**. “SIMD-acceleration of chemical source term Evaluation via Python.” 2017 SIAM Conference on Computational Science and Engineering (CSE17), Atlanta, GA, USA. 27 February–3 March 2017. <https://doi.org/10.6084/m9.figshare.4736254>
4. Christopher S. Minar\* and **Kyle E. Niemeyer**. “Investigation of GPU-based immersed boundary method solvers with direct forcing.” 28th International Conference on Parallel Computational Fluid Dynamics, Kobe, Japan. 9–12 May 2016. <https://doi.org/10.6084/m9.figshare.3365383>
3. **Kyle E. Niemeyer**. “Using GPUs to accelerate nonstiff and stiff chemical kinetics in combustion simulations.” 15th International Conference on Numerical Combustion, Avignon, France. 19–22 April 2015.
2. Christopher P. Stone and **Kyle E. Niemeyer**. “Faster Kinetics: Accelerate Your Finite-Rate Combustion Simulation with GPUs.” GPU Technology Conference 2014, San Jose, CA, USA. 24–27 March 2014.
1. **Kyle E. Niemeyer** and Chih-Jen Sung. “Accelerating stiff chemical kinetics in combustion simulations using GPUs.” 14th International Conference on Numerical Combustion, San Antonio, TX, USA. 8–10 April 2013.

#### OTHER PAPERS

4. **Kyle E. Niemeyer**. 2017. “Open science and the future university researcher.” Available via engrXiv <https://doi.org/10.17605/OSF.IO/2XZXH>
3. Daniel S. Katz, **Kyle E. Niemeyer**, and Arfon M. Smith. 2016. “Strategies for biomedical software management, sharing, and citation.” *PeerJ Preprints* 4:e2640v1. <https://doi.org/10.7287/peerj.preprints.2640v1>
2. Daniel S. Katz, **Kyle E. Niemeyer**, Arfon M. Smith, William L. Anderson, Carl Boettiger, Konrad Hinsén, Rob Hooft, Michael Hucka, Allen Lee, Frank Löffler, Tom Pollard, and Fernando Rios. 2016. “Software vs. data in the context of citation.” *PeerJ Preprints* 4:e2630v1. <https://doi.org/10.7287/peerj.preprints.2630v1>
1. Devin Berg, **Kyle Niemeyer**, and Luciano Fleischfresser. 2016. “[Editorial] Open Publishing in Engineering.” *The Journal of Open Engineering*, version b1e28b58d6e7c97f66b251c44f2d7d11f933785d. <https://doi.org/10.21428/12302>

POSTER  
PRESENTATIONS

9. Arfon Smith, Lorena A. Barba, George Githinji; Melissa Gymrek, Kathryn Huff, Daniel S. Katz, Christopher Madan, Abigail Cabunoc Mayes, Kevin M. Moerman, **Kyle E. Niemeyer**, Pjotr Prins, Karthik Ram, Ariel Rokem, Tracy Teal, and Jake Vanderplas. "The Journal of Open Source Software." SIAM Computational Science & Engineering 2017 (CSE17), Atlanta, GA, USA. 27 February–3 March 2017. <https://doi.org/10.6084/m9.figshare.4688911>
8. **Kyle E. Niemeyer**, Arfon Smith, and Daniel S. Katz. "Software citation principles for credit and reuse." SIAM Computational Science & Engineering 2017 (CSE17), Atlanta, GA, USA. 27 February–3 March 2017. <https://doi.org/10.6084/m9.figshare.4688908>
7. Christopher Minar\* and **Kyle E. Niemeyer**. "GPU Based Fluid Structure Interaction." GPU Technology Conference 2016, San Jose, CA, USA. 4–7 April 2016. Poster P6241.
6. **Kyle E. Niemeyer** and Chih-Jen Sung. "SLACKHA: Software Library for Accelerating Chemical Kinetics on Hybrid Architectures." 2016 NSF SI2 PI Workshop, Arlington, VA, USA. 16 February 2016. <https://doi.org/10.7921/Go9884XX>
5. Christopher Minar\* and **Kyle E. Niemeyer**. "Development of a GPU-Based Computational Fluid Dynamics Modeling Tool for Design & Optimization of Wave Energy Converters." Oregon State University Engineering Research Expo, Portland, OR, USA. 4 March 2015.
4. **Kyle E. Niemeyer** and Chih-Jen Sung. "Strategies for accelerating combustion simulations with GPUs." 35th International Symposium on Combustion, San Francisco, CA, USA. 4–8 August 2014. <https://doi.org/10.6084/m9.figshare.1128029>
3. **Kyle E. Niemeyer**, Shane Daly\*, William Cannella, and Christopher L. Hagen. "A new fuel index for LTC engines based on operating envelopes in light-duty driving cycle simulations." 35th International Symposium on Combustion, San Francisco, CA, USA. 4–8 August 2014. <https://doi.org/10.6084/m9.figshare.1128030>
2. **Kyle E. Niemeyer** and Chih-Jen Sung. "Mechanism reduction strategies for gasoline surrogate fuels." 24th International Colloquium on the Dynamics of Explosions and Reactive Systems, Taipei, Taiwan. 28 July–2 August 2013.
1. **Kyle E. Niemeyer** and Chih-Jen Sung. "GPU-based explicit integration algorithms for accelerating chemical kinetics in CFD simulations." 24th International Colloquium on the Dynamics of Explosions and Reactive Systems, Taipei, Taiwan. 28 July–2 August 2013.

