UNIVERSITY OF WYOMING

College of Arts and Sciences
Dept. 3254• 1000 E. University Avenue• Room 114, A&S Building • Laramie, WY 82071
Phone (307) 766-4106 • fax (307) 766-2697 • e-mail: asdean@uwyo.edu • www.uwyo.edu/as

8 September 2016

MEMO

TO: Kate Miller
Provost/VPAA

FROM: Paula M. Lutz
Dean, Arts and Sciences

RE: Program Review for Math M.S.—Dean's recommendation

There have been twenty-four M.S. degrees in Math in the last five years. The M.S. curriculum is the first two years of the Ph.D. program. It is occasionally a 'fall-back' degree but much more often serves as a benchmark on the way to the Ph.D. in this discipline. However, not all students stop and earn the M.S. on the way to the Ph.D., a situation which the department is about to rectify.

Recent emphasis on Ph.D. education in the department has resulted in Math's ranking with Chemistry, Psychology, and Zoology & Physiology in the top echelon of Ph.D.-producing departments in A&S. In addition to this increased emphasis on graduate education, faculty research output has also been on the rise. Publications and prestigious fellowships have increased in number. They are also interested in increased participation in their upper division and graduate courses by attracting graduate students from outside Math and are reviewing their curriculum to that end.

Math makes a huge contribution to the teaching mission of A&S and UW. They teach ~19,000 SCH's per year, supplying the Q USP requirement as well as other foundational courses for the campus. Their GA's are a critical component of their instruction. A strong math graduate program (and therefore strong GA's) across both the M.S. and Ph.D. are important to student success.

No cost savings would result from terminating this degree. With the department's decision to have all Ph.D. students earn the M.S. as they proceed through the program, these M.S. numbers will increase. **The dean's recommendation is to maintain the M.S. degree.**

Academic Program Review: Math Master Program (2010-2015)

Program Demand

a. 24 (OIA).
b. Enrollment (OIA): 12-6-4-4-5

Program Quality

Accreditation/Previous APR: N/A

Credentials of Faculty:

Faculty and Lecturer List (Note: Former faculty and lecturers from 2010-2015 are listed in italics. Dr. Quade joins the department in fall 2016.)

1. Myron Allen, PhD (Princeton), Applied Mathematics
2. Charles Angevine, PhD (Cornell), Geology
3. Hakima Bessaih, PhD (Scuola Normale Superiore di Pisa), Mathematics
4. Michelle Chamberlin, PhD (Purdue), Mathematics Education
5. Craig Douglas, PhD (Yale), Computer Science
6. Frederico Furtado, PhD (NYU), Mathematics
7. Victor Ginting, PhD (Texas A&M), Mathematics
8. Chris Hall, PhD (Princeton), Mathematics
9. Stefan Heinz, PhD (Heinrich Hertz Institute), Physics
10. *Sylvia Hobart, PhD (Michigan), Mathematics*
11. Lynne Ipina, PhD (NYU), Mathematics
12. Farhad Jafari, PhD (Wisconsin), Mathematics
13. Long Lee, PhD (Washington), Applied Mathematics
14. Rongsong Liu, PhD (York), Mathematics
15. Gregory Lyng, PhD (Indiana), Mathematics
16. Tyrrell McAllister, PhD (UC Davis), Mathematics
17. Eric Moorhouse, PhD (Toronto), Mathematics
18. *Siguna Mueller, PhD (Klagenfurt), Mathematics*
19. Zhuang Niu, PhD (Toronto), Mathematics
20. *Felipe Pereira, PhD (Stony Brook), Applied Mathematics*
21. Peter Polyakov, PhD (Moscow State), Mathematics
22. Bryan Shader, PhD (Wisconsin), Mathematics
23. *Chanyoung Shader, PhD (Wisconsin), Mathematics*
24. *Shagi-Di Shih, PhD (Maryland), Mathematics*
25. Dan Stanescu, PhD (Concordia), Engineering
26. Jason Williford, PhD (Delaware), Mathematics
27. Man-Chung Yeung, PhD (UCLA), Mathematics
28. David Anton, MS (Wyoming), Mathematics
29. Nathan Clements, DA (Idaho State), Mathematics
30. *Jon Prewett, MS (Idaho), Mathematics*
31. Eric Quade, PhD (Wyoming), Mathematics

32. Jeff Selden, PhD (Arizona), Mathematics
33. John Spitler, MS (Wyoming), Mathematics
34. William Weber, MS (Wyoming), Mathematics

Gender/Ethnicity Breakdown: Men: 27, Women: 7

External Grants Awarded with UW Math Personnel as PI or Co-PI (2010 – 2015)[1]

2016-2019, Allen: EDT/Collaborative Proposal: FRAMEWORK—Front Range Applied Mathematics Exchanges and Workshops, Co-PI with G. Lyng (PI), National Science Foundation, $299,475.

2011-2012, Bessaih: International Conference on Random Dynamical Systems, DMS 1053072, NSF, $22,000.

2011, Bessaih: Travel grant, Association for women in Mathematics (AWM), $1,500.

2013-2018, Bessaih: SPDEs in Hydrodynamic: Statistical Properties and inviscid Limits, Simons foundation, $35,000

2014-2017, Bessaih: Collaborative Research: Determining Forms and Data Assimilation with Stochastic Data, DMS-1418838, NSF, $139,587.

2014-2015 Bessaih: Summer School at the UW: Stochastic equations for complex systems: theory and applications, DMS-1416689, NSF, $46,374.

2014, Bessaih: Wyoming Women in Science and Engineering (WWISE) Program, $1,750

2014, Bessaih: Summer School at the UW: Stochastic equations for complex systems: theory and applications, IMA, $4,500.

2014, Bessaih: Summer School at the UW: Stochastic equations for complex systems: theory and applications, NCAR, $12,000.

2014-2019, Chamberlin: Wyoming Interns to Teacher Scholars (WITS) Program. PIs: Leonard, J. & Wells, K. (for Central Wyoming College), Co-PIs: Aryana, S., Chamberlin, M. T., Chamberlin, S. A., & Sivanpillai, R. Noyce Teacher Scholarships, National Science Foundation, $1.5 million.

2009-2012, Douglas: ITR/NGS: Collaborative Research: DDDAS: Data Dynamic Simulation for Disaster Management, National Science Foundation, $78,636.

[1] Grants list compiled individually. Some grants may appear more than once if they have multiple UW Math PIs and/or Co-PIs.

2009-2011, Douglas: CSR-CSI: Collaborative Research: Dynamic Sensor/Computation Network for Wildfire Management, Co-Principal Investigators Jan Mandel (CU-Denver) and Anthony Vodacek (RIT), $82,752.

2010-2011, Douglas: High Performance Computing for Subsurface Flow Simulation, Co-Principal Investigator Guan Qin, SER/CFSF, $105,727.

2011 – 2013, Douglas: Dynamic Data-Driven Modeling of Uncertainties and 3D Effects of Porous Shape Memory Alloys, Co-Principal Investigators Yalchin Efendiev and Peter Popov (Texas A&M), Air Force Office of Scientific Research, $200,000.

2012 – 2015, Douglas: Numerical Porous Media (NumPor), King Abdullah University of Science & Technology, $192,705.

2014 – 2017, Douglas: CC*IIE Networking Infrastructure: Enabling Scientific Discovery through a UW-DMZ, NSF, $500,000.

2015 – 2017, Douglas: CC*DNI Engineer: Big Data Enabler for the UW-DMZ, NSF, $366,306.

2010-2011, Douglas: Multi-scale and Multi-physics Modeling of Unconventional Gas Development, Principal Investigator Guan Qin, SER/CFSF, $98,000.

2011-2015, Douglas: Collaborative Research: CI-Water, Principal Investigators Norm Jones (BYU) and Fred Ogden, National Science Foundation, $6,000,000 total with $2,564,127 for the University of Wyoming.

2011, Douglas: Collaboration with KAUST, Principal Investigator, Li Deng, $45,000.

2012 – 2015, Douglas: Strategic Research Initiative Center on Numerical Porous Media (NumPor), King Abdullah University of Science & Technology (KAUST) Office of International Competitive Research, $4,500,000 with $192,705 subcontracted to the University of Wyoming.

2010-2013, Furtado: Maximization of Permanent Trapping of CO2 and Co-contaminants in the Highest Porosity Formations of the Rock Spring Uplift (Southwest Wyoming): Experimentation and Multi-scale Modeling, Mohammad Piri (PI), Lamia Goual, Shunde Yin, Victor Ginting, Felipe Pereira, Frederico Furtado, Department of Energy, $1,500,000

2010-2013, Ginting: A Posteriori Analysis of of Multirate Numerical Methods, Computational Mathematics, Division of Mathematical Sciences, National Science Foundation, $188,159

2010-2013, Ginting: Enabling Predictive Simulation and UQ of Complex Multiphysics PDE Systems by the Development of Goal-Oriented Variational Sensitivity Analysis and A Posteriori Error Estimation Methods, Department of Energy, $73,359

2016, Ginting: RMMC Workshop on Functional Analytic Methods in Error Prediction with Applications, Co-PI: F. Jafari, National Science Foundation, $48,401

2010-2013, Ginting: Maximization of Permanent Trapping of CO2 and Co-contaminants in the Highest Porosity Formations of the Rock Spring Uplift (Southwest Wyoming): Experimentation and Multi-scale Modeling, Mohammad Piri (PI), Lamia Goual, Shunde Yin, Felipe Pereira, Frederico Furtado, Department of Energy, $1,500,000

2012–2017, Hall: Compatible Systems and Big Monodromy, Simons Foundation (Collaboration Grants for Mathematicians, $30,000

2009 – 2012, Hall: Rocky Mountain algebra, combinatorics, and number theory days, with Bryan Shader (PI) and Jason Williford (Co-PI), NSF, $22,320.

2014-2015, Hall: Verallgemeinerun der horizontalen Isogenie-Satze von Frey und Jarden und von Ratazzi auf alle abelschen Varietaten, DFG, 5530 EUR

2012-2017, Heinz: Turbulence Structure Preserving Unified and Dynamic Large Eddy Simulation of Separated Flows, (NASA, Aug. 2012 – Feb. 2017, $508,321)

2014, Heinz: Stochastic Equations for Complex Systems: Theory and Applications, UW Summer School (IMA, May 2014 – June 2014, $4,500)

2013, Heinz: Computational Methods for Wind Energy Applications (National Renewable Energy Laboratory (NREL), May 2013 - Oct. 2013, $6,500).

2014-2015, Heinz: Stochastic Equations for Complex Systems: Theory and Applications, UW Summer School (NSF, March 2014 – Feb. 2015, $46,374)

2014, Heinz: Stochastic Equations for Complex Systems: Theory and Applications, UW Summer School (NCAR, May 2014 – June 2014, $12,000).

2012-2013, Hobart: Sonia Kovalevsky High School Day, together with Lynne Ipina and Cara Wiblemo, Association for Women in Mathematics (supported by the National Science Foundation), $942.

