

Jeffrey J. Heys

Experience

Montana State University, Chemical and Biological Engineering

July 2012 to present

Associate Professor and Department Head

Responsible for guiding a rapidly growing Chemical and Biological Engineering Department from approximately 300 students to 600 students and faculty growth from 9 tenure track faculty to 13 tenure track faculty and 1 non-tenure track faculty.

Montana State University, Chemical and Biological Engineering

Aug 2008 to 2012

Assistant Professor

Advisor for the Computational Biofluid Dynamics research group that focuses on numerical models of biomimetic micro-flow sensors, weighted least-squares finite-element methods for analysis of PIV data from the left ventricle, biofilm mechanics models, and particle deposition in the human airways.

Arizona State University, Chemical and Materials Engineering

Aug 2004 to Aug 2008

Assistant Professor

Established a research group focused on developing advanced mathematical models and numerical analysis to a variety of biological problems including fluid-tissue interaction, porous flow through heterogeneous tissues, inhaled particle deposition, drug delivery, and fluid-hair interaction.

University of Colorado, Department of Applied Mathematics

June 2001 to Aug 2004

VIGRE Postdoctoral Fellow

Conducted research on advanced numerical techniques for solving mechanically coupled systems that include a moving fluid and a deformable tissue. Applications include the modeling of blood flow in vessels following a Fontane procedure, and modeling of aqueous humor interaction with the iris.

- Utilized an algebraic multigrid (AMG) algorithm to solve the linear equation system resulting from a finite element discretization.
- Created an original parallel (MPI) software package to solve differential equations with FOSLS.

University of Colorado, Department of Chemical Engineering

August 1996 to May 2001

Graduate Research Assistant

Research focused in the areas of biomechanics and finite element modeling of biological transport.

- Developed finite element models of the anterior eye that are capable of describing the complex coupling between the circulating fluid and the elastic tissues in the eye.

Completed the following laboratory rotations as part of the Biotechnology program:

- "Transdermal Photopolymerizations" with Prof. Kristi Anseth
- "Isoprene Production during *Bacillus* Fermentation" with Prof. Ray Fall

NeXStar Pharmaceuticals, Inc.

June 1998 to August 1998

Biotechnology Internship

Conducted experiments on the scale-up of a new RNA synthesis technique and developed techniques for measurement of modified RNA solubility.

Extensive use of the following experimental techniques:

- HPLC including Ion exchange chromatography and size exclusion chromatography
- NMR, Spectrophotometry, Mass Spectrometry

Stone Container Corp.

May 1995 to September 1995

Intern

Assisted the Process Control Engineer in updating and improving the process control system at a major pulp and paper mill.

- Developed novel software to enable remote communication between the process control computers and a PC.

Worked in the Environmental Engineering Department on monitoring air emissions and compliance reporting.

- Prepared MSDS reports for new chemicals produced within the plant.
- Prepared daily air emission reports and reported violations to the state government.

Education

University of Colorado at Boulder

Doctor of Philosophy Degree in Chemical Engineering

May, 2001

Thesis advisor: Prof. Victor H. Barocas

Thesis title: "An Elastohydrodynamic Model of the Anterior Eye with Application to the Pigmentary Glaucoma"

Master of Science Degree in Chemical Engineering

May, 1998

Thesis advisor: Prof. Victor H. Barocas

Thesis title: "Mathematical Modeling of Fluid Dynamics in the Eye"

Received a Graduate Interdisciplinary Certificate in Biotechnology

Montana State University

Bachelor of Science Degree in Chemical Engineering

May, 1996

Completed a senior thesis entitled, "Distinguishing Between 6-Carbon Sugars on Surfaces Using Time-of-Flight Secondary Ion Mass Spectroscopy and X-Ray Photoelectron Spectroscopy"

Machine Learning

January, 2016

Certificate of Completion from Coursera

Awards

Award for Excellence
Montana State University Alumni Foundation 2016

Distinguished Professor of Chemical Engineering
Arizona State University 2008

Outstanding Teaching Award
Ira A Fulton School of Engineering 2008

Outstanding Teaching Award
Ira A Fulton School of Engineering 2007

First place in the Bio-modeling poster session at the
ASME/AICHE Summer Bioengineering Conference 2001

First place in the Ph.D. student poster competition
ASME/AICHE Summer Bioengineering Conference 1999

Beverly Sears Dean's Small Grant Award
"Biomechanical Characterization of the Iris" 1999

Dean's Travel Grant 1999

NIH Biotechnology Traineeship 1998 and 1999

Refereed Archival Journal Papers

1. Carlson, R.P., A.E. Beck, P. Phalak, M.W. Fields, T. Gedeon, L. Hanley, W.R. Harcombe, M.A. Henson, J.J. Heys, (2018) "Competitive resource allocation to metabolic pathways contributes to overflow metabolisms and emergent properties in cross-feeding microbial consortia", *Biochemical Society Transactions*, BST20170242
2. Akar, B., K. Subramaniam, E. Narayanan, K. Rege and J.J. Heys, (2018) "Mechanistic investigation of radiolysis-induced gold nanoparticle formation for radiation dose prediction", *Biomedical Physics & Engineering Express*
3. Mushaben, M., R. Urie, T. Flake, K. Rege, and J.J. Heys, (2018) "Spatiotemporal Modeling for the Optimization of Laser Tissue Soldering", *Lasers Surg. Med.*, 50(2): 143-152
4. Schepens, D., A.E. Beck, J.J. Heys, T. Gedeon, and R.P. Carlson, (2017) "The Benefits of Resource Partitioning and Division of Labor in Microbial Consortia", *Advances in Systems and Synthetic Biology*,
5. Rajaraman, P.K., G.D. Vo, G. Hansen, and J.J. Heys, (2017) "Comparison of Continuous and Discontinuous Galerkin Finite Element Methods for Parabolic Differential Equations Employing Implicit Time Integration", *Int. J. Comp. Meth. Eng. Sci. and Mech.*, 18(2-3): 182-190
6. Venters, M., R.P. Carlson, T. Gedeon, and J.J. Heys, (2017) "Effects of Spatial Localization on Microbial Consortia Growth", *PLoS One*, 12(1): e0168592
7. Rajaraman, P.K., T.A. Manteuffel, M. Belohlavek, and J.J. Heys, (2017) "Combining Existing Numerical Models with Data Assimilation using Weighted Least-Squares Finite Element Methods", *Int. J. Num. Meth. Biomed. Eng.*, 33(1), 1-16
8. Gosney, J. and J. J. Heys, (2016) "Numerical Prediction of Microbubble Attachment in Biological Flows." *Am. J. Undergrad. Res.*, 13(1), 21-30
9. Rajaraman, P.K., and J.J. Heys (2014), "Echocardiographic Data Assimilation Using Least-Squares Finite Element Method." *Comput & Math Appl*, 68(11), 1569-1580
10. Harvey, E., J.J. Heys, and T. Gedeon (2014) "Quantifying the Effects of the Division of Labor in Metabolic Pathways", *J Theo Biol*, 360, 222-242
11. Rajaraman, P.K., and J.J. Heys, (2014) "Simulation of Nanoparticles Transport in Airways Using Petrov-Galerkin Finite Element Methods", *Int. J. Num. Meth. Biomed. Eng.*, 30(1), 103-116
12. Borazjani, I., J. Westerdale, E. McMahon, P.K. Rajaraman, J.J. Heys, and M. Belohlavek, (2013) "Left Ventricular Flow Analysis: Recent Advances in Numerical Methods and Applications in Cardiac Ultrasound", *Comp Math Methods Medicine*, n. 395081
13. Heys, J.J., P.K. Rajaraman, T. Gedeon, and J.P. Miller, (2012) "A Model of Filiform Hair Distribution on the Cricket Cercus", *PLoS One*, 7(10): e46588
14. Gedeon, T., G. Cummins, and J. Heys, (2012) "Effect of model selection on prediction of periodic behavior in gene regulatory networks", *Bull. Math. Biol.*, 74(8): 1706-1726
15. Wei, F., J. Westerdale, M. Belohlavek, and J.J. Heys, (2012) "Weighted Least-Square Finite Element Method for Cardiac Blood Flow Simulation with Echocardiographic Data", *Comp. Math. Methods Medicine*, n. 371315
16. Miller, J.P., S. Krueger, J.J. Heys, and T. Gedeon, (2011) "Quantitative Characterization of the Filiform Mechanosensory Hair Array on the Cricket Cercus", *PLoS One*, 6(11): e27873
17. Wininger, C.W., and J.J. Heys (2011) "Particle Transport Modeling in Pulmonary Airways with High-order Elements", *Mathematical Biosciences*, 232(1): 11-19