INVITED  
LECTURES

6. "Good-Enough Practices for Computing in Research," OSU MIME Design Seminar Series. 18 November 2016.
5. "Novel modeling tools for next-generation combustion," OSU Applied Mathematics and Computation Seminar. 28 October 2016.
4. "Making effective use of graphics processing units (GPUs) in computations," Oregon State University Research Computing Seminar Series. 7 March 2016.



3. “Best Research Practices Part 2: Time Management and Effective Communication,” OSU MIME Design Seminar Series. 16 October 2015.
2. “Novel computational modeling tools for next-generation combustion,” Invited talk, University of Utah. 2 October 2015.
1. “Graphics processing units (GPUs) as tools for accelerating computational design and optimization,” OSU MIME Design Seminar Series. 23 January 2015.

#### EXTERNAL FUNDING & SUPPORT

**NSF CBET-1733968**, “Workshop: Building a sustainable combustion research community”. PIs: **Kyle Niemeyer**, Nicole Labbe (CU Boulder), Jacqueline O’Connor (Penn State), and Richard West (Northeastern). March 2017–December 2017. Total funding: \$15,195.  
<https://doi.org/10.6084/m9.figshare.4620163>

**NSF ACI-1702722**, “2017 Software Infrastructure for Sustained Innovation (SI2) Principal Investigator Workshop.” PIs: Ganesh Gopalakrishnan (U. Utah), Matthew Turk (UIUC), Yung-Hsiang Lu (Purdue), Matthew Knepley (Rice), and **Kyle Niemeyer**. December 2016–November 2017. Total funding: \$94,993.

**NSF ACI-1648293**, “The 4th Workshop on Sustainable Software for Science: Best Practices and Experiences (WSSSPE4).” PIs: Daniel Katz (UIUC), Gabrielle Allen (UIUC), and **Kyle Niemeyer**. August 2016–July 2017. Total funding: \$40,000.

**NVIDIA Tesla K40 GPU Hardware Donation**. March 2016. Estimated value: \$3000.

**SERDP RC-2651**, “Ignition, Propagation, and Emissions of Smoldering Combustion: Experimental Analysis and Physics Based-Modeling.” PIs: David Blunck, **Kyle Niemeyer**; Bret Butler and Wei Min Hao (US Forest Service). May 2016–April 2021. Total funding: \$2,059,094 (OSU portion: \$1,280,544).

**NASA NNX15AU66A**, “Swept time-space domain decomposition rule for breaking the latency barrier.” PIs: Qiqi Wang (MIT), **Kyle Niemeyer**, and David Gleich (Purdue University). September 2015–August 2018. Total funding: \$696,444 (OSU portion: \$273,454).

**Energy Industry Sponsor**, “Advanced Internal Combustion Engine Fuel Modeling and Testing Phase II.” PIs: Christopher Hagen and **Kyle Niemeyer**. September 2015–August 2016. Total funding: \$142,178.