2009-2014, Jafari: Determining features of fires from remote observations, $432K. DoD (PI: Jerry Hamman)

2013-2017, Jafari: UGame-ICompute, $1.2M. NSF ITEST Grant. (PI: Jacqueline Leonard)

2013-2017, Jafari: NOYCE: Science and Mathematics in rural communities in Wyoming. $0.8M. NSF. (PI: Andreas Burrows)

2015-2016, Jafari: CBMS Conference: The Basic Homotopy Lemma, the Asymptotic Uniqueness Theorem and the Classification of C*-Algebras, $35,190. NSF. (PI: Zhuang Niu)

2015-2016, Jafari: RMMC Summer School: The Structure of C*-Algebras, $35,213. NSF. (PI: Zhuang Niu)

2015-2015: Jafari: IMA: Control Theory and Its Applications, $26000. NSF.

2016-2017, Jafari: Functional analytic methods in error prediction and its applications, $29,800. NSF. (PI: Victor Ginting)

2012-2013, Liu: RMMC 2012: Mathematical Modeling in Ecology and Epidemiology, NSF, with Michael Dillon, $25,000.

2012, Liu: RMMC 2012: Mathematical Modeling in Ecology and Epidemiology, IMA, with Michael Dillon, $4,500.

2015-2018, Liu (with Grant Bowman): A scaffolding protein is a multivalent hub for organizing bacterial cytoplasm, NSF, $791,542.

2016–2019, Lyng: National Science Foundation (DMS-1551236), $599,471 (UW Share: $299,475). Principal Investigator, Title of Project: EDT/Collaborative Research—FRAMEWORK: Front Range Applied Mathematics Exchanges & Workshops, [Co-PIs: M. Allen (U. Wyoming), S. Pankavich & B. Moskal (Colorado School of Mines)].

2014-2017, Lyng: National Science Foundation (DMS-1413273), $245,486, Principal Investigator, Title of Project: New Perspectives in Nonlinear Waves: Taming Modulational Instability, [Co-PI: L. Lee (U. Wyoming)].

2010-2011, Lyng: National Science Foundation (DMS-1005317), $25,000, Principal Investigator, Title of Project: Rocky Mountain Summer School: Conservation Laws & Applications

2010, Lyng: Institute for Mathematics and its Applications, $5,000. Principal Investigator, Title of Project: Rocky Mountain Summer School: “Conservation Laws & Applications”.

2009-2014, Lyng: National Science Foundation (DMS-0845127), $409,998, Principal Investigator, Title of Project: CAREER: Wyoming Applied Analysis & Computing Group: Behavior of Solutions of Nonlinear Partial Differential Equations, (Faculty Early Career Development (CAREER) Program)

2008-2011, Lyng: REU Site: Rocky Mountain Mathematical Research and Career Experiences, PI: Bryan Shader, NSF, $221,000.

2014-2019, Niu: Collaboration Grant for Mathematicians, $35,000, Simons Foundation.

2015, Niu: CBMS Conference: the Basic Homotopy Lemma, the Asymptotic Uniqueness Theorem, and the Classification of C*-Algebras, $35,190, NSF, Co-PI: Farhad Jafari.

2015, Niu: RMMC Summer School: The Structure of C*-Algebras, $35,213, NSF, Co-PI: Farhad Jafari.

2011 -201, Polyakov: Multiscale modeling and uncertainty quantification for nuclear fuel performance, Co-Principal Investigators: Michael Pernice (INL), Anter El-Azab, Dongbin Xiu (Purdue University), Don Estep, Simon Tavener (Colorado State University), DOE, U of Wyoming part - $167,987.

2010 -2012, Shader: Rocky Mountain Algebra, Combinatorics and Number Theory Days, Chris Hall and Jason Williford, NSF, $21,000.

2008-2011, Shader: REU Site: Rocky Mountain Mathematical Research and Career Experiences, Greg Lyng, NSF, $221,000.

2014-2015, Shader: UW/Microsoft Collaboration Dry Creek Demonstration Project, Microsoft, $40,463

2014-2016, Shader: CC*IIE Networking Infrastructure: Enabling Scientific Discovery through a UW-DMZ, with Craig Douglas and Robert Morrison, NSF, $500,000

2013-2017, Shader: NSF Graduate Research Fellowship Program (GRFP), NSF, $87,250.

2008-2012, Shader: Math Teacher Leadership Center, Bob Mayes, Jodie Novak (UNC), NSF, $4,999,744.

2014, Spitler: Common Core and Beyond, Math-Science Partnership Grant, Wyoming Department of Education, University of Wyoming, Dr. Linda Hutchinson, $218,567

2015-2018, Stanescu: CS 10K: Beauty and Joy, Adapted and Adopted: Building a Computational Teaching Cadre from within Wyoming Schools, L. Ipina, R. Gamboa and D. Stanescu, National Science Foundation, $587,947.

2013, Williford: “Rocky Mountain Summer School 2013: Algebraic Graph Theory,” NSF (DMS-1301674), $25,000.

2013, Williford: “Rocky Mountain Summer School 2013: Algebraic Graph Theory,” NSA (Grant H98230-13-1-0260), $15,000.

2014-2017, Williford: “Q-polynomial schemes, coherent configurations and applications,” NSF (DMS-1400281), initially $188,000, increased to $228,000 as of 8/8/2016.

2015-2016, Williford: “Q-polynomial schemes, coherent configurations and applications,” NSA (Young Investigator), $40,000. (PI Declined Funding Due to NSF Grant)

External Grants Submitted by UW Math Personnel as PI or Co-PI (2010-2015)[2]

2014, Allen: NRT/Collaborative Research: Framework — Front Range Applied Mathematics Exchanges & Workshops, with G. Lyng and 2 investigators from Colorado School of Mines, NSF, $1,499,976 (UW’s half).

2011-2014, Bessaih: Stochastic shell models of 3D turbulence: statistical properties, NSF $274,562.

2011-2014, Bessaih: Collaborative research: Inviscid limits for stochastic models of complex turbulent flows, NSF, $193,363.

2011-2016, Bessaih: Collaborative grant Simons Foundation, $30,000.

2012-2017, Bessaih: Collaborative grant Simons Foundation, $35,000.

2012-2015, Bessaih: Statistical properties of 3D turbulence, NSF $278,072

2012-2014, Bessaih: Stochastic shell models of 3D turbulence: statistical properties, NSA, $65,096.

2012-2015, Bessaih: SPDEs in Hydrodynamic: Qualitative behavior and inviscid limits, NSF, $203,604.

2014-2017, Bessaih: Random perturbation of inviscid equations in fluid dynamics: uniqueness, inviscid limits and anomalous dissipation, NSF, $189,454.

2016-2019, Bessaih: Multiscale methods for stochastic and heterogeneous media, NSF.

2013, Chamberlin: Wyoming Interns to Teacher Scholars (WITS) Program. PI: Leonard, J. Co-PIs: Buss, A. R., Chamberlin, M. T., & Clementz, M. T. Noyce Teacher Scholarships, National Science Foundation, $1.45 million.

---

[2] Grant list compiled individually. Some grants may appear more than once if there are multiple UW Math PIs and/or Co-PIs.

2016–2017, Clements: Mechanisms of Math Anxiety: Individual Differences in Avoidance Temperament, Anxious Arousal/apprehension and Working Memory Capacity, PI: Meredith Minear (UW), Spencer Foundation, $50,000

2015–2017, Clements: Research-based Conceptual Inventory for Differential Calculus, PI: Dianna White (UC-Denver), National Science Foundation, $250,000

2015 – 2016, Douglas: BIGDATA: IA-DKA: Transportation Connection Analytics, Timothy J. Considine, NSF, $373,579.

2015 – 2016, Douglas: QuBBD: Collaborative Research: Connecting Census, Health, and Target Specific Big Datasets, Timothy Considine (Co-PI), NSF, $65,121. (Additional contract: University of Kentucky, Robert A. Lodder (PI), NSF, $33,167.)

2015 – 2018, Douglas: Big Data Algorithms to Transform Transportation Efficiency, Timothy J. Considine (Co-PI), NSF, $518,484.

2015 – 2018, Douglas: NRI: Collaborative Research: Robotic Land Based Seismic Mapping, Jeff Clune (Co-PI), NSF, $648,674. Additional subcontract: University of Kentucky, Robert A. Lodder (PI), $482,515.

2010-2013, Furtado: Maximization of Permanent Trapping of CO2 and Co-contaminants in the Highest Porosity Formations of the Rock Spring Uplift (Southwest Wyoming): Experimentation and Multi-scale Modeling, Mohammad Piri (PI), Lamia Goual, Shunde Yin, Victor Ginting, Felipe Pereira, Frederico Furtado, Department of Energy, $1,500,000

2014-2017, Ginting: Multiscale Domain Decomposition for Multiphysics Simulations, Computational Mathematics, Division of Mathematical Sciences, National Science Foundation, $170,000

2016-2019, Ginting: Multiscale Methods for Stochastic and Heterogenous Media, PI: H. Bessaih, National Science Foundation, $291,646

2016-2019, Ginting: An Interdisciplinary Approach to Flow Instabilities in Porous Media: Numerical Simulation and Experimental Observations, PI: S. Aryana, Co-PI: F. Furtado, National Science Foundation, $294,275

2010, Hall: Big-monodromy theorems for Hurwitz spaces, (NSF DMS – Algebra, Number Theory, and Combinatorics), $174,720.

2010, Hall: Big-monodromy theorems for Hurwitz spaces," NSA (Young Investigator Award), $39,848.

2015-2018, Heinz: Dynamic Unified RANS-LES Methods for Attached and Separated Turbulent Flows (NASA, Oct. 2015 –September 2018, NASA Proposal 15-TTT1-0014, $643,089.00).

2015-2018, Heinz: Dynamic Unified Simulations of Turbulent Flows (NSF, Sept. 2015 – August 2018, NSF Proposal 1522793, $ 301,771).

2014-2017, Heinz: Dynamic Unified Simulations of Turbulent Flows (NSF, Sept. 2014 – August 2017, NSF Proposal 1419106, $345,664).

2013-2017, Heinz: Integrated Computational/Experimental Study of Rough Turbulent Boundary Layers Ranging from Transition to Fully Turbulent Flow, NASA EPSCoR Proposal 12-2012EPSCoR-0057, Jan. 2013 – Dec. 2017, $750,000.

2011-2014, Heinz: Integrated Computational/Experimental Study of Rough Turbulent Boundary Layers Ranging from Transition to Fully Turbulent Flow, NASA EPSCoR Proposal 11-EPSCoR-0047, Sept. 2011 –Aug. 2014, $748,773.

2012-2015, Heinz: Turbulence Structure Preserving Stochastic Methods for Turbulent Flow Simulations, NSF-proposal 1217300, Sept. 2012 – Aug. 2015, $425,140.