18. Vo, G., and J.J. Heys, (2011) "Biofilm Deformation in Response to Fluid Flow in Capillaries", *Biotech. Bioeng.*, 108(8): 1893-1899
19. Adams, J.C., P. Jiamsripong, M. Belohlavek, E.M. McMahon, V. Marupakula, J.J. Heys, and H.P. Chaliki, (2011) "Potential Role of Reynolds Number in Resolving Doppler- and Catheter-Based Transvalvular Gradient Discrepancies in Aortic Stenosis", *J Heart Valve Disease*, 20(2):159-164.
20. Westerdale, J., M. Belohlavek, E.M. McMahon, P. Jiamsripong, J.J. Heys, and M. Milano, (2011) "Flow Velocity Vector Fields by Ultrasound Particle Imaging Velocimetry: In Vitro Comparison to Optical Flow Velocimetry", *J. Ultrasound Med.*, 30(2): 187-195
21. Jiamsripong, P., M.S. Alharthi, A.M. Calleja, E.M. McMahon, M. Katayama, J. Westerdale, M. Milano, J.J. Heys, F. Mookadam, and M. Belohlavek (2010) "Impact of pericardial adhesions on diastolic function as assessed by vortex formation time, a parameter of transmitral flow efficiency", *Cardiovascular Ultrasound*, 8:42
22. J.J. Heys, N. Holyoak, A.M. Calleja, M. Belohlavek, H.P. Chaliki, (2010) "Revisiting the Simplified Bernoulli Equation", *TOBEJ*, 4: 123-128
23. Vo, G., E. Brindle, and J.J. Heys, (2010) "An Experimentally Validated Immersed Boundary Model of Fluid-Biofilm Interaction", *Water Science & Tech.*, 61(12): 3033-3040
24. Haung, H.C., K. Rege, and J.J. Heys, (2010) "Spatiotemporal Temperature Distribution and Cancer Cell Death in Response to Extracellular Hyperthermia Induced by Gold Nanorods", *ACS Nano*, 4(5): 2892-2900
25. Heys, J.J., T.A. Manteuffel, S.F. McCormick, M. Milano, and M. Belohlavek, (2010) "Weighted Least-Squares Finite Elements for Particle Imaging Velocimetry Analysis", *J. Comp. Physics* 229(1): 107-118
26. Heys, J.J., E. Lee, T.A. Manteuffel, and S.F. McCormick, (2009) "Enhanced Mass Conservation in Least-Squares Methods for Navier-Stokes Equations", *SIAM J. Sci. Comput.*, 31(3): 2303-2321
27. Jiamsripong, P., A.M. Callega, M.S. Alharthi, M. Dzsini, E.M. McMahon, J.J. Heys, M. Milano, P.P. Sengupta, B.K. Khandheria, M. Belohlavek, (2009) "Impact of Acute Moderate Elevation in Left Ventricular Afterload on Diastolic Transmitral Flow Efficiency: Analysis by Vortex Formation Time", *J. Am. Soc. Echocardi.*, 22(4): 427-431
28. Jiamsripong, P., A.M. Callega, M.S. Alharthi, E.J. Cho, E.M. McMahon, J.J. Heys, M. Milano, P.P. Sengupta, B.K. Khandheria, M. Belohlavek, (2009) "Increase in the Late Diastolic Filling Force Is Associated With Impaired Transmitral Flow Efficiency in Acute Moderate Elevation of Left Ventricular Afterload", *J. Ultrasound Med.*, 28(2): 175-182
29. Wong, S.S., J. Vargas, A. Thomas, C. Fastje, M. McLaughlin, R. Camponovo, R. C. Lantz, J. Heys, and M.L. Witten, (2008) "In Vivo Comparison of Epithelial Responses for S-8 versus JP-8 Jet Fuels Below Permissible Exposure Limit." *Toxicology*, 254(1-2): 106-111
30. Heys, J.J., B. Knott, T. Gedeon, and Y. Kim, (2008) "Modeling Arthropod Filiform Hair Motion using the Penalty Immersed Boundary Method." *J. Biomech Eng.*, 41(5): 977-984
31. Stukel, J.M., J.J. Heys, and M.R. Caplan, (2008) "Optimizing Delivery of Multivalent Constructs for Detection of Secondary Tumors." *Ann. Biomed. Eng.* 36(7): 1291-1304,
32. Heys J.J., (2008) "Group Projects in Chemical Engineering Using a Wiki.", *Chem. Eng. Ed.*, 42(2): 91-104
33. Merchant, B., and J.J. Heys, (2008) "Effects of Variable Permeability on Aqueous Humor Outflow" *Appl. Math. Comput.*, 196: 371-380
34. Heys, J.J., E. Lee, T.A. Manteuffel, and S.F. McCormick, (2007) "An Alternative Least-Squares Formulation of

the Navier-Stokes Equations with Improved Mass Conservation" *J. Comp. Physics*, **226**: 994-1006