**NSF ACI-1535065**, “Collaborative Research: SI2-SSE: An intelligent and adaptive parallel CPU/GPU co-processing software library for accelerating reactive-flow simulations.” PIs: **Kyle Niemeyer** and Chih-Jen Sung (University of Connecticut). September 2015–August 2018. Total funding: \$492,644 (OSU portion: \$278,287).  
*REU Supplement*: Summer 2016, \$7200.

**DOE/NETL DE-FE0025822**, “Pulse detonation engine for advanced oxy-combustion of coal-based fuels.” PIs: David Blunck, Sourabh Apte, and **Kyle Niemeyer**. September 2015–March 2017. Total funding: \$874,750.

**Oregon BEST**, Commercialization Program “Arc Position Sensing Technology Commercialization,” PI: **Kyle Niemeyer**. June 2015–December 2016. Total funding: \$149,975.

**NVIDIA** Tesla K40 GPU Hardware Donation. January 2015. Estimated value: \$3000.

**NSF Center for e-Design**, Lucid Energy/Oregon BEST. “A tool to estimate the electrical energy generated from turbines inserted in fresh water pipes,” PIs: Christopher Hoyle and **Kyle Niemeyer**. January 2015–December 2015. Total funding: \$30,000.

**TEACHING  
EXPERIENCE**

**Oregon State University**

ME 373, Mechanical Engineering Methods (undergraduate)

Junior-level course covering analytical and numerical methods for solving ordinary and partial differential equations.

—Winter 2015, Winter 2016, Winter 2017

ME 599, Advanced Combustion (graduate)

Advanced graduate-level course on fundamental principles of combustion. Co-taught with David Blunk.

—Fall 2016

ME 461/561, Gas Dynamics (undergraduate/graduate)

Combined senior undergraduate and graduate course on compressible fluid flows.

—Fall 2016

MIME 101, Introduction to MIME (undergraduate)

Freshman-level course providing an overview of mechanical, industrial, and manufacturing engineering as well as academic success skills.

—Fall 2015

ME 331, Introductory Fluid Mechanics (undergraduate)

Junior-level course introducing concepts and applications of fluid mechanics and dimensional analysis.

—Fall 2013, Fall 2014

ESE 497, MIME Capstone Design (undergraduate)

Senior-level design capstone course for Energy Systems Engineering (ESE) students, covering real-world product design, project management, and professional communication skills.

—Fall 2014

**Case Western Reserve University** (as teaching assistant)

EMAE 350, Mechanical Engineering Analysis (undergraduate)

Junior-level course on mathematical methods (analytical and numerical) used in mechanical engineering, with a focus on ordinary and partial differential equations.

—Fall 2007, Fall 2009, Fall 2010

EMAE 359, Aero/Gas Dynamics (undergraduate)

Junior-level course on incompressible and compressible flow theory and applications.

—Spring 2010

EMAE 376, Aerostructures (undergraduate)

Junior-level course on solid mechanics of thin-walled aerospace structures, including introduction to finite element methods.

—Spring 2008

## ADVISING EXPERIENCE

### PhD Students Supervised

- Luz Pacheco, Mechanical Engineering (in progress)
- Aaron Fillo, Mechanical Engineering (in progress)

### MS Students Supervised

- Tejas Mulky, Mechanical Engineering (in progress)
- Andrew Alferman, Mechanical Engineering (in progress)
- Matthew Zaiger, Mechanical Engineering (in progress; co-advised with David Blunck)
- Daniel Magee, Mechanical Engineering (in progress)
- Himakar Ganti, Mechanical Engineering (in progress)
- Miguel Soler, "[Computational Investigation on the Effects of Arc Location in Vacuum Arc Remelting](#)," Mechanical Engineering (Dec. 2016)
- Christopher Minar, "[GPU-Based Fluid-Structure Interaction using Immersed Boundary Methods](#)," Mechanical Engineering (Dec. 2016)
- Shane Daly, "[Chemometrics-based Approach for Predicting Low Temperature Combustion Engine Fuel Performance](#)," Mechanical Engineering; co-advised with Christopher Hagen (Sep. 2015)

### Undergraduate students supervised

- Morgan Mayer, Chemical Engineering (Jan. 2017–present)
- Parker Clayton, Mechanical Engineering (Feb. 2016–present)
- Kenny Warren, BioResource Research/Bioenergy (June 2016–present)
- Brian Butcher, Mechanical Engineering (Feb.–June 2016)