2013-2014, Heinz: Rigorous Model for Coupling Interior Nozzle Flows with Large Eddy Simulation of Jet Plumes (DoD SBIR Proposal N132-102-0846 with IllinoisRocstar LLC, Nov. 2013 – May 2014, $80,000).

2012-2015, Heinz: Investigation of Swirl and Free-Stream Turbulence Effects on an Axisymmetric Wake with Application to Wind Energy. NSF-proposal 1236893, Sept. 2012 – Aug. 2015, $ 344,819.

2011-2014, Heinz: Multi-fidelity Analysis Platform for Off-shore Wind Plants (MAPOW). DOE-Proposal 10903966, Sept. 2011- Sept. 2014, $1,485,410.

2011-2014, Heinz: Unstructured Mesh Aerodynamic Analysis Using a Unified RANS-LES Model, NASA Proposal 10-SFW1-0070, May 2011 –April 2014, $469,896.

2011-2014, Heinz: A High-Order Discontinuous Galerkin Approach for High-Speed Flows. Invited NASA Proposal, June 2011-May 2014, $465,642.00

2011-2013, Heinz: Integrated Computational/Experimental Study of Rough Turbulent Boundary Layers, AFOSR Proposal 10-NA-227, Jan. 2011 –Dec. 2013, $621,228.

2010-2013, Heinz: Swarm Robotic Chemical Plume Tracing in Challenging Simulated Environments, NSF Proposal 1017060, July 2010 – June 2013, $497,567.

2012-2015, Hobart: Q-polynomial schemes, coherent configurations, and applications, PI: Jason Williford, NSF (DMS-Algebra, Number Theory and Combinatorics), $240,000

2013-2015, Hobart: Q-polynomial schemes, coherent configurations, and applications, PI: Jason Williford, NSF (DMS-Algebra, Number Theory and Combinatorics), $155,000

2011-2014, Jafari: Identification of objects in orbit from observations from a collection of nano-satellites, $330K. AFOSR. (PI: J. McInroy)

2011-2016, Jafari: Image reconstruction from partial data, A multi-university collaborative effort with Arizona State University and Michigan State University, Wyoming part: $560K. NSF. (CoPI; Jeff Selden)

2013-2015, Jafari: Academic Language and Literacy in STEM (ALL-in-STEM), $100,000. NSF. (CoPIs: J. Leonard and V. Gillis)

2014 – 2016, Jafari: Academic Language and Literacy in STEM (All-In-STEM). CoPIs: J. Leonard and Dana Patterson, $200K. State of WY Board of Education. (CoPI: J. Leonard and Dana Patterson).

2016-2019, Lee: NSF, DMS. Statistical landmark-based algorithms for automatic pattern recognition and abnormality detection.

2015-2018, Lee: NSF, DMS. Fast Geodesic Shooting Algorithms for Template Matching and Its Applications via the N-particle System of the Euler-Poincare Equations, Co-Principal Investigator: Snehalata V. Huzurbazar, Amount: $240,054.

2014-2017, Lee: NSF, DMS.Fast N-particle algorithms and their applications for soliton dynamics and template matching. $216,011.

2011-2016, Lee: NSF CAREER, $417,264, CAREER: How Does a Virus Control Its Motion in Blood Plasma? – Planting Seeds of Scientific Computing in Wyoming.

2011-2013, Lee: NSF, CBET, Fluid Dynamics (2011—2013), $220,058, Un-prescribed mechanical motion of immersed rigid structures in viscous fluid Viral Transportation: Effects of Size, Shape, and Surface Structure, $270,000.

2016-2019, Lee: NSF DMS. Construction and analysis of a deflection projector: improving the stability and efficiency of iterative methods for solving ill-conditioned linear systems.

2010-2013, Liu: Mathematical theory of plant allocation to defense, PI, NSF, $263,692.

2014-2016, Liu (with Merav Ben-David, Elizabeth Flaherty, Melanie Murphy): Modeling 2 prey - 2 predator cycles in a heterogeneous landscape, NSF, 276,910.

2012-2017, Liu: Modeling the within-host dynamics and the global spread of Avian Influenza in birds, NSF CAREER, $470,044.

2014, Lyng: NRT/Collaborative Research: FRAMEWORK — Front Range Applied Mathematics Exchanges & Workshops, M. Allen (UW), S. Pankavich (Colorado School of Mines), B. Moskal (Colorado School of Mines), National Science Foundation, $1,499,976.

2016-2019, Niu: Structure of simple separable amenable C*-algebras, $214,205, NSF.

2015-2020, Niu: CAREER: The structure of simple separable amenable C*-algebras, $520,861, NSF.

2015-2018, Niu: Some problems on the structure of the C*-algebra of a dynamical system, $206,924, NSF.

2014-2017, Niu: Structure of Simple Amenable C*-algebras, NSF, $163,356.00.

2012, Polyakov: Formulas for d-bar equation on projective manifolds, Simons Foundation, $14,000.

2010, Polyakov: Stable and low computational cost methods with uncertainty quantification for Electrical Impedance Tomography, Principal Investigator – Tarek Mathew, National Science Foundation, U of Wyoming part - $124,119.00

2015, Shader: Complex Adaptive Systems Science through an Interdisciplinary Lens for Education (CASTLE), Co-PIs: Bob Mayes, NSF, 1,500,000.

2011-2013, Williford: “Extremal Problems in Graph Theory and Finite Geometry,” NSF (DMS-Algebra, Number Theory and Combinatorics), $167,515.

2012-2013, Williford: “Extremal Problems in Graph Theory and Finite Geometry,” NSA (Young Investigator), $40,000.

2012-2015, Williford: “Q-polynomial schemes, coherent configurations and applications,” NSF (DMS-Algebra, Number Theory and Combinatorics), $240,000.

2013-2014, Williford: “Algebraic and combinatorial constructions of dense graphs with forbidden cycle lengths,” NSA (Young Investigator), $40,000.

2013-2015, Williford: “Q-polynomial schemes, coherent configurations and applications,” NSF (DMS-Algebra, Number Theory and Combinatorics), Co-Pi Sylvia Hobart, $155,000.

2013, Williford: “Rocky Mountain Summer School 2013: Algebraic Graph Theory,” IMA (Conference Grant), $5,000.

2013-2018, Williford: Collaborations in Algebraic and Extremal Combinatorics, Simons Foundations, $35,000

2014-2015, Williford: “Algebraic and combinatorial constructions of dense graphs with forbidden cycle lengths,” NSA (Young Investigator), Co-Pi Felix Lazebnik, $40,000.

2016-2019, Yeung: Construction and Analysis of a Deflation Projector: Improving the Stability and Efficiency of Iterative Methods for Solving Ill-Conditioned Linear Systems, with Craig Douglas and Long Lee, NSF, $537,628.

Publications by UW Math Personnel (2010 – 2015)[3]

M.B. Allen, *Continuum Mechanics: Birthplace of Partial Differential Equations,* under contract with John Wiley & Sons, Hoboken, NJ, 298 pages (graduate-level monograph), 2015.

S. Heinz and H. Bessaih (Eds.), Stochastic Equations for Complex Systems: Theoretical and Computational Topics. Springer Verlag, Heidelberg, Dordrecht, London, New York (2015).

H. Bessaih, Stochastic incompressible Euler equations in two-dimensional domain (2015), Progress in Probability, 68, Stochastic Analysis: A series of Lectures, Birkhauser, 135--156.

Chandana Wijeratne, Hakima Bessaih, Fractional Brownian Motion and an Application to Fluids, Stochastic Equations for Complex Systems: Theoretical and Computational Topics, Springer-Verlag, 37--52, (2015).

H. Bessaih, Y. Efendiev, F. Maris, Homogenization of Brinkman flows in heterogenous dynamic media, SPDE: Analysis and Computations, 3 (2015), no 4, 479--505.

H. Bessaih, E. Hausenblas, P. Razafimandimby, Strong solutions to stochastic hydrodynamical systems with multiplicative noise of jump type, Nonlinear Differential Equations and Applications NoDEA., Volume 22, Issue 6 (2015), 1661--1697.

H. Bessaih, E. Olson, E. S. Titi , Continuous data assimilation with a stochastically noisy data, Nonlinearity, Vol 28 (2015), 729--753.

H. Bessaih, Y. Efendiev, F. Maris (2015), Homogenization of the evolution Stokes equation in a perforated domain with a stochastic dynamical boundary condition, Networks and Heterogeneous Media, Vol 10 (2) (2015), 343--367.

---

[3] List compiled author by author. Some items appear more than once due to multiple UW Math authors.

H. Bessaih, Z. Brzezniak, A. Millet, Splitting up method for a 2D-stochastic Navier-Stokes equations, Stochastic Partial Differential Equations: Analysis and Computations, 2 (2014), no 4, 433--470.

H. Bessaih, M. J. Garrido-Azienda, B. Schmalfuss, Pathwise solutions and attractors for retarded SPDEs with time smooth diffusion coefficients, DCDS-A., Vol 34 (2014), no 10, 3945--3968.

H. Bessaih, B. Ferrario (2014), Inviscid limit of stochastic damped 2D Navier-Stokes equations, Nonlinearity, 27 (2014), 1--15.

D. Barbato, H. Bessaih, B. Ferrario (2014), On a stochastic Leray-α model of Euler equations, Stochastic Processes and Applications, 124 (2014), 199--219.

H. Bessaih, R. Kapica, T. Szarek (2014), Criterion on stability for Markov processes applied to a model with jumps, Semigroup Forum, 88 (2014) no1, 76--92.

H. Bessaih, B. Ferrario (2012), Invariant Gibbs measures of the energy for shell models of turbulence; the inviscid and viscous cases, Nonlinearity, 25, 1075--1097.

H. Bessaih, B. Ferrario (2012), Invariant measures of Gaussian type for 2D turbulence, Jour. Stat. Phys., Vol 149, number 2, 259--283.

H. Bessaih, A. Millet (2012), Large deviation principle and the zero viscosity limit for the 2D Navier-Stokes equations with a free boundary condition, SIAM J. Math. Anal., Vol. 44, No. 3, pp. 1861—1893

Chamberlin, M. T., Troudt, M. L., Nair, R., Breitstein, A. (2015). The perspectives of teacher leaders on mathematics, learning, and teaching: Supporting reform-oriented instruction. National Council of Supervisors of Mathematics Journal of Mathematics Education Leadership, 16(1), 41-54.

Chamberlin, M. T. (2013). Prospective teachers' perspectives on mathematics teaching and learning: Lens for interpreting experiences in a standards-based mathematics course. School Science and Mathematics, 113(8), 369-379.