35. Heys, J.J., E. Lee, T.A. Manteuffel, and S.F. McCormick, (2006) "On Mass-Conserving Least Squares Methods." *SIAM J. Sci. Comp.*, **28**: 1675-1693
36. Heys, J.J., C.G. DeGroot, T.A. Manteuffel, and S.F. McCormick, (2006) "First-Order System Least Squares (FOSLS) for Modeling Blood Flow." *Med. Eng. & Phys.*, **28**(6): 495-503
37. DeSterck, H., U.M. Yang, and J.J. Heys, (2006) "Reducing Complexity in Parallel Algebraic Multigrid Preconditioners." *SIAM J. Mat. Anal. App.*, **27**: 1019 - 1039
38. Heys, J.J., T.A. Manteuffel, S.F. McCormick, and L.N. Olson, (2005) "Algebraic Multigrid (AMG) for Higher-Order Finite Elements." *J. Comp. Physics*, **204**: 520-532
39. Heys, J.J., T.A. Manteuffel, S.F. McCormick, and J.W. Ruge, (2004) "First-Order System Least Squares (FOSLS) for Coupled Fluid-Elastic Problems." *J. Comp. Physics*, **195**(2): 560-575
40. Heys, J.J. and V.H. Barocas, (2002) "A Boussinesq Model of Natural Convection in the Human Eye and the Formation of Krukenberg's Spindle." *Ann. Biomed. Eng.*, **30**: 392-401.
41. Heys, J.J. and V.H. Barocas, (2002) "Computational Evaluation of the Role of Accommodation in Pigmentary Glaucoma." *Inv. Ophthalmol. Vis. Sci.*, **43**(3): 700-708.
42. Heys, J.J., V.H. Barocas, and M. J. Taravella. (2001) "Modeling Passive Mechanical Interaction between the Aqueous Humor and Iris." *J. Biomech. E.*, **123**(6): 540-547.
43. Xu, J., J.J. Heys, V.H. Barocas, and T.W. Randolph (1999). "Permeability and Diffusion in Vitreous Humor: Implications for Drug Delivery." *Pharmaceut. Res.*, **17**(6): 664-669
44. Heys, J. and V.H. Barocas (1998). "Mechanical Characterization of the Bovine Iris." *J. Biomech.*, **32**: 999-1003

Archived National Conference Proceedings (Peer Reviewed)

1. Heys, J.J., "An Open Source Approach to Numerical Methods in Engineering", ASEE PNW Regional Meeting, Boise, ID, April 2016
2. Richards, A. and Heys, J.J., "An Analysis of Factors Impacting Retention and Student Success in Chemical and Biological Engineering at Montana State University", ASEE PNW Regional Meeting, Portland, OR, March 2012
3. Heys, J.J., "Chemical Engineering Problem Solving: How Important is Persistence?", ASEE Annual Meeting, Vancouver, Canada, June 2011.
4. Gedeon, T., J.J. Heys, B.C. Knott, and J. Mulder-Rosi, "Modeling Insect Filiform Hair Motion Using the Penalty Immersed Boundary Method." Proceedings of IMECE 2007, ASME, Seattle, Washington.
5. Heys, J.J., C.G. DeGross, W.W. Orlando, T.M. Manteuffel, and S.F. McCormick, (2002) "First-Order System Least Squares for Elastohydrodynamics with Application to Flow in Compliant Blood Vessels." *Biomed. Sci. Instr.*, **38**:277-282
6. Barocas, V.H., E.C. Haug, and J.J. Heys (2003) "Aqueous Humor and Iris Mechanics in Synechial vs. Appositional Contact in Primary Angle-Closure Glaucoma." *Inv. Ophthalmol. Vis. Sci.*, **44**: S3426
7. Heys, J.J. and V.H. Barocas (2002) "Free Convection in Aqueous Humor and the Krukenberg Spindle: Theoretical Analysis." *Inv. Ophthalmol. Vis. Sci.*, **43**: S3285.
8. Barocas, V. H. and J.J. Heys (2001) "Computer Simulation of Passive Iris Deformation During Blinking and Accommodation." *Inv. Ophthalmol. Vis. Sci.*, **42**: S3563
9. May, M.J., V.H. Barocas, J.J. Heys, and M.J. Taravella (2000) "Mathematical Modeling of Aqueous Humor Dynamics." *Inv. Ophthalmol. Vis. Sci.*, **41**: S505

Books

1. Heys, J.J., (2017) "Chemical and Biological Engineering Calculations using Python." First Edition, John Wiley & Sons, Hoboken, NJ, ISBN: 9781119246930

Book Chapters

1. Schepens, D., Beck, A.E., Heys, J.J., Gedeon, T., Carlson, R.P. (2017) The Benefits of Resource Partitioning and Division of Labor in Microbial Consortia. *Advances in Systems and Synthetic Biology*. (editors P. Amar, F. Kepes, V. Norris) EDP Sciences Publishing. pp. 137-148. ISBN 978-2-7598-2116-7

Other Archived Publications

1. Heys, J.J., Richards, A.M., and Seymour, J., (2016) "Chemical Engineering at Montana State University." *Chem. Eng. Educ.*, **50**(1): 76-83

Conference Presentations (Speaker in Bold)