### Visiting Students Supervised

Daiki Ichinokiyama, MS student at University of Tsukuba, Japan (Oct. 2015–Feb. 2016)

### MS Thesis Committee Member

- Sean Brown, Mechanical Engineering (in progress)
- Aaron J. Fillo, Mechanical Engineering (Dec. 2016)
- Eric Walters, Mechanical Engineering (July 2016)
- Eric Zeuthen, Mechanical Engineering (Feb. 2016)
- Sebastian Okhovat, Mechanical Engineering (Dec. 2015)

### Honors BS Thesis Committee Member

- Ian Walters, Mechanical Engineering (May 2016)

### Graduate Council Representative

- Matt O'Banion, PhD Civil Engineering (in progress)
- Sheng Chen, PhD Computer Science (Mar. 2017)
- Ajinkya Patil, MS Computer Science (Aug. 2016)
- Alexander Clucas, MS Computer Science (June 2016)
- Thanh Huynh, MS Civil Engineering/Wood Science (June 2016)
- Kendall Bailey, MS Computer Science (Dec. 2015)
- Ben McCamish, MS Electrical Engineering (June 2015)

### PROFESSIONAL SERVICE

#### Journal Editorial Positions

Associate Editor, *Journal of Open Research Software*, Feb. 2016–present  
Editor, *The Journal of Open Engineering*, Apr. 2016–present  
Editor, *The Journal of Open Source Software*, May 2016–present  
Subject Editor, *RIO Journal*

#### Technical Committee Participation

- Lead organizer, 2017 “Workshop: Building a sustainable combustion research community”
- Co-chair of organizing committee, 2017 NSF SI2 Principle Investigator Workshop
- Steering committee, [engrXiv](#) (eprint server for engineering)
- Organizing committee, 4th Workshop on Sustainable Software for Science: Practice and Experiences ([WSSSPE4](#))
- Co-chair, [FORCE11 Software Citation Working Group](#)

#### Conference Session Chair

10th National Combustion Meeting, April 2017  
2017 SIAM International Conference on Numerical Combustion, April 2017  
SIAM Computational Science & Engineering, Feb. 2017  
28th International Conference on Parallel Computational Fluid Dynamics, May 2016  
Western States Section of the Combustion Institute Spring Meeting, Mar. 2016  
Western States Section of the Combustion Institute Fall Meeting, Oct. 2015

#### Invited Workshops & Panels

- NSF Workshop: Future Combustion Research to Mitigate Carbon Emissions, Hyattsville MD. 26–27 April 2017.
- Imagining Tomorrow's University: Rethinking scholarship, education, and institutions for an open, networked era, Rosemont IL. 8–9 March 2017.
- CodeMeta Workshop: The Future of Software Metadata, Portland, OR. 15–17 April 2016.

#### Proposal/Award Referee

NSF Panel Reviewer: 2016, 2017  
Sloan Foundation: 2017  
DOE Advanced Scientific Computing Research Leadership Computing Challenge: 2016, 2017

Air Force Summer Faculty Fellowship Program: 2015, 2016  
National Defense Science and Engineering Graduate (NDSEG) Fellowship: 2015

### **Journal Reviewer**

*Proceedings of the Combustion Institute*  
*Combustion and Flame*  
*Journal of Computational Physics*  
*Energy & Fuels*  
*Fuel*  
*Combustion Science & Technology*  
*Combustion Theory & Modelling*  
*Energy Conversion and Management*  
*International Journal of Energetic Materials and Chemical Propulsion*  
*SAE International Journal of Aerospace*  
*International Journal of Chemical Reactor Engineering*  
*Journal of Open Research Software*  
*Journal of Open Source Software*  
*Aerospace*

### **Conference Reviewer**

SAE World Congress  
ASME Internal Combustion Engine Fall (ICEF) Meeting  
SAE 2014 International Powertrain, Fuels & Lubricants Meeting  
ASME 2015 International Design Engineering Technical Conferences  
ASME 2016 35th International Conference on Ocean, Offshore and Arctic Engineering  
15th Annual Scientific Computing with Python Conference (SciPy 2016)