Hauk, S., Chamberlin, M. T., Jackson, B., Yestness, N., King, K., & Raish, R. (2012). Interculturally rich mathematics pedagogical content knowledge for teacher leaders. In S. Brown (Ed.), Proceedings of the 15th annual conference on Research in Undergraduate Mathematics Education (Portland, OR). Retrieved from http://sigmaa.maa.org/rume/Site/Conferences.html

Chamberlin, M. T. (2011). The potential of prospective teachers experiencing differentiated instruction in a mathematics course. International Electronic Journal of Mathematics Education, 6(3), 134-156.

Schnorenberg, M., & Chamberlin, M. T. (2011). Using a lesson experiment to investigate the promise of differentiated instruction for prospective elementary teachers: An area and volume lesson. Proceedings of the 33rd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 1493-1501). Reno, NV: University of Nevada, Reno.

Hatfield, L. L., Belbase, S., Chamberlin, M. T., & Schnorenberg, M. (2011). Lived and living mathematical experiences of pre-service elementary teachers: An exploratory investigation. Proceedings of the 33rd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 1295-1303). Reno, NV: University of Nevada, Reno.

Hatfield, L. L., & Chamberlin, M. T. (2011). Developing investigations of lived and living mathematical experiences: The DIME working group. Proceedings of the 33rd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 2054-2064). Reno, NV: University of Nevada, Reno.

K. Heinrich, K. Serve, N. Clements, and R. Smith, (2013) “The Tale of Two Degrees: The Need and Power of the Doctor of Arts Degree.” College Teaching, 61:4, 113-115

J. Gleason, M. Thomas, S. Bagley, L. Rice, D. White, N. Clements, “Analyzing the Calculus Concept Inventory: Content Validity, Internal Structure Validity and Reliability Analysis,” In: T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Bradfield, & H. Dominguez (Eds.). (2015). Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. East Lansing, MI: Michigan State University.

S. I. Ao, C. C. Douglas, W. S. Grunfest, and J. Burgstone (eds.), World Congress on Engineering and Computer Science 2010, San Francisco, 20-22 October, 2010 Proceedings (2 volumes), International Association of Engineers (IAENG), Hong Kong, 2010, ISBN 978-988-17012-0-6 and 978-988-18210-0-3.

S. I. Ao, C. C. Douglas, W. S. Grunfest, and J. Burgstone (eds.), World Congress on Engineering and Computer Science 2011, San Francisco, 19-21 October, 2011 Proceedings (2 volumes), International Association of Engineers (IAENG), Hong Kong, 2011, ISBN 978-988-18210-9-6.

S. I. Ao, O. Castillo, C. C. Douglas, D. D. Feng, J.-A. Lee (eds.), International MultiConference of Engineers and Computer Scientists 2011, Hong Kong, 16-18 March, 2011, Proceedings (2 volumes), International Association of Engineers (IAENG), Hong Kong, 2011, ISBN 978-988-18210-3-4 and 978-988-19251-2-1.

S. I. Ao and Oscar Castillo and Craig Douglas and David Dagan Feng and Jeong-A Lee, International MultiConference of Engineers and Computer Scientists 2012, Hong Kong, 14-16 March, 2012, Proceedings (2 volumes), International Association of Engineers (IAENG), Hong Kong, 2012, ISBN 978-988-19251-1-4 and 978-988-19251-9-0.

S. I. Ao, C. C. Douglas, W. S. Grunfest, and J. Burgstone (eds.), World Congress on Engineering and Computer Science 2012, San Francisco, 24-26 October, 2012 Proceedings, International Association of Engineers (IAENG), Hong Kong, 2012, ISBN ISBN: 978-988-19251-6-9.
Q. Guo and C. C. Douglas, 11th International Symposium on Distributed Computing and Applications to Business, Engineering & Science, DCABES 2012, 19-22 October, 2012, Guilin, China, IEEE Computer Society, Los Alamitos, CA, 2012, ISBN-13: 978-0-7695-4818-0.

S. I. Ao, O. Castillo. C. C. Douglas, D. D. Feng, and J.-A Lee (eds.), International MultiConference of Engineers and Computer Scientists 2013, Hong Kong, 12-15 March, 2013, Proceedings (2 volumes), International Association of Engineers (IAENG), Hong Kong, 2013.

S. I. Ao, C. C. Douglas, W. S. Grunfest, and J. Burgstone (eds.), World Congress on Engineering and Computer Science 2013, San Francisco, 23-25 October, 2013 Proceedings, International Association of Engineers (IAENG), Hong Kong, 2013.

S. I. Ao, O. Castillo. C. C. Douglas, D. D. Feng, and J.-A Lee (eds.), International MultiConference of Engineers and Computer Scientists 2014, Hong Kong, 12-14 March, 2014, Proceedings (2 volumes), International Association of Engineers (IAENG), Hong Kong, 2014.

S. I. Ao, C. C. Douglas, W. S. Grunfest, and J. Burgstone (eds.), World Congress on Engineering and Computer Science 2014, San Francisco, 22-24 October, 2014 Proceedings, International Association of Engineers (IAENG), Hong Kong, 2014.

J. Xie, R. Cools, C. C. Douglas, and W. Zhang (eds.), Data Intensive Scientific Discovery, , Shanghai University Press, 2014, pp. 40-48.

C. C. Douglas and Y. Guo (eds.), Proceedings of DCABES 2014, C. C. Douglas and Y. Guo (eds.), IEEE Computer Society CPS, Los Alamitos, CA, 2014.

S. I. Ao, O. Castillo. C. C. Douglas, D. D. Feng, and J.-A Lee (eds.), International MultiConference of Engineers and Computer Scientists 2015, Hong Kong, 18-20 March, 2015, Proceedings (2 volumes), International Association of Engineers (IAENG), Hong Kong, 2015, ISBN 978-988-19253-2-9 and ISBN 978-988-19253-9-8.

S. I. Ao, C. C. Douglas, W. S. Grunfest, and J. Burgstone (eds.), World Congress on Engineering and Computer Science 2015, San Francisco, 21-23 October, 2015 Proceedings, International Association of Engineers (IAENG), Hong Kong, 2015, ISBN: 978-988-19253-6-7 and ISBN 978-988-19253-2-5.

C. C. Douglas, L. Deng, G. Haase, H. Lee, and R. A. Lodder, Data-driven pill monitoring, Procedia Computer Science series, Elsevier, 1 (2010), pp. 1207-1214.

C. C. Douglas, F. Furtado, V. Ginting, M. Mendes, F. Pereira, and M. Piri, On the development of a high performance tool for the simulation of CO2 injection into deep saline aquifers, Rocky Mountain Geology, 45 (2010), pp. 151-161.

C. C. Douglas, G. Qin, N. Collier, and B. Gong, Intelligent fracture creation for shale gas development, Procedia Computer Science series, Elsevier, 4 (2011), pp. 1745-1750.

C. C. Douglas, Y. Efendiev, R. Ewing, V. Ginting, R. Lazarov, M. Cole, and G. Jones, Least squares approach for initial data recovery in dynamic data-driven applications simulations, Computation and Visualization in Science, 13 (2010), pp. 365-375.

C. C. Douglas, H. Lee, I. Kim, and D. Sheen, Higher-order schemes for the Laplace transformation method for parabolic problems, Computation and Visualization in Science, 14 (2011), pp. 14-37.

C. C. Douglas, L. Deng, Y. Efendiev, G. Haase, A. Kucher, and R. Lodder, Real-time multiscale detection of defective pills during manufacturing, International Journal on Numerical Analysis and Modeling, 9 (2012), pp. 169-180.

H. Yu, C. C. Douglas, and F. L. Ogden, A new application of dynamic data driven system in the Talbot-Ogden model for groundwater infiltration, Procedia Computer Science, 9 (2012), pp. 1073-1080.

C. C. Douglas, Y. Efendiev, P. Popov, and V. Calo, An introduction to a porous shape memory alloy dynamic data driven application system, Procedia Computer Science, 9 (2012), pp. 1081-1089.

C. C. Douglas, V. M. Calo, D. C. Cerwinsky, and Y. R. Efendiev, Using shape memory alloys: a dynamic data driven approach, Procedia Computer Science, 18 (2013), pp. 1844-1850.

H. Yu, C. C. Douglas, and L. Deng, An extension of the Talbot–Ogden hydrology model to an affine multi-dimensional moisture content domain, Journal on Applications and Computational Technology, 7 (2013), pp. 271-286.

S. O. Settle, C. C. Douglas, I. Kim, and D. Sheen, On the derivation and highest-order of compact finite-difference schemes for the one- and two-dimensional Poisson equation with Dirichlet boundary conditions, SIAM Journal on Numerical Analysis, 54 (2013), pp. 2470-2490.

L. Deng, W. H. Boukaram, and C. C. Douglas, A finite element method perturbation expansion for a coupled structural-acoustic system: two dimensional case, Journal of the Japanese Society of Industrial and Applied Mathematics, 30 (2013), pp. 545-563.

C. C. Douglas, An Open Framework for Dynamic Big-Data-Driven Application Systems (DBDDAS) Development, 29 (2014), Procedia Computer Science, pp. 1246-1255.

H. Yu and C. C. Douglas, An analysis of infiltration with porosity distribution in a novel two dimensional discretized moisture content domain, Hydrological Processes, 29 (2015), pp. 1225-1237.

E. Fabiano, M. Seo, X. Wu, and C. C. Douglas, OpenDBDDAS Toolkit: Secure MapReduce and Hadoop-like Systems, Procedia Computer Science, 51 (2015), pp. 1675-1684.

C. C. Douglas, T. M. de Andrade Soares, M. V. Kritz, A Data Driven Scientific Approach to Environmental Probes, in Dynamic Data-Driven Environmental Systems Science, S. Ravela and A. Sandu (eds.), Lecture Notes in Computer Science series, vol. 8964, Springer, New York, 2015, pp. 89-99.

C. C. Douglas, H. Lee, and D. Sheen, Parallelized local volatility estimation using GP-GPU hardware acceleration, in ICISA - International Conference on Information Science and Applications, April 21-23, 2010, Seoul, ICISA series, IEEE Computer Society, Washington, DC, 2 (2010), pp. 508-511.

C. C. Douglas and H. Lee, Basket option pricing using GP-GPU hardware acceleration, in DCABES 2010: Ninth International Symposium on Distributed Computing and Application to Business and Engineering and Science, Hong Kong, China, 10-12 August 2010, Q. Guo and Y. Guo (eds.), IEEE Computer Society Press, 2010, pp. 46-49.

J. L. Coen and C. C. Douglas, Computational modeling of large wildfires: a roadmap, in DCABES 2010: Ninth International Symposium on Distributed Computing and Application to Business and Engineering and Science, Hong Kong, China, 10-12 August 2010, Q. Guo and Y. Guo (eds.), IEEE Computer Society Press, 2010, pp. 113-117.

M. Liebmann, C. C. Douglas, G. Haase, and Z. Horvath, Large scale simulations of the Euler equations on GPU clusters, in DCABES 2010: Ninth International Symposium on Distributed Computing and Application to Business and Engineering and Science, Hong Kong, China, 10-12 August 2010, Q. Guo and Y. Guo (eds.), IEEE Computer Society Press, 2010, pp. 50-54.