1. **C. Wiley** and J.J. Heys, "Modelling and Optimization of Selective Hyperthermia Using Gold Nanorods", Student Research Celebration, Montana State University, April 2016
2. **J.J. Heys** and P.K. Rajaraman, "A New Computationally Efficient Data Assimilation Approach for Finite Element Models.", AIChE Annual Meeting, Salt Lake City, UT, Nov. 2015
3. R. Urie, **K. Rege**, M. Jaffe, **J. J. Heys**, M. Mushaben, and Tanner Flake, "Spatiotemporal Modeling of Laser Tissue Welding of Plasmonic Nanoparticles.", AIChE Annual Meeting, Salt Lake City, UT, Nov. 2015
4. **J.J. Heys** and P.K. Rajaraman, "Echocardiographic Particle Image Velocimetry Data Assimilation using Weighted Least-Squares FEM", ICES/USACM Workshop on Minimum Residual and Least Squares Finite Element Methods, Austin, TX, Nov. 2013
5. **J.J. Heys** and P.K. Rajaraman, "Weighted Least-Square Finite Element Methods for PIV Data Assimilation", 4th International Congress on Computational Engineering and Sciences, Las Vegas, NV, May, 2013
6. **J.J. Heys** and P.K. Rajaraman, "Simulation of Nanoparticle Transport In Airways Using Petrov-Galerkin Finite Element Methods", AIChE Annual Meeting, Pittsburgh, PA, October, 2012
7. **J.J. Heys**, "What is Calculus Used For?", TEDxBozeman, Bozeman, MT, March 2012
8. **J.J. Heys**, G.D. Vo, P. Rajaraman, and G. Hansen, "Comparison of Continuous and Discontinuous Galerkin Finite Element Methods for Parabolic Differential Equations", Copper Mountain Iterative Methods Conference, Copper Mountain Colorado, March. 2012
9. **J.J. Heys**, B. Vadheim, and G.D. Vo, "Modeling Fluid Structure Interactions with Application to Biofilms", AIChE Annual Meeting, Minneapolis, MN, Oct. 2011
10. **J.J. Heys**, B. Vadheim, and G.D. Vo "Immersed Boundary Model of Biofilm Deformation and Detachment in Response to Fluid Flow", Montana Biofilm Science & Technology Meeting, Bozeman, MT, July 2011
11. **J.J. Heys**, G.D. Vo, G. Hansen, "Implicit Discontinuous Galerkin Methods for Parabolic Problems", FEMTEC 2011, Reno, NV, May 2011.
12. **G. Vo** and J.J. Heys, "On the Use of Limiters and Filters in the Discontinuous Galerkin Method for Burgers' Equation", ASME Graduate Students Technical Conference, Cheney, Washington, April 2011.
13. **H.-C. Huang**, J. Ramos, S. Barua, J. J. Heys, K. Rege, "Polymer-Coated-Gold Nanorods for Administration of Extracellular Hyperthermia and Delivery of Nucleic Acids to Cancer Cells", AIChE 2010 Annual Meeting, Salt Lake City, UT, Nov. 2010.
14. **J.J. Heys**, J. Johnson, H.-C. Huang, and K. Rege, "Spatiotemporal Temperature Distribution and Cancer Cell Death in Response to Extracellular Hyperthermia Induced by Gold Nanorods", AIChE 2010 Annual Meeting, Salt Lake City, UT, Nov. 2010.
15. **J.C. Adams**, P. Jiamsripong, M. Belohlavek, J.J. Heys, and E.M. McMahon, "Doppler and Catheter Gradient Discrepancies in Aortic Stenosis: Potential Role of Reynolds Number", 1^{5th} World Congress on Heart Disease, Vancouver, BC, Canada, July 2010.
16. **J.J. Heys**, G. Vo, and I. Klapper, "An Experimentally Validated Immersed Biofilm Model", Montana Biofilm Science & Technology Meeting, Bozeman, MT, July 2009
17. **J.J. Heys**, "Algebraic Multigrid Solvers for Weighted Least-Squares Finite Elements with Application to Particle Imaging Velocimetry Analysis", Copper Mountain Algebraic Multigrid Conference, Copper Mountain, CO, Mar. 2009

18. **Wininger, C.W.**, and J.J. Heys, "Eulerian Particle Tracking in Bifurcating Biofluids." AICHE 2008 Annual Meeting, Philadelphia, PA, Nov. 2008
19. **J.P. Miller**, T. Gedeon, and J.J. Heys, "A Model for the Development of Filiform Hair Distribution on the Cricket Cercus." Principal Investigator Meeting: Collaborative Research in Computational Neuroscience, Univ. of Southern Cal., June 2008
20. **J.J. Heys**, C.W. Wininger, and M.L. Witten, "Spectral Element Simulation of Pulmonary Drug Delivery." Design of Medical Devices Conference, Minneapolis, Minnesota, Apr. 2008
21. **J.J. Heys**, "Group Projects in Engineering Using a Wiki." American Society of Engineering Education: Pacific-Southwest Regional Conference, Flagstaff, Arizona, Mar. 2008
22. **Merchant, B.B.**, and J.J. Heys, "Effects of Porous Connective Tissue Heterogeneity on Aqueous Humor Outflow." AICHE 2007 Annual Meeting, Salt Lake City, Utah, Nov. 2007
23. **Wininger, C.W.**, and J.J. Heys, "Spectral Element Method For Particle Deposition Patterns In The Human Upper Airway." AICHE 2007 Annual Meeting, Salt Lake City, Utah, Nov. 2007
24. **J.J. Heys**, E. Lee, T.A. Manteuffel, and S.F. McCormick, "Alternative Least-Squares Formulations and Mass Conservation for the Navier-Stokes Equations." Finite Elements in Flows, Santa Fe, NM, March 2007
25. **B. Knott** and J.J. Heys, "Modeling the Motion of Cricket Filiform Hairs." AICHE Rocky Mountain Regional Student Conference, Tempe, AZ, March 2007 (*received 2nd best presentation award)
26. **J.J. Heys**, E. Lee, T.A. Manteuffel, and S.F. McCormick, "Improving Mass-Conservation of Least-Squares Finite Element Methods." World Congress on Computation Mechanics, Los Angeles, CA, July 2006
27. **J.J. Heys**, E. Lee, T.A. Manteuffel, and S.F. McCormick, "Improving Mass-Conservation of Least-Squares Finite Element Methods." Copper Mountain Iterative Methods Conference, Copper Mountain, Colorado, Apr. 2006
28. **L.N. Olson**, J.J. Heys, T.A. Manteuffel, and S.F. McCormick, "Algebraic Multigrid (AMG) For Higher-Order Finite Elements." Copper Mountain Multigrid Conference, Copper Mountain, Colorado, Apr. 2005.
29. **J.J. Heys**, T.A. Manteuffel, and S.F. McCormick. "Modeling Fluid-Elastic Interaction in 3-D with Algebraic Multigrid (AMG)." Third DOE Workshop on Multiscale Mathematics. Portland, Oregon, Sept. 2004
30. **J.J. Heys**, C.G. DeGroat, T.A. Manteuffel, S.F. McCormick, and H. Tufo. "Modeling 3-D Compliant Blood Flow with FOSLS." 41st Rocky Mountain Bioengineering Symposium. Fort Collins, Colorado, April 2004.
31. **J.J. Heys**, T.A. Manteuffel, and S.F. McCormick. "Modeling Fluid-Elastic Interaction in 3-D with First-Order Systems Least Squares (FOSLS)." Copper Mountain Conference on Iterative Methods. Copper Mountain Colorado. April 2004.
32. **J.J. Heys**, T.A. Manteuffel, and S.F. McCormick. "First-Order System Least Squares (FOSLS) and AMG for Fluid-Elastic Problems." 11th Copper Mountain Conference on Multigrid Methods. Copper Mountain Colorado. April 2003.
33. **J.J. Heys**, C. DeGroat, W. Orlando, T.A. Manteuffel, S.F. McCormick. "First-Order System Least Squares for Elastohydrodynamics with Application to Flow in Compliant Blood Vessels." 39th Annual Rocky Mountain Bioengineering Symposium. Copper Mountain Colorado. April 2002.
34. **J.J. Heys**, V.H. Barocas, M.J. May, and M.J. Taravella, "Modeling Passive Iris Deformation with Application to Pigmentary Glaucoma." Biomedical Engineering Society National Meeting, Seattle, WA. October 2000.
35. **J.J. Heys** and V.H. Barocas, "Role of Blinking in Pigmentary Glaucoma." AICHE National Meeting, Dallas, TX.