### **Professional Affiliations**

The Combustion Institute  
American Physical Society (APS)  
Society for Industrial and Applied Mathematics (SIAM)  
The Future of Research Communications and e-Scholarship (FORCE11)  
American Institute of Aeronautics and Astronautics (AIAA)

### **School Service**

- MIME Awards Committee (2015–2016, 2016–2017)
- Faculty search committee: Data Science & Engineering (2016–2017)
- Search committee: MIME School Operations Manager (2016–2017)

### **Outreach Efforts**

- SIAM Computational Science & Engineering 2017 meeting Broader Engagements Mentor-Protege program, Feb.–March 2017
- “Discovering the Scientist Within” outreach event for middle-school girls; 8 March 2015, 5 March 2016
- “Explore Engineering Careers” speaker for Energy Systems Engineering, 14 January 2015

## AWARDS & HONORS

4th Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE<sub>4</sub>) travel award, 2016  
 3rd Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE<sub>3</sub>) travel award, 2015  
 NSF Graduate Research Fellow, 2010–2013  
 National Defense Science and Engineering Graduate Fellow, 2009–2012  
 NSF Graduate Research Fellowship Program Honorable Mention, 2009  
 The Case Alumni Association Prize for Achievement, 2009  
 M. Roger Clapp Memorial Scholarship, Case Alumni Association, 2009  
 Robert and Leona Garwin Award, Mechanical and Aerospace Engineering, 2008  
 Outstanding Junior in Engineering Award, Case Western Reserve University, 2008  
 Case Alumni Association Scholarship, 2007–2008  
 Outstanding Sophomore in Engineering Award, Case Western Reserve University, 2007  
 Presidential Scholar, Case Western Reserve University, 2005–2008  
 Scholar-Athlete, Case Western Reserve University, 2005  
 Tau Beta Pi (Ohio Alpha Chapter)

## SUBMITTED FUNDING PROPOSALS

- **Kyle Niemeyer (PI)**. “Automatic mechanism reduction of large kinetic models for multicomponent surrogate fuels,” DOE Co-Optima. Total funding: \$399,440.
- Chris Hagen (PI) and **Kyle Niemeyer**. “Advanced fuels characterization by attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTIR),” DOE Co-Optima. Total funding: \$563,353.
- David Hendrix (PI), Xiaoli Fern, **Kyle Niemeyer**, Liang Huang, Paul Cheong, Debashis Mondal. “GPU Cluster for Big Data Analysis and High Performance Computing,” Oregon State Research Equipment Reserve Fund. Total funding: \$140,000 (matching funds: \$40,000).
- Bryony DuPont (PI), Sarah Henkel, and **Kyle Niemeyer**. “CyberSEES: Type 1: A Detailed Modeling Framework for Optimizing Offshore Wind Energy Systems,” NSF, Cyber-Innovation for Sustainability Science and Engineering (CyberSEES). Total funding: \$399,213.
- **Kyle Niemeyer (PI)** and Chih-Jen Sung (University of Connecticut). “Collaborative Research: Enabling accurate turbulence-chemistry interaction modeling with GPU acceleration and dynamic mechanism reduction,” NSF, CBET Combustion and Fire Systems. Total funding: \$368,454 (OSU portion: \$218,453).
- Christopher Hagen (PI), **Kyle Niemeyer**, and Marc Rubin. “Imaging smartphone-based leak detection network,” ARPA-E, Methane Observation Networks with Innovative Technology to Obtain Reductions (MONITOR). Total funding: \$934,311.
- **Kyle Niemeyer (PI)**. “Marine and Hydrokinetic (MHK) Demonstrations at the Navy’s Wave Energy Test Site (WETS),” **Oscilla Power, Inc.** (As subcontractor on DOE proposal). Total funding: \$99,998.
- **Kyle Niemeyer (PI)** and Chih-Jen Sung (University of Connecticut). “Collaborative Research: An intelligent and adaptive parallel CPU/GPU co-processing software library for accelerating combustion simulations,” NSF, ACI Software Infrastructure for Sustained Innovation (SI<sub>2</sub>). Total funding: \$487,518 (OSU portion: \$274,878).



- **Kyle Niemeyer (PI).** “Accelerating Combustion Modeling with Many-Core Parallel Co-Processing”, **Computational Science and Engineering LLC** (As subcontractor on DOE SBIR proposal). Total funding: \$26,682.