L. Deng, H. Lee, H. Yu, D. Cerwinsky, X. Li, and C. C. Douglas, Variable Satellite Usage in GPS Receivers, in S. I. Ao, C. C. Douglas, W. S. Grunfest, and J. Burgstone (eds.), World Congress on Engineering and Computer Science 2010, San Francisco, 20-22 October, 2010 Proceedings, International Association of Engineers (IAENG), Hong Kong, 2010, pp. 181-185.

N. Collier, A. Ahmadia1, V. M. Calo, H. Lee, and C. C. Douglas, GPU acceleration of the assembly process in isogeometric analysis, in R. Buchty and J.-P. Weiβ (eds.), Proceedings of the Second International Workshop on New Frontiers in High-performance and Hardware-aware Computing (HipHac'11), 2011, KIT Scientific Publishing, Karlsruhe, pp. 41-45.

C. C. Douglas, H. Lee, and W. Lee, A computational agent-based modeling approach for competitive wireless service market, in ICISA 2011 - International Conference on Information

Science and Applications, 2011, ICISA series, IEEE Computer Society, Washington, DC, 2011, track 6 (paper 9), pp. 1-6.

C. C. Douglas, L. Deng Douglas, H. Lee, and D. Sheen, A comparison of the Parareal and the Laplace transform algorithms, in Proceedings of DCABES 2012, Guilin, China, 2012, Q. Guo and C. C. Douglas (eds.), IEEE Computer Society CPS, Los Alamitos, CA, 2012, pp. 1-4.

C. C. Douglas and M. V. Kritz, A glimpse on environmental probes, in Proceedings of DCABES 2012, Guilin, China, 2012, Q. Guo and C. C. Douglas (eds.), IEEE Computer Society CPS, Los Alamitos, CA, 2012, pp. 473-476.

C. C. Douglas and G. Haase, Parallel ADI smoothers for multigrid, in Proceedings of DCABES 2013, Kingston University London, U.K., S. Khaddaj (ed.), IEEE Computer Society CPS, Los Alamitos, CA, 2013, pp. 100-104.

C. C. Douglas, L. Deng, Y. Efendiev, and R. A. Lodder, A note on dynamic big data driven application systems (DBDDAS) with examples, in Data Intensive Scientific Discovery, J. Xie, R. Cools, C. C. Douglas, and W. Zhang (eds.), Shanghai University Press, 2014, pp. 40-48.

M. Seo, D. C. Cerwinsky, K. Gahalaut, and C. C. Douglas, Implementations and interpretations of the Talbot-Ogden infiltration model, in Proceedings of DCABES 2014, C. C. Douglas and Y. Guo (eds.), IEEE Computer Society CPS, Los Alamitos, CA, 2014, pp. 1-5.

A.V. Azevedo, A.J. de Souza, F. Furtado, and D. Marchesin, 2014, Uniqueness of the Riemann solution for three-phase flow in a porous medium, SIAM Journal of Applied Mathematics 74 (6), 1967-1997.

A. Rahunanthan, F. Furtado, D. Marchesin, and M. Piri, 2014, Hysteretic enhancement of carbon dioxide trapping in deep aquifers, Computational Geosciences 18 (6), 899-912.

F. Furtado, A. Rahunanthan, D. Marchesin, and M. Piri, 2014, Hysteretic trapping of carbon dioxide in deep aquifers, DOI: 10.3997/2214-4609.20141879, ECMOR XIV – 14th European Conference on the Mathematics of Oil Recovery, EAGE.

J.S. Olsen, G. Braga, F. Furtado, J. Mortensen, and A. Telyakovskiy, 2013, Erratum to “Approximate similarity solutions to the Boussinesq equation”[Adv. Water Resour. 25 (2002) 191-194], Adv. Water Resour. 57, 71.

P. Castaneda, F. Furtado, and D. Marchesin, 2013, On singular points for convex permeability models, Proc. of Hyp2012, AIMS Series on Appl. Math. 8, 415-422.

P. Castaneda, F. Furtado, and D. Marchesin, 2013, The convex permeability three-phase flow in reservoirs, IMPA Preprint Series E, 1-34.

F. Furtado, V. Ginting, F. Pereita, and M. Presho, 2011, Operator splitting multiscale finite volume element method for two-thase flow with capillary pressure, Transport in Porous Media 90 (3), 927 – 947.

M. Akbarabadi, F. Furtado, F. Pereira, M. Piri, and A. Rahunanthan, 2011, Stationary Discontinuities in Hysteretic Two-Phase Flow, Proceedings of the Tenth Annual Carbon & Capture Sequestration Conference, Electric Power Research Institute. CD-ROM.

C. Douglas, F. Furtado, V. Ginting, M. Mendes, F. Pereira, and M. Piri, 2010, On the development of a high-performance tool for the simulation of CO2 injection into deep saline aquifers, Rocky Mountain Geology 45 (2), 151-161.

A.V. Azevedo, A.J. de Souza, F. Furtado, D. Marchesin, and B. Plohr, 2010, The solution by the wave curve method of three-phase flow in virgin reservoirs, Transport in Porous Media 83 (1), 99-125.

Bush, L., Deng, Q., and Ginting, V. (2015) A Locally Conservative Stress Recovery Technique for Continuous Galerkin FEM in Linear Elasticity. Computer Methods in Applied Mechanics and Engineering, 286, 354–372.

Chaudhry, J., Estep, D., Ginting, V., Shadid, J., and Tavener, S. (2015) A Posteriori Error Analysis of IMEX Multi-Step Time Integration Methods for Advection-Diffusion-Reaction Equations. Computer Methods in Applied Mechanics and Engineering, 285, 730–751.

Chaudhry, J., Estep, D., Ginting, V., and Tavener, S. (2015) A Posteriori Analysis for Iterative Solvers for Nonautonomous Evolution Problems. SIAM/ASA Journal on Uncertainty Quantification, 3, 434–459.

Deng, Q. and Ginting, V. (2015) Construction of Locally Conservative Fluxes for the SUPG Method. Numerical Methods for Partial Differential Equations, 31, 1971–1994.

Elfverson, D., Ginting, V., and Henning, P. (2015) On Multiscale Methods in Petrov-Galerkin Formulation. Numerische Mathematik, 131, 643–682.

Ginting, V., Pereira, F., and Rahunanthan, A. (2015) Multi-physics Markov Chain Monte Carlo Methods for Subsurface Flows. Mathematics and Computers in Simulation, 118, 224–238.

Johansson, A., Chaudhry, J., Carey, V., Estep, D., Ginting, V., Larson, M., and Tavener, S. (2015) Adaptive Finite Element Solution of Multiscale PDE-ODE Systems. Computer Methods in Applied Mechanics and Engineering, 287, 150–171.

Bi, C. and Ginting, V. (2014) Global Superconvergence and A Posteriori Error Estimates of the Finite Element Method for Second-Order Quasilinear Elliptic Problems. Journal of Computational and Applied Mathematics, 260, 78–90.

Bush, L., Ginting, V., and Presho, M. (2014) Application of a Conservative, Generalized Multiscale Finite Element Method to Flow Models. Journal of Computational and Applied Mathematics, 260, 395–409.

Francisco, A., Ginting, V., Pereira, F., and Rigelo, J. (2014) Design and Implementation of a Multiscale Mixed Method Based on a Nonoverlapping Domain Decomposition Procedure. Mathematics and Computers in Simulation, 99, 125–138.

Ginting, V., Pereira, F., and Rahunanthan, A. (2014) A Prefetching Technique for Prediction of Porous Media Flows. Computational Geosciences, 18, 661–675.

Ginting, V., Pereira, F., and Rahunanthan, A. (2014) Rapid Quantification of Uncertainty in Permeability and Porosity of Oil Reservoirs for Enabling Predictive Simulation. Mathematics and Computers in Simulation, 99, 139–152.

Bi, C. and Ginting, V. (2013) A Posteriori Error Estimates of Discontinuous Galerkin Method for Nonmonotone Quasi-Linear Elliptic Problems. Journal of Scientific Computing, 55, 659–687.

Bush, L. and Ginting, V. (2013) On the Application of the Continuous Galerkin Finite Element Method for Conservation Problems. SIAM Journal on Scientific Computing, 35, A2953–A2975.

Chaudhry, J., Estep, D., Ginting, V., and Tavener, S. (2013) A Posteriori Analysis of an Iterative Multi-Discretization Method for Reaction-Diffusion Systems. Computer Methods in Applied Mechanics and Engineering, 267, 1–22.

Ginting, V., Pereira, F., and Rahunanthan, A. (2013) A Multi-Stage Bayesian Prediction Framework for Subsurface Flows. International Journal for Uncertainty Quantification, 3, 499–522.

Chatzipantelidis, P. and Ginting, V. (2013) A Finite Volume Element Method for a Nonlinear Parabolic Problem. Numerical solution of partial differential equations: theory, algorithms, and their applications, vol. 45 of Springer Proc. Math. Stat., pp. 121–136, Springer, New York.

Ginting, V., Pereira, F., and Rahunanthan, A. (2013) Forecasting Production in an Oil Reservoir Simulation and Its Challenges. Cangiani, A., Davidchack, R. L., Georgoulis, E., Gorban, A. N., Levesley, J., and Tretyakov, M. V. (eds.), Numerical Mathematics and Advanced Applications 2011, pp. 693–701, Springer Berlin Heidelberg.

Estep, D., Ginting, V., and Tavener, S. (2012) A Posteriori Analysis of a Multirate Numerical Method for Ordinary Differential Equations. Computer Methods in Applied Mechanics and Engineering, 223-224, 10–27.

Ginting, V. (2012) Time Integration Techniques for Richards Equation. Procedia Computer Science, 9, 670–678, proceedings of the International Conference on Computational Science, ICCS 2012.

Ginting, V., Pereira, F., and Rahunanthan, A. (2012) Multiple Markov Chains Monte Carlo Approach for Flow Forecasting in Porous Media. Procedia Computer Science, 9, 707–716, proceedings of the International Conference on Computational Science, ICCS 2012.

Bi, C. and Ginting, V. (2011) Finite-Volume-Element Method for Second-Order Quasilinear Elliptic Problems. IMA Journal of Numerical Analysis, 31, 1062–1089.

Bi, C. and Ginting, V. (2011) Two-Grid Discontinuous Galerkin Method for Quasi-Linear Elliptic Problems. Journal of Scientific Computing, 49, 311–331.

Furtado, F., Ginting, V., Pereira, F., and Presho, M. (2011) Operator Splitting Multiscale Finite Volume Element Method for Two-Phase Flow with Capillary Pressure. Transport in Porous Media, 90, 927–947.

Ginting, V., Pereira, F., Presho, M., and Wo, S. (2011) Application of the Two-Stage Markov Chain Monte Carlo Method for Characterization of Fractured Reservoirs using a Surrogate Flow Model. Computational Geosciences, 15, 691–707.