November 1999.

36. **J.J. Heys** and V.H. Barocas, "Mathematical Modeling of Fluid Mechanics in the Eye." Twelfth Annual Colorado Biotechnology Symposium, Boulder, CO. September 1999.
37. Heys, J.J., **V.H. Barocas**, and M.J. Taravella, "Mathematical Modeling of Eye Dynamics" AIChE National Meeting, Miami, FL. November 1998.
38. **J.J. Heys** and V.H. Barocas, "Mathematical Modeling of Fluid Dynamics in the Eye." 28th Annual Biochemical Engineering Symposium, Ames, IA. October 1998.
39. **V.H. Barocas**, J.J. Heys, and M.J. Taravella, "Contribution of Aqueous Humor Flow to Iris Displacement in Pigmentary Dispersion Syndrome." AIChE National Meeting, Los Angeles, CA. November 1997.
40. **V.H. Barocas**, J.J. Heys, and M.J. Taravella, "Finite Element Simulation of Aqueous Humor Flow." US National Congress on Computational Mechanics, San Francisco, CA. August 1997.

Invited Presentations

1. L. Ray, J. Iliff, and J.J. Heys, "Analysis of Convective and Diffusive Transport in the Brain Interstitium", Oregon Health Sciences University Seminar, June, 2018
2. J.J. Heys, "Finite Element Methods for Assimilation of PIV Data", Chemical Engineering Graduate Seminar, Arizona State University, November, 2014
3. P.K. Rajaraman and J.J. Heys, "Improved Models through Data", Applied Mathematics Seminar, University of Colorado at Boulder, Oct. 2014
4. J.J. Heys and P.K. Rajaraman, "Better Models Through Data? Echocardiographic Particle Image Velocimetry Data Assimilation using Weighted Least-Squares FEM." MSU College of Engineering seminar, Nov. 2014
5. J.J. Heys, "Modeling of Heat Transport and Cell Death Using Gold Nanorods", Applied Mathematics Seminar, Montana State University, March, 2014
6. P.K. Rajaraman and J.J. Heys, "Weighted Least-Squares Finite Element Methods for Data Assimilation", Applied Mathematics Seminar, University of Colorado at Boulder, June, 2013
7. P.K. Rajaraman and J.J. Heys, "Simulation of Nanoparticles Transport in Airways Using Petrov-Galerkin Finite Element Methods", Applied Mathematics Seminar, Montana State University, October, 2012
8. J.J. Heys, G.D. Vo, P. Rajaraman, and G. Hansen, "Comparison of Continuous and Discontinuous Galerkin Finite Element Methods for Parabolic Differential Equations", Applied Mathematics Seminar, Montana State University, March, 2012
9. J.J. Heys, "Coupling of Fluid Flow and Biological Materials", Physics Colloquium, Montana State University, November, 2011
10. J.J. Heys, "Mathematical Simulation of Two Biological Systems", Computational Mathematics Seminar, University of Colorado at Boulder, November, 2011
11. J.J. Heys, "Applications of Computational Fluid Dynamics to Biological System", South Dakota School of Mines and Technology, Dept. of Chemical Engineering Seminar, Rapid City, SD, April 2011
12. J.J. Heys, "Applications of Computational Fluid Dynamics to Biofilms and Other Biological Systems", Center for Biofilm Engineering Seminar, Montana State University, March, 2011

13. J.J. Heys, "Coupling of Fluid Flow and Biological Materials", Applied Mathematics Seminar, Montana State University, Nov. 2010
14. J.J. Heys, "Two Examples of the Mathematical Modeling of Biological Systems", Multiphysics Seminar, Idaho National Laboratory, Idaho Falls, Idaho, Feb. 2010
15. J.J. Heys, G. Vo, and I. Klapper, "Modeling Fluid Structure Interactions with Application to Biofilms", Computational Mathematics Seminar, University of Colorado at Boulder, Nov. 2009
16. J.J. Heys, "Computational Fluid Dynamics Applied to Blood Flow." Mayo Clinic Visiting Seminar Speaker, Mayo Clinic Scottsdale, Arizona, Feb. 12, 2009
17. J.J. Heys, "Numerical Issues in the Modeling of Biological Fluid Flows." Applied Mathematics Seminar, Montana State University, Oct. 30, 2008
18. J.J. Heys, "Applications of Computational Biofluid Dynamics", University of Oklahoma, Department of Chemical Engineering Seminar, Norman, OK, Sept. 11, 2008
19. J.J. Heys, "Spatial Variation in Drug Delivery", Pfizer Pharmaceuticals Seminar, San Diego, CA May 22, 2008.
20. J.J. Heys, "Numerical Issues in the Modeling of Biological Fluid Flows." Los Alamos National Laboratory T7 Division Seminar, Los Alamos, New Mexico, May 20, 2005.
21. J.J. Heys, "Modeling Coupled Fluid/Elastic Systems with FOSLS and Earlier Lessons." ASU Bioengineering Seminar, Sept. 22, 2005
22. J.J. Heys, "Numerical Issues in the Modeling of Biological Fluid Flows." ASU Computational Mathematics Seminar, Oct. 2005
23. J.J. Heys, "Problems in Search of a Good Mathematician." Computational Mathematics Seminar, Boulder, Colorado, Feb. 2005.
24. J.J. Heys, T.A. Manteuffel, S.F. McCormick. "Numerical Issues When Modeling Fluid-Elastic Interaction in 3-D with First-Order Systems Least Squares." Lawrence Livermore National Laboratory, invited talk, May 2004.
25. J.J. Heys, "Mathematical Modeling of Elastohydrodynamic Systems - Application to the Eye and Blood Flow." Center for Aerospace Structures Seminar, University of Colorado at Boulder. March 2002.