Presho, M., Wo, S., and Ginting, V. (2011) Calibrated Dual Porosity, Dual Permeability Modeling of Fractured Reservoirs. Journal of Petroleum Science and Engineering, 77, 326–337.

Ginting, V. and Presho, M. (2011) Model Reduction Techniques for Characterization of Fractured Subsurfaces. Procedia Computer Science, 4, 938–947, proceedings of the International Conference on Computational Science, ICCS 2011.

A. Castillo, C. Hall, R.J. Lemke Oliver, P. Pollack, L. Thompson, ``Bounded gaps between primes in number fields and function fields,'' Proc. Amer. Math. Soc, 143 (2015), no. 7, 2841--2856.

C. Hall, A. Perucca, “Characterizing abelian varieties by the reduction of the Mordell-Weil group,”' Pacific J. Math. 265 (2013), No. 2, 441--454.

C. Hall, A. Perucca, “On the prime divisors of the number of points on an elliptic curve,” C.R. Acad. Sci. Paris, Ser. I, 351 (2013), No. 1--2, 1--3.

S. Baig, C. Hall, “Experimental data for Goldfeld’s conjecture over function fields”, Experimental Mathematics, 21 (4), 362—374, 2012.

J. Ellenberg, C. Hall, E. Kowalski, “Expander graphs, gonality and variation of Galois representations,” Duke Math. Journal, Vol. 161 (2012), no. 7, 1233—75.

R. Conceicao, C. Hall, D. Ulmer, “Explicit points on the Legendre curve II”, Math. Res. Lett. 21 (2014), no. 2, 261--280.

C. Hall, A. Perucca, “Characterizing abelian varieties by the reduction of the Mordell-Weil group,”' Pacific J. Math. 265 (2013), No. 2, 441--454.

C. Hall, A. Perucca, “On the prime divisors of the number of points on an elliptic curve,”' C.R. Math. Acad. Sci. Paris 351 (2013), No. 1--2, 1—3

Heinz, S. 2015 Comment on Analysis of Transport Properties Determined by Langevin Dynamics Using Green-Kubo Formulae. Physica A 423, 27-32.

Heinz, S., Gopalan, H., Kazemi Foroushani, E., Stoellinger, M., Mokhtarpoor, R. & Balakumar, P. 2015 Realizable Dynamic LES Subgrid-Scale Modeling. TSFP-9, Melbourne, Australia, TSFP Paper 2015-1B-5, 1-6.

Stoellinger, M., Roy, R. & Heinz, S. 2015 Unified RANS-LES Method Based on Second-Order Closure. TSFP-9, Melbourne, Australia, TSFP Paper 2015-P-44, 1-6.

Heinz, S., Stoellinger, M. & Gopalan, H. 2015 Unified RANS-LES Simulations of Turbulent Swirling Jets and Channel Flows. In: Progress in Hybrid RANS-LES Modelling (Notes on Numerical Fluid Mechanics and Multidisciplinary Design 130). Springer, ISBN: 978 3 319 15140 3, Cham, Heidelberg, New York, Dordrecht, London, 265-275.

Stoellinger, M., Heinz, S. & Saha, P. 2015 Reynolds Stress Closure in Hybrid RANS-LES Methods. In: Progress in Hybrid RANS-LES Modelling (Notes on Numerical Fluid Mechanics and Multidisciplinary Design 130). Springer, ISBN: 978 3 319 15140 3, Cham, Heidelberg, New York, Dordrecht, London, 319-328.

Heinz, S. 2014 Uncertainty Quantification of World Population Growth: A Self-Similar PDF Model. Monte Carlo Methods Applic. 20, 261–277.

Stoellinger, M. K., Heinz, S. & Balakumar, P. 2014 Attached and Separated Flow Simulations with Realizable Unified RANS-LES Methods. In: AIAA Aviation 2014, Atlanta, GA, AIAA Paper 14-3327.

Heinz, S. & Gopalan, H. 2014 Wind Energy Applications of Unified and Dynamic Turbulence Models. In: Wind Energy – Impact of Turbulence (Research Topics in Wind Energy 2), edited by Hoelling, M., Peinke, J. & Ivanell, S., Springer, ISBN: 978 3 642 54695 2, Heidelberg, New York, Dordrecht, London, 141-146.

Heinz, S., Zemtsop, C. P., Gopalan, H. & Stoellinger, M. K. 2014 Unified RANS-LES Analysis of Turbulent Jets Covering Several Swirl Number Regimes. In: 52st AIAA Aerospace Sciences Meeting and Exhibit, National Harbor, MD, AIAA Paper 14-0589.

Saha, P., Heinz, S., Kazemi Foroushani, E. & Stoellinger, M. K. 2014 Turbulence Structure Characteristics of LES Methods Implied by Stochastic Turbulence Models. In: 52st AIAA Aerospace Sciences Meeting and Exhibit, National Harbor, MD, AIAA Paper 14-0592.

Gopalan, H., Heinz, S. & Stoellinger, M. 2013 A Unified RANS-LES Model: Computational Development, Accuracy and Cost. J. Comput. Phys. 249, 249–279.

Stoellinger, M., Roekaerts, D., Naud, B., Beishuizen, N. & Heinz, S. 2013 PDF Modeling and Simulations of Pulverized Coal Combustion - Part 1: Theory and Modeling. Combust. Flame 160, 384–395.

Stoellinger, M., Roekaerts, D., Naud, B., Beishuizen, N. & Heinz, S. 2013 PDF Modeling and Simulations of Pulverized Coal Combustion - Part 2: Application. Combust. Flame 160, 396–410.

Heinz, S. 2013 Realizable Unified RANS-LES and Dynamic LES Methods for Turbulent Flow Simulations. In: 51st AIAA Aerospace Sciences Meeting and Exhibit, Grapevine, TX, AIAA Paper 13-0686.

Stoellinger, M. K., Gopalan, H., Kazemi Foroushani, E. & Heinz, S. 2013 Atmospheric Boundary Layer Studies with Unified RANS-LES and Dynamic LES Methods. In: 51st AIAA Aerospace Sciences Meeting and Exhibit, Grapevine, TX, AIAA Paper 13-0747.

Heinz, S. & Gopalan, H. 2012 Realizable Versus Non-Realizable Dynamic Sub-Grid Scale Stress Models. Phys. Fluids 24, 115105/1-23.

Rai, R., Gopalan, H., Heinz, S. & Naughton, J. W. 2012 A Study of the Sensitivity of Wind Turbine Response to Inflow Temporal and Spatial Resolution. In: 50th AIAA Aerospace Sciences Meeting and Exhibit, Nashville, TN, AIAA Paper 12-0819.

Heinz, S. 2011 Mathematical Modeling. Springer-Verlag, Heidelberg, Dordrecht, London, New York.

Naughton, J. W., Balas, M., Gopalan, H., Gundling, C., Heinz, S., Kelly, R., Lindberg, W., Rai, R., Sitarama, J. & Singh, M. 2011 Turbulence and the Isolated Wind Turbine. In: Proceedings of the 6th AIAA Theoretical Fluid Mechanics Conference 2011, Honolulu, Hawaii, ISBN: 978-1-61839-172-8, Curran Associates, Inc., Red Hook, NY, 852-870.

Stoellinger, M., Roekaerts, D., Naud, B., Heinz, S. & Beishuizen, N. 2011 Application of the Transported PDF Method in Pulverized Coal Combustion. European Combustion Meeting, Cardiff, UK, 1-6.

Gopalan, H. & Heinz, S. 2011 A New Realizable Subgrid-Scale Stress Model for Large Eddy Simulation of Neutral Atmospheric Boundary Layer. In: 49th AIAA Aerospace Sciences Meeting and Exhibit, Orlando, FL, AIAA Paper 11-556.

Gopalan, H., Heinz, S. & Stoellinger, M. K. 2011 Simulation of Turbulent Channel Flow Using a Linear and Non Linear Realizable Unified RANS-LES Model. In: 49th AIAA Aerospace Sciences Meeting and Exhibit, Orlando, FL, AIAA Paper 11-752.

Gopalan, H., Zemtsop, C. P., Heinz, S. & Stoellinger, M. K. 2011 Investigation of Vortex Breakdown and Scalar Mixing in Swirling Turbulent Jet Flows Using Unified LES-RANS Models. In: 49th AIAA Aerospace Sciences Meeting and Exhibit, Orlando, FL, AIAA Paper 11-768.

Stoellinger, M. & Heinz, S. 2010 Evaluation of Scalar Mixing and Time Scale Models in PDF Simulations of a Turbulent Premixed Flame. Combust. Flame 157, 1671-1685.

Jenny, P., Torrilhon, M. & Heinz, S. 2010 A Solution Algorithm for the Fluid Dynamic Equations Based on a Stochastic Model for Molecular Motion. J. Comput. Phys. 229, 1077–1098.

Gopalan, H., Stoellinger, M. K. & Heinz, S. 2010 Analysis of a Realizable Unified RANS-LES Model. In: 48th AIAA Aerospace Sciences Meeting and Exhibit, Orlando, FL, AIAA Paper 10-1102.

Stoellinger, M. K., Zemtsop, C. P., Gopalan, H. & Heinz, S. 2010 Realizable Unified RANS-LES Simulations of Swirling and Non-Swirling Turbulent Jets. In: 48th AIAA Aerospace Sciences Meeting and Exhibit, Orlando, FL, AIAA Paper 10-1289.

Hobart, Sylvia A.; Williford, Jason. Tightness in subset bounds for coherent configurations. J. Algebraic Combin. 39 (2014), no. 3, 647–658.

Hobart, Sylvia A.; Williford, Jason The absolute bound for coherent configurations. Linear Algebra Appl. 440 (2014), 50–60.

Hobart, Sylvia A.; Williford, Jason, The independence number for polarity graphs of even order planes. J. Algebraic Combin. 38 (2013), no. 1, 57–64.

David Thayer and Farhad Jafari, Understanding the spin correlations of singlet state pair particles, Int. J. Adv. Res. Physics, 2 (2), 18-16, 2015.

Jafari, F.; Słodkowski, Z.; Tonev, T. A new proof for the description of holomorphic flows on multiply connected domains. Int. J. Math. Math. Sci. 2014, Art. ID 160579, 5 pp.

S. Mukherjee, F. Jafari, J.-M. Kim, Optimization of Spearman's rho, Revista Colombiana de Estadística, Volume 38, Issue 1, pp. 209-218, 2014.

Jafari, Farhad; Slodkowski, Zbigniew; Tonev, Thomas Semigroups of operators on Hardy spaces and cocycles of holomorphic flows. Complex Anal. Oper. Theory 6 (2012), no. 1, 113–119.