Poster Presentations

1. Schepens, D., A.E. Beck, **J.J. Heys**, T. Gedeon, and R.P. Carlson, "The Benefits of Resource Partitioning and Division of Labor in Biofilm Based Microbial Consortia." AIChE Annual Meeting, Minneapolis, MN, Oct. 2017
2. **R. Urie**, K. Rege, M. Jaffe, J. J. Heys, M. Mushaben, and Tanner Flake, "Plasmonic Nanocomposites for Laser Tissue Welding with Spatiotemporal Modeling." AIChE Annual Meeting, Salt Lake City, UT, Nov. 2015
3. **J. Gosney** and J.J. Heys, "Force Analysis of Microbubble Complexes in the Vascular System", McNair Scholars Poster Session, April, 2013.
4. **A. Bleem**, E. Harvey, H.C. Bernstein, R.P. Carlson, and J. Heys, "Theoretical and Experimental Analysis of a Synthetic Escherichia coli Consortium Engineered for Enhanced Biomass Productivity", NIH-NISBRE Biannual Meeting, Washington DC, June. 2012
5. T. Gedeon, G. Cummins, and **J.J. Heys**, "Effect of Model Selection on Prediction of Periodic Behavior in Gene Regulatory Networks", NIH-NISBRE Biannual Meeting, Washington DC, June. 2012

6. **G. Vo** and J.J. Heys, "Discontinuous Galerkin Methods for Implicit Parabolic Differential Equations", ASME Annual Meeting, Denver, CO, Nov. 2011
7. **B. Vadheim** and J.J. Heys, "Impact of Biofilm Structure on Biofilm-Fluid Interactions", Montana Biofilm Meeting, Bozeman, MT, Feb. 2011
8. **E. D. Gordon** and J.J. Heys, "Using the Penalty Immersed Boundary Method to Model the Interaction of Filiform Hairs On Crickets", AIChE 2010 Annual Meeting, Salt Lake City, UT, Nov. 2010.
9. **H.-C. Huang**, J. Ramos, S. Barua, J. J. Heys and K. Rege, "Polymer-Coated-Gold Nanorods for Administration of Extracellular Hyperthermia and Delivery of Nucleic Acids to Cancer Cells", AIChE 2010 Annual Meeting, Salt Lake City, UT, Nov. 2010.
10. **F. Wei** and J.J. Heys, "Weighted Least-Square Finite Element Methods for PIV Data Assimilation", AIChE 2010 Annual Meeting, Salt Lake City, UT, Nov. 2010.
11. **J.J. Heys**, C.W. Wininger, and M. Witten, "Simulation of Second Hand Smoke Deposition in the Airways." FAMRI Scientific Symposium, Miami, FL. May 2010
12. **G. Vo** and J.J. Heys, "Simulation of Biofilm-Fluid Interaction", NCUR Conference, Missoula, MT, April 2010
13. **N. Holyoak**, J.J. Heys, "Simulation of Particle Deposition in the Human Airways Using OpenFOAM" Undergraduate Scholars Program, Bozeman, MT, April 2010
14. **G. Vo** and J.J. Heys, "Simulation of Biofilm-Fluid Interaction", Montana Biofilm Meeting, Bozeman, MT, Feb, 2010
15. **J.J. Heys**, C.W. Wininger, and M. Witten, "Simulation of Second Hand Smoke Deposition in the Airways." FAMRI Scientific Symposium, Boston, MA. May 2009
16. **N. Holyoak**, J.J. Heys, "Improved Evaluation of Valvular Stenosis" Undergraduate Scholars Program Capital Presentation, Capital Rotunda, Helena, MT, April 2009
17. **J.J. Heys**, C.W. Wininger, and M. Witten, "Simulation of Second Hand Smoke Deposition in the Airways." FAMRI Scientific Symposium, Boston, MA. May 2008
18. **S. Kubinski** and J.J. Heys, "Analysis of Alternative Propulsion Methods", Fulton Undergraduate Research Symposium, Apr. 2008
19. **J.J. Heys** and M. Witten, "Simulation of Second Hand Smoke Deposition in the Airways." FAMRI Scientific Symposium, Miami, FL. May 2007
20. **B. Knott** and J.J. Heys, "Modeling the Motion of Cricket Filiform Hairs.", Fulton Undergraduate Research Symposium, Nov. 2006
21. **R. McLemore**, M.C. Preul, J.J. Heys, B. Vernon, "Controlling Delivery of In Situ Forming Gels through study of Time Variant Properties", Western Biomedical Engineering Conference, Phoenix, AZ, Nov. 2006
22. **J.J. Heys** and M. Witten, "Simulation of Second Hand Smoke Deposition in the Airways." FAMRI Scientific Symposium, Boston, MA. May 2006
23. **J.J. Heys**, "Learner Centered Education in Fluid Dynamics." LCE Spring Retreat, Tempe, AZ. May 2006
24. **B. Knott** and J.J. Heys, "Least-Squares Finite Element Methods in Computational Fluid Dynamics.", Fulton Undergraduate Research Symposium, April 2006

25. **J. Gemmell** and J.J. Heys, "Digital Airflow in the Lungs.", Fulton Undergraduate Research Symposium, April 2006
26. **B. Merchant** and J.J. Heys, "Modeling Aqueous Humor Flow In The Trabecular Meshwork." Summer Bioengineering Symposium, Vail, CO. June 2005
27. **J.J. Heys**, T.A. Manteuffel, and S.F. McCormick. "First-Order System Least Squares (FOSLS) for Modeling Flow in Compliant Blood Vessels." Colorado Alliance for Bioengineering BioExpo. Colorado Institute of Technology. December 2002.
28. **J.J. Heys**, T.A. Manteuffel, and S.F. McCormick. "First-Order System Least Squares (FOSLS) for Modeling Flow in Compliant Blood Vessels." Butcher Symposium on Genomics and Biotechnology. Denver, CO. November 2002.
29. J.J. Heys and **V.H. Barocas**, "Modeling of Passive Iris Deformation during Accommodation." ASME/AICHE Summer Bioengineering Conference, Snowbird, UT. June 2001.
30. **M.J. May**, J.J. Heys, V.H. Barocas, and M.J. Taravella, "Mathematical Modeling of Aqueous Humor Dynamics." ARVO Annual Meeting, Ft. Lauderdale, FL, May 2000.
31. **J.J. Heys**, M.J. Taravella, and V.H. Barocas, "Biomechanics of the Aqueous Humor and Iris in Pigmentary Glaucoma." ASME/AICHE Summer Bioengineering Conference, Big Sky, MT. June 1999.
32. **J.J. Heys** and V.H. Barocas, "Mathematical Modeling of Fluid Mechanics in the Eye." Eleventh Annual Colorado Biotechnology Symposium, Fort Collins, CO. September 1998
33. **J.J. Heys** and V.H. Barocas, "Mathematical Modeling of Fluid Mechanics in the Eye." AAAS Southwestern and Rocky Mountain Division Meeting, Grand Junction, CO. May 1998

Student Theses and Dissertations Supervised

Current Graduate Projects in Progress

Ray, Lori, project on biological systems modeling initiating summer of 2016, PhD expected in 2019

Former Graduate Students

Akar, Burak, Optimization of nanoparticle kinetics for ionizing radiation dose measurement, MS 2017

Madrid, Ashley Research on biological treatment of mine waste water, MS 2017, co-adviser