Mukherjee, S.; Jafari, F.; McInroy, J. E. On the range of composition operators on spaces of entire functions. Function spaces in modern analysis, 185–195, Contemp. Math., 547, Amer. Math. Soc., Providence, RI, 2011

Jafari, Farhad; Putinar, Mihai Extremal positive pluriharmonic functions on Euclidean balls. Pure Appl. Math. Q. 6 (2010), no. 4, Special Issue: In honor of Joseph J. Kohn. Part 2, 1013–1025.

D. Kuang and L. Lee, A conservative formulation and a numerical algorithm for the double-gyre nonlinear shallow-water model, Numer. Math. Theor. Meth. Appl. Vol 8, No. 4 (2015) pp 634-650.

Y. Kim, L. Lee, and G. Lyng, The Wentzel-Kramers-Brillouin approximation of semiclassical eigenvalues of the Zakharov-Shabat problem. Journal of Mathematical Physics, 55(8) (2014) 083516.

L. Lee and G. Lyng, A second look at the Gaussian semiclassical soliton ensemble for the focusing nonlinear Schroedinger equation. Phys. Lett. A, 377, (2013) pp 1179-1188.

L. Lee, G. Lyng, and I. Vankova, The Gaussian semiclassical soliton ensemble and numerical methods for the focusing nonlinear Schroedinger equation, Physica D, 241 (2012), pp 1767-1781.

R. Camassa, M. G. Forest, L. Lee, H. R. Ogrosky, and J. Olander, Ring-wave as a mass transport mechanism in air-driven core-anular flows, Physical Review E, v8 (6), Dec. (2012), 066305.

L. Lee and I. Vankova, A class of Cartesian grid embedded boundary algorithms for incompressible flow with time-varying complex geometries, Physica D, 240 (2011), pp 1583-1592.
R. Camassa, P. H. Chiu, L. Lee, and T. W. H. Sheu, A particle method and numerical investigation of a quasi-linear partial differential equation, Commun. Pure and Appl. Analysis, 10 (2011), pp 1503-1512.

Gourley, S. A.; Liu, Rongsong An age-structured model of bird migration. Math. Model. Nat. Phenom. 10 (2015), no. 6, 61–76. (Reviewer: Samares Pal) 92D25 (92D40)

Gourley, Stephen A.; Jennings, Rachel; Liu, Rongsong An advection and age-structured approach to modeling bird migration and indirect transmission of avian influenza. SIAM J. Appl. Math. 75 (2015), no. 4, 1620–1647.

Gourley, Stephen A.; Liu, Rongsong Delay equation models for populations that experience competition at immature life stages. J. Differential Equations 259 (2015), no. 5, 1757–1777.

Wang, Chuncheng; Liu, Rongsong; Shi, Junping; Martinez del Rio, Carlos Traveling waves of a mutualistic model of mistletoes and birds. Discrete Contin. Dyn. Syst. 35 (2015), no. 4, 1743–1765.

Liu, Rongsong; Gourley, Stephen A. A model for the biocontrol of mosquitoes using predatory fish. Discrete Contin. Dyn. Syst. Ser. B 19 (2014), no. 10, 3283–3298.

Wang, Chuncheng; Liu, Rongsong; Shi, Junping; del Rio, Carlos Martinez Spatiotemporal mutualistic model of mistletoes and birds. J. Math. Biol. 68 (2014), no. 6, 1479–1520.

Wang, Chuncheng; Gourley, Stephen A.; Liu, Rongsong Delayed action insecticides and their role in mosquito and malaria control. J. Math. Biol. 68 (2014), no. 1-2, 417–451.

Liu, Rongsong; Gourley, Stephen A.; DeAngelis, Donald L.; Bryant, John P. A mathematical model of woody plant chemical defenses and snowshoe hare feeding behavior in boreal forests: the effect of age-dependent toxicity of twig segments. SIAM J. Appl. Math. 73 (2013), no. 1, 281–304.

Wang, Zhi-Cheng; Wu, Jianhong; Liu, Rongsong Traveling waves of the spread of avian influenza. Proc. Amer. Math. Soc. 140 (2012), no. 11, 3931–3946.

Feng, Zhilan; Liu, Ronsong; Qiu, Zhipeng; Rivera, Joaquin; Yakubu, Abdul-Aziz Coexistence of competitors in deterministic and stochastic patchy environments. J. Biol. Dyn. 5 (2011), no. 5, 454–473.

Gourley, Stephen A.; Liu, Rongsong; Wu, Jianhong Slowing the evolution of insecticide resistance in mosquitoes: a mathematical model. Proc. R. Soc. Lond. Ser. A Math. Phys. Eng. Sci. 467 (2011), no. 2132, 2127–2148.
Liu, Rongsong; del Rio, Carlos Martinez; Wu, Jianhong Spatiotemporal variation of mistletoes: a dynamic modeling approach. Bull. Math. Biol. 73 (2011), no. 8, 1794–1811. 92D30

Bourouiba, Lydia; Gourley, Stephen A.; Liu, Rongsong; Wu, Jianhong The interaction of migratory birds and domestic poultry and its role in sustaining avian influenza. SIAM J. Appl. Math. 71 (2011), no. 2, 487–516.

Feng, Zhilan; Qiu, Zhipeng; Liu, Rongsong; DeAngelis, Donald L. Dynamics of a plant-herbivore-predator system with plant-toxicity. Math. Biosci. 229 (2011), no. 2, 190–204.

Jeffrey Hendricks, Jeffrey Humpherys, Gregory Lyng, & Kevin Zumbrun. Stability of viscous weak detonation waves for Majda's model, Journal of Dynamics and Differential Equations, 27 (2015): 237–260.

Blake Barker, Jeffrey Humpherys, Gregory Lyng, & Kevin Zumbrun, Viscous hyperstabilization of detonation waves in one space dimension, SIAM Journal on Applied Mathematics, 75 (2015): 885–906.

Nicholas Anderson, Allison Lindgren, & Gregory Lyng, Computing the refined stability condition. Quarterly of Applied Mathematics, 73 (2015): 1–21.

Gregory Lyng, Spectral and nonlinear stability of viscous strong and weak detonation waves in Majda's qualitative model. Proceedings of the 25th International Colloquium on the Dynamics of Explosions and Reactive Systems, 6 pages, 2015.

Gregory D. Lyng, Semiclassical soliton ensembles for the focusing nonlinear Schrödinger equation: Recent developments. in "Nonlinear Wave Equations: Analytic and Computational Techniques," 91–108, Contemporary Mathematics, 635, American Mathematical Society, Providence, RI, 2015.

Yeongjoh Kim, Long Lee, & Gregory Lyng, The Wentzel–Kramers–Brillouin approximation of semiclassical eigenvalues of the Zakharov–Shabat problem. Journal of Mathematical Physics, 55 (2014), 083516, 18 pp.

Jeffrey Humpherys, Gregory Lyng, & Kevin Zumbrun, Stability of viscous detonation waves for Majda's model. Physica D, 259 (2013): 63–80.

Long Lee & Gregory Lyng, A second look at the Gaussian semiclassical soliton ensemble for the focusing nonlinear Schrödinger equation. Physics Letters A, 377 (2013): 1179–1188.

Long Lee, Gregory Lyng, & Irena Vankova, The Gaussian semiclassical soliton ensemble and numerical methods for the focusing nonlinear Schrödinger equation. Physica D, 241 (2012): 1767–1781.

Jerónimo-Castro, Jesús; McAllister, Tyrrell B. Two characterizations of ellipsoidal cones. J. Convex Anal. 20 (2013), no. 4, 1181–1187.

Beck, Matthias; Jayawant, Pallavi; McAllister, Tyrrell B. Lattice-point generating functions for free sums of convex sets. J. Combin. Theory Ser. A 120 (2013), no. 6, 1246–1262.

Draisma, Jan; McAllister, Tyrrell B.; Nill, Benjamin Lattice-width directions and Minkowski's 3d-theorem. SIAM J. Discrete Math. 26 (2012), no. 3, 1104–1107.

Howard, Benjamin J.; McAllister, Tyrrell B. Degree bounds for type-A weight rings and Gelfand-Tsetlin semigroups. J. Algebraic Combin. 34 (2011), no. 2, 237–249.

G. Eric Moorhouse and Tim Penttila, 'Groups of projective planes with differing numbers of point and line orbits', Journal of Algebra, 399 (2014), pp.1013-1020.

G. Eric Moorhouse, Codes of Nets and Projective Planes, pp. 207-216 in: Error-Correcting Codes, Finite Geometries and Cryptography, ed. Aiden A. Bruen and David L. Wehlau, Contemporary Mathematics 523, American Mathematical Society, Providence RI, 2010.

C. Caliskan and G. Eric Moorhouse, 'Subplanes of order 3 in Hughes planes', The Electronic Journal of Combinatorics, 18 (2011), no. 1 (8 pp.)

Müller, Siguna On the existence and non-existence of elliptic pseudoprimes. Math. Comp. 79 (2010), no. 270, 1171–1190.

Niu, Zhuang A classification of tracially approximate splitting interval algebras. II. Existence theorem. C. R. Math. Acad. Sci. Soc. R. Can. 37 (2015), no. 1, 1–32.

Niu, Zhuang A classification of tracially approximate splitting interval algebras. III. Uniqueness theorem and isomorphism theorem. C. R. Math. Acad. Sci. Soc. R. Can. 37 (2015), no. 2, 41–75.

Elliott, George A.; Niu, Zhuang All irrational extended rotation algebras are AF algebras. Canad. J. Math. 67 (2015), no. 4, 810–826.

Niu, Zhuang, A classification of tracially approximate splitting interval algebras I. The building blocks and the limit algebras. C. R. Math. Acad. Sci. Soc. R. Can. 36 (2014), no. 2-3, 33–66.

Niu, Zhuang, Homomorphisms into a simple Z-stable C*-algebras. (With H. Lin) J. Operator Theory 71 (2014), no. 2, 517--569.

Elliott, George A.; Niu, Zhuang Remarks on the Pimsner-Voiculescu embedding. Operator algebra and dynamics, 131–140, Springer Proc. Math. Stat., 58, Springer, Heidelberg, 2013.

Elliott, George A.; Niu, Zhuang On the radius of comparison of a commutative C*-algebra. Canad. Math. Bull. 56 (2013), no. 4, 737–744.

Ciuperca, A.; Giordano, T.; Ng, P. W.; Niu, Z. Amenability and uniqueness. Adv. Math. 240 (2013), 325–345.

Ciuperca, A.; Giordano, T.; Ng, P. W.; Niu, Z. Amenability and uniqueness. Adv. Math. 240 (2013), 325–345.

G. A. Elliott and Z. Niu, Remarks on Pimsner-Voicuescu embedding. In: Operator Algebra and Dynamics (Nordforsk Network Closing Conference, Faroe Islands, May 2012), Springer Proceedings in Mathematics & Statistics, Vol. 58, pp 125–134, Carlsen, T.M.; Eilers, S.; Restorff, G.; Silvestrov, S. (Eds.) 2013.