Rajaraman, Prathish Project on data assimilation using Least-Squares Finite Element Methods, PhD 2016; Project on stabilized finite elements for particle deposition simulation in the human airways, MS 2012

Salinas, Daniel Project on noise in microbial dynamical systems models and metabolic network analysis, MS 2013

Vo, Garrett Project on comparison of continuous and discontinuous Galerkin methods for parabolic PDEs, MS 2012

Wei, Fei Project on computational fluid dynamics with PIV data assimilation using least-squares finite element methods, MS 2011

Gordon, Eric Project on immersed boundary simulation of the cricket sensory system and micro-flow sensors, MS 2011

Merchant, Bradley Project on flow through the trabecular meshwork, MS 2007

Wininger, Clinton Project on particle deposition in the human airways, MS 2008

Undergraduate Research Supervised

Johnson, Timothy, Inhibition kinetics of microbial consortia, 2016-2017

Lima Salles de Souza, Caroline, Microbial cooperation modeling in biofilms, 2017

Dalke, Riley, New computational paradigms for chemical engineering education, 2017

Vanaclocha-Saiz, Maria, Finite Element Analysis of Sacroiliac Prosthetic, BS Thesis, 2016

Christopher, Wiley, Optimization of heat shock inhibition, 2015

Mushaben, Madaline, Effects of reaction kinetics in laser tissue welding, 2015

Venters, Michael, Spatial segregation and diffusivity in microbial communities, 2015

Selenis, Rachel, Effects of segregation on microbial consortia growth, 2015

Akar, Burak, Simulation of gold nanoparticle synthesis, 2014

Vigers, Michael, Optimized laser tissue welding algorithm, 2014

Tosun, Kubra, Implemented a model of laser tissue welding in FEniCS, 2013

Gosney, Joshua, Developed a model of drag on attached microbubbles, 2013-2014

Vadheim, Bryan, Research on biofilm detachment models, 2011

Aisenbrey, Elizabeth, Development of edge detection algorithms for airway MRI, 2010-2011

Williamson, Nathan, Research on high-order particle deposition modeling, 2010

Johnson, Jason, Research on hyperthermal cancer treatment with GNRs, 2009-2010

Hu, James, Undergraduate researcher on hyperthermal cancer treatment with GNRs, 2009-2010

Zeller Schmid, Undergraduate researcher on Viscoelastic Models of Cricket Flow Sensor, 2008-2009

Travis Harrer, Undergraduate researcher on Immersed Particle Method for Biofilms, 2009

Nicole Holyoak, Undergraduate Scholars Program, Flow Through the Aortic Valve, 2008-2009

Garret Vo, Undergraduate researcher on Immersed Boundary Methods for Biofilms, 2008-2009

Sorensen, Kimberly Undergraduate researcher on Flow Through the Aortic Valve, 2008

Lenzi, Jacob Undergraduate researcher on Analysis of PIV data in the Left Ventricle, 2008

Kubinski, Susan Fulton Undergraduate Researcher on Car Propulsion, 2007-2008

Jasper-Duruzor, Afam Undergraduate researcher on Analysis of PIV data in the Left Ventricle, 2007

Knott, Brandon Fulton Undergraduate Researcher on Least-squares finite element methods, 2006

Gemmel, Joshua Undergraduate researcher on mesh generation of bifurcating geometries, 2006

Abell, Benjamin Undergraduate researcher on finite elements with distributed computers, 2004

Nolting, Josh VIGRE undergraduate researcher. 2002-2003.

Ramirez, Pete Independent Study, Spring, 2000.

Garcia, Janet SMART summer intern program, 1999. Final report: "Building the Square Eye."

Martien, Leslie Employed as an hourly student research assistant in 1999
McCormick, Dan Employed as an hourly student research assistant in 1998-1999.
Koch, Nathan Employed as an hourly student research assistant in 1997-1998.
Frazier, Christine E. SMART summer student, 1997. Final report: "Biomechanics of the Bovine Eye."

Postdoctoral Research Supervised

Harvey, Emily, Analyzed models of microbial consortia, 2012-2013
Cummins, Graham, Analyzed the impact of RNA production on feedback networks, 2011

Graduate Student Committees (past 4 years)

Diana Schepens, member, Mathematics
Barkan Sidar, member, Chemical Engineering
Neerja Zambare, member, Chemical Engineering
Ashley Beck, member, Microbiology
Reed Taffs, member, Chemical Engineering
Daniel Kanewske, member, Mathematics
Kristopher Hunt, member, Chemical Engineering
Mehmet Kiris, member, Chemical Engineering

Teaching Evaluations

Course	Semester	# Students	Instructor Avg.	Course Avg.
ChE 527: Adv. Appl. Math. Anal. in ChE	Fall, 2004	9	4.70/5.0	4.35/5.0
ChE 331: Transport Phenomena I: Fluids	Spring, 2005	36	4.86/5.0	4.31/5.0
ChE 591: Graduate Seminar	Spring, 2005	21	4.83/5.0	4.64/5.0
ChE 311: Introduction to Chemical Proc.	Fall, 2005	40	4.61/5.0	4.19/5.0
ChE 331: Transport Phenomena I: Fluids	Spring, 2006	36	4.86/5.0	4.51/5.0
ChE 211: Introduction to Chemical Proc.	Fall, 2006	70	4.71/5.0	4.34/5.0
ChE 527: Adv. Appl. Math. Anal. In ChE	Fall, 2006	15	4.78/5.0	4.54/5.0
ChE 494: ChemE Car	Spr, 2007	15	4.94/5.0	4.71/5.0
ChE 211: Introduction to Chemical Proc.	Fall, 2007	68	4.74/5.0	4.30/5.0
ASU 101: The ASU Experience	Fall, 2007	19	NA	NA
ChE 231: Transport Phenomena I: Fluids	Spring, 2008	59	4.88/5.0	4.36/5.0
CHBE 215: Elementary Principles I	Fall, 2008	55	6.45/7.0	6.46/7.0
CHBE 323: Mass Transfer Operations	Spring, 2009	32	5.25/7.0	5.29/7.0
CHBE 215: Mass Transfer Operations	Fall, 2009	64	6.28/7.0	6.20/7.0
CHBE 442: CHBE Laboratory I	Fall, 2009	30	6.42/7.0	6.42/7.0
CHBE 323: Mass Transfer Operations	Spring, 2010	45	6.0/7.0	6.24/7.0
CHBE 215: Elementary Principles	Fall, 2010	70	3.57/4.0	3.63/4.0
CHBE 442: CHBE Laboratory I	Fall, 2010	38	3.75/4.0	3.69/4.0
CHBE 461: BIOE Laboratory I	Fall, 2010	1	NA	NA
CHBE 323: Mass Transfer Operations	Spring, 2011	51	3.31/4.0	3.28/4.0
CHBE 510: Advanced Reactor Design	Spring, 2011	12	3.60/4.0	3.64/4.0
ECHM 215: Elementary Principles	Fall, 2011	125	3.47/4.0	3.52/4.0
ECHM 442: CHBE Laboratory I	Fall, 2011	51	3.62/4.0	3.5/4.0
ECHM 323: Mass Transfer Operations	Spring, 2012	51	3.34/4.0	3.38/4.0
ECHM 451: Process Dynamics & Control	Spring, 2012	70	3.64/4.0	3.66/4.0
ECHM 215: Elementary Principles	Fall, 2012	145	3.56/4.0	3.5/4.0
ECHM 442: CHBE Laboratory I	Fall, 2012	55	3.52/4.0	3.45/4.0
ECHM 510: Advanced Reactor Design	Spring, 2013	10	3.13/4.0	3.0/4.0
ECHM 451: Process Dynamics & Control	Spring, 2013	72	3.63/4.0	3.55/4.0
ECHM 215: Elementary Principles	Fall, 2013	147	3.26/4.0	3.32/4.0
ECHM/EBIO 442: CHBE Laboratory I	Fall, 2013	71	3.56/4.0	3.49/4.0
ECHM 451: Process Dynamics & Control	Spring, 2014	70	3.63/4.0	3.63/4.0
ECHM 201: Elementary Principles	Fall, 2014	137	4.12/5.0	4.13/5.0
ECHM/EBIO 442: CHBE Laboratory I	Fall, 2014	104	4.28/5.0	4.43/5.0
ECHM 451: Process Dynamics & Control	Spring, 2015	102	3.51/4.0	3.55/4.0

EGEN 102: Engineering Computations	Spring, 2015	143	3.71/4.0	3.19/4.0
ECHM 201: Elementary Principles	Fall, 2015	141	3.3/4.0	3.4/4.0
EGEN 102: Engineering Computations	Spring, 2016	175	3.0/4.0	2.7/4.0
ECHM 323: Mass Transfer Operations	Spring, 2016	92	3.4/4.0	3.6/4.0
ECHM 451: Process Dynamics & Control	Spring, 2016	108	3.6/4.0	3.7/4.0
EBIO 411: Biological Engineering Design	Fall, 2016	18	3.6/4.0	3.5/4.0
ECHM 451: Process Dynamics & Control	Spring, 2017	110	3.3/4.0	3.3/4.0
EBIO 412: Biological Engineering Design 2	Spring, 2017	17	3.5/4.0	3.5/4.0
EGEN 102: Engineering Computations	Spring, 2017	165	3.4/4.0	3.3/4.0
EGEN 102: Engineering Computations	Fall, 2017	45		
EGEN 102: Engineering Computations	Spring, 2018	130		

Other Courses Taught

- Numerical Analysis I, Fall, 2003 and Numerical Analysis II, Spring, 2004 - 40 students.
- Scientific Computing, Spring 2002. Taught within a computer lab setting - 13 students.
- Calculus for Engineers I, Fall, 2001; Fall, 2002; Spring, 2003; 75-150 students.

Professional and Scientific Service

Scientific and Professional Society Memberships

American Institute of Chemical Engineers – member
Biomedical Engineering Society – member
American Society of Engineering Education – member
American Association for the Advancement Science - member

Conference Activities

Session Chair: 85th Annual Pacific Northwest ASEE Conference, Boise, ID, April, 2016
Session Chair: 4th International Congress on Computational Engineering and Sciences, Las Vegas, NV, May, 2013
Session Chair: Advances in Numerical Methods for Transport Phenomena, AIChE Annual Meeting, October, 2012
Session Chair: Focus on Capstone Experiences in the Chemical Engineering Curriculum, ASEE Annual Meeting, June, 2011
Session Chair: Mathematical and Computational Biosystems Engineering I and II, AIChE National Meeting, November, 2008
Session Chair: Applied Mathematics in Energy and the Environment, AIChE National Meeting, November, 2008
Session Chair: Advances in Computational Methods and Numerical Analysis Session, AIChE National Meeting, November, 2007
Session Chair: FOSLS Methods, Copper Mountain Iterative Methods Conference, March, 2006
Submission Reviewer: Summer Bioengineering Conference, 2010, 2011
Student Poster Competition Judge, AIChE National Meeting, 2008, 2011

Journal Referee Service

Journal of the Royal Society Interface
Journal of Biotechnology
Experimental Thermal and Fluid Science
Journal of Computational Physics
Applied Numerical Mathematics
Journal of Biomechanical Engineering
Computer Methods and Programs in Biomedicine
International Journal of Mathematics and Mathematical Sciences
SIAM Journal on Scientific Computing
Electronic Transactions on Numerical Analysis
Applications and Applied Mathematics
ACS Nano
Computers in Biology and Medicine
SIAM Journal on Numerical Analysis
Engineering in Life Sciences
PLoS One
Medical & Biological Engineering
Nanomaterials
(In total, >65 papers reviewed)

Mathematical Reviews Authored (brief reviews of published articles with byline)

>60 articles reviewed
3 books reviewed

Proposal Review Service

National Science Foundation (7 review panels – CBET and GRFP)
Department of Energy (2 review panels)
Department of Defense
Stanford Synchrotron Radiation Lightsource
Romanian National Council for Scientific Research

Arizona State University Committee Service

University Committees

Academic Senate (2007-2008)

College Committees

Committee of Review (2006-2008)

Department Committees

Graduate Student seminar (spring, 2005)

Graduate Student Affairs committee (2005-2008)

AICHE faculty advisor (2004-2008)

Faculty Search Committee (spring, 2007)

Faculty Search Committee (spring, 2008)

Undergraduate Student Affairs committee (2006-2008)

Montana State University Committee Service

University Committees

Presidential Scholarship Selection Committee (2014-present)

Center for Computational Biology Visioning Committee (2011)

ADVANCE Grant Coordinator Search Committee (2012)

Rapid Action Task Force for VPR (2013)

P&T Revision Task Force (2014-2015)

Update Budget Committee (2014-2015)

College Committees

Curriculum Renewal Committee (2014-2015)

Strategic Planning Committee (2008-2012)

CFAC Committee (2010-present)

Committee on Grievance Hearings (2010-2014)

Faculty Development Advisory Committee (chair, 2012-present)

COE Dean Search Committee (2013)

Scholarship Committee (2013-present)

Department Committees

Promotion and Tenure Committee (2010-2011)

Undergraduate Scholarship Committee (2009-present)

ABET coordinator (2009-present)

Administrative Assistant Search Committee (2012)

Community Service

Family Promise of the Gallatin Valley (2010-present) – volunteer

Bozeman Daily Chronicle Editorial Board (2012-2013) – community member