Elliott, George A.; Niu, Zhuang Extended rotation algebras: adjoining spectral projections to rotation algebras. J. Reine Angew. Math. 665 (2012), 1–71.

Brenken, Berndt; Niu, Zhuang The C∗-algebra of a partial isometry. Proc. Amer. Math. Soc. 140 (2012), no. 1, 199–206.

Dadarlat, Marius; Elliott, George A.; Niu, Zhuang One-parameter continuous fields of Kirchberg algebras. II. Canad. J. Math. 63 (2011), no. 3, 500–532.

Lin, Huaxin; Niu, Zhuang The range of a class of classifiable separable simple amenable C∗-algebras. J. Funct. Anal. 260 (2011), no. 1, 1–29. 46L05

Ginting, V.; Pereira, F.; Rahunanthan, A. A prefetching technique for prediction of porous media flows. Comput. Geosci. 18 (2014), no. 5, 661–675.

Ginting, V.; Pereira, F.; Rahunanthan, A. Rapid quantification of uncertainty in permeability and porosity of oil reservoirs for enabling predictive simulation. Math. Comput. Simulation 99 (2014), 139–152.

Francisco, A.; Ginting, V.; Pereira, F.; Rigelo, J. Design and implementation of a multiscale mixed method based on a nonoverlapping domain decomposition procedure. Math. Comput. Simulation 99 (2014), 125–138.
Ginting, V.; Pereira, F.; Rahunanthan, A. Forecasting production in an oil reservoir simulation and its challenges. Numerical mathematics and advanced applications 2011, 693–701, Springer, Heidelberg, 2013.

Ginting, V.; Pereira, F.; Rahunanthan, A. A multi-stage Bayesian prediction framework for subsurface flows. Int. J. Uncertain. Quantif. 3 (2013), no. 6, 499–522.

Furtado, Frederico; Ginting, Victor; Pereira, Felipe; Presho, Michael Operator splitting multiscale finite volume element method for two-phase flow with capillary pressure. Transp. Porous Media 90 (2011), no. 3, 927–947.

Ginting, Victor; Pereira, Felipe; Presho, Michael; Wo, Shaochang Application of the two-stage Markov chain Monte Carlo method for characterization of fractured reservoirs using a surrogate flow model. Comput. Geosci. 15 (2011), no. 4, 691–707.

Pereira, F.; Rahunanthan, A. A semi-discrete central scheme for the approximation of two-phase flows in three space dimensions. Math. Comput. Simulation 81 (2011), no. 10, 2296–2306.

Borges, M. R.; Pereira, F.; Amaral Souto, H. P. Efficient generation of multi-scale random fields: a hierarchical approach. Int. J. Numer. Methods Biomed. Eng. 26 (2010), no. 2, 176–189.

D. Estep, P. Polyakov, “On a perturbation method for stochastic parabolic PDE”, Communications in Mathematics and Statistics, 3:2 (2015), 215-226, DOI 10.1007/s40304-015-0056-z

G. Henkin, P.Polyakov, “Residual d-bar cohomology and the complex Radon transform on subvarieties of CP^n”, Math. Annalen, 354:2 (2012), 497-527

G. Henkin, P.Polyakov , “Inversion formulas for complex Radon transform on projective varieties and boundary value problems for systems of linear PDE “, Proc. Steklov Inst. Math., v. 279 (2012), 242-256.

Monfared, Keivan Hassani; Shader, Bryan L. The λ-τ structured inverse eigenvalue problem. Linear & Multilinear Algebra 63 (2015), no. 11, 2275–2300.

Nelson, Curtis; Shader, Bryan A (0,1)-matrix existence theorem and equivalent tiling problems with dimers and monomers. Linear Algebra Appl. 485(2015), 503–526.

Nelson, Curtis; Shader, Bryan Maximal P-sets of matrices whose graph is a tree. Linear Algebra Appl. 485 (2015), 485–502.

Eastman, Brydon; Shader, Bryan L.; Vander Meulen, Kevin N.Sparse spectrally arbitrary patterns. Electron. J. Linear Algebra 28 (2015), 83–98.

Cioabă, Sebastian M.; Murty, M. Ram; Shader, Bryan; Tardif, Claude; Vander Meulen, Kevin; Wehlau, David Preface to the Special volume of the Electronic Journal of Linear Algebra on the occasion of Conference on Graph Theory, Matrix Theory and Interactions: a conference to celebrate the scholarship of David Gregory, Queen's University, Canada, June 20–21, 2014. Electron. J. Linear Algebra 28 (2015), 1–3.

Nelson, Curtis; Shader, Bryan All pairs suffice for a P-set.Linear Algebra Appl. 475 (2015), 114–118.

Eastman, B.; Kim, I.-J.; Shader, B. L.; Vander Meulen, K. N.Companion matrix patterns. Linear Algebra Appl. 463 (2014), 255–272.

Shader, Bryan; Shaked-Monderer, Naomi; Szyld, Daniel B.Nearly positive matrices. Linear Algebra Appl. 449 (2014), 520–544

Garnett, C.; Olesky, D. D.; Shader, B. L.; van den Driessche, P. Integrally normalizable matrices and zero-nonzero patterns. Linear Algebra Appl.449 (2014), 132–153.

Mallik, Sudipta; Shader, Bryan L. Classes of graphs with minimum skew rank 4. Linear Algebra Appl. 439 (2013), no. 11, 3643–3657.

Monfared, Keivan Hassani; Shader, Bryan L. Construction of matrices with a given graph and prescribed interlaced spectral data. Linear Algebra Appl. 438 (2013), no. 11, 4348–4358.

Nair, Reshmi; Shader, Bryan L. Acyclic matrices with a small number of distinct eigenvalues. Linear Algebra Appl. 438 (2013), no. 10, 4075–4089.
Garnett, Colin; Shader, Bryan L. The nilpotent-centralizer method for spectrally arbitrary patterns. Linear Algebra Appl. 438 (2013), no. 10,3836–3850.

Kim, In-Jae; Shader, Bryan L. Unordered multiplicity lists of a class of binary trees. Linear Algebra Appl. 438 (2013), no. 10, 3781–3788.

Barioli, Francesco; Barrett, Wayne; Fallat, Shaun M.; Hall, H. Tracy; Hogben, Leslie; Shader, Bryan; van den Driessche, P.; van der Holst, Hein Parameters related to tree-width, zero forcing, and maximum nullity of a graph. J. Graph Theory 72 (2013), no. 2, 146–177.

Garnett, Colin; Shader, Bryan L. A proof of the Tn conjecture: centralizers, Jacobians and spectrally arbitrary sign patterns. Linear Algebra Appl. 436(2012), no. 12, 4451–4458.

Allison, Mary; Shader, Bryan L. Fastest mixing Markov chain problem for the union of two cliques. Linear Multilinear Algebra 59 (2011), no. 7,801–823.

Doering, E.; Michael, T. S.; Shader, B. L. Even and odd tournament matrices with minimum rank over finite fields. Electron. J. Linear Algebra22 (2011), 363–377.

Dr. Richard Loft, Aaron Andersen, Dr. Frank Bryan, Dr. John M. Dennis, Tom Engel, Pam Gillman, David Hart, Anke Kamrath, Dr. Gabrielle Pfister, Dr. Matthias Rempel, Dr. Justin Small, Dr. William Skamarock Dr. Michael Wiltberger, Dr. Bryan Shader, Dr. Po Chen, and Dr. Ben Cash, Yellowstone: A Dedicated Resource for Earth System Science, to appear in Contemporary High Performance Computing, CRC Press, 2015

Shader, Chanyoung Lee Hook Schur functions for Littlewood-Richardson coefficients. JP J. Algebra Number Theory Appl. 21 (2011), no. 2, 179–202

B. Chen-Charpentier and D. Stanescu, Parameter estimation Using Polynomial Chaos and Maximum Likelihood, International Journal of Computer Mathematics, Vol. 91, 2014, Issue 2, pp. 336-346.

B. Chen-Charpentier and D. Stanescu, Virus propagation with randomness, Mathematical and Computer Modeling, Vol. 57, 2013, pp. 1816-1821.

D. Stanescu, B. Chen-Charpentier, Parameter Estimation Using Polynomial Chaos, Proceedings of Modelling for Engineering and Human Behavior 2012.

B. Chen-Charpentier and D. Stanescu, Biofilm growth on medical implants with randomness, Mathematical and Computer Modeling, Vol. 54, 2011, pp. 1682-1686.

S. Hobart, J. Williford, 2014, “The Absolute Bound for Coherent Configurations”, Linear Algebra and its Applications, 440 (2014), 50–60.

S. Hobart, J. Williford, 2014, “Tightness in subset bounds for coherent configurations.” J. Algebraic Combin. 39 (2014), no. 3, 647-658.
F. Firke, P. Kosek, E. Nash, J. Williford, 2013, “Extremal Graphs Without 4-Cycles”, Journal of Combinatorial Theory, Series B 103 (2013), no. 3, 327-336.

S. A. Hobart, J. Williford, 2012, “The independence number for polarity graphs of even order planes”, J. Algebraic Combin. 38 (2013), no. 1, 57-64.

T. A. Terlep, J. Williford, 2012 “Graphs from Generalized Kac-Moody Algebras”, Siam Journal on Discrete Math. 26 (2012), 1112-1120.

Tim Penttila, Jason Williford, 2011 “New families of Q-polynomial association schemes.” J. Combin. Theory Ser. A 118 (2011), no. 2, 502-509.

Man-Chung Yeung, ML(n)BiCGStabt: A ML(n)BiCGStab Variant with A-transpose, Journal of Computational and Applied Mathematics, 272 (2014) 57-69.

Man-Chung Yeung, ML(n)BiCGStab: Reformulation, Analysis and Implementation, Numer. Math. Theor. Meth. Appl. 5(2012), pp.447-492.

Craig Douglas, Long Lee, and Man-Chung Yeung, On Solving Ill-conditioned Linear Systems, Procedia Computer Science, Volume 80, 2016, Pages 1-10.

Man-Chung Yeung, 2012, An Introduction to ML(n)BiCGStab, Proceedings of BEM XXXIV, WITpress, edited by Brebbia and Poljak.

Presentations by UW Math Personnel (2010-2015)

M.B. Allen, “The case for dimensional analysis,” 28 March 2014, MAA Regional Meetings, Laramie, WY.

M.B. Allen, “Dimensional analysis: how to cook a turkey,” 4 April 2014, Wyoming Mathematics Articulation Conference, Powell, WY.

M.B. Allen, “Deriving Darcy’s law from mixture theory” (invited), 20 May 2014, Workshop on Experimentation, Mathematical Modeling, & Numerical Simulation of Porous Media Flows, UW School of Energy Resources, Laramie, WY.

A.S. Telyakovskiy, M.B. Allen and S. Kurita, “Approximate solution to the Boussinesq equation near a well.” SIAM Conference on Geosciences, Stanford, CA, July 2015.

M.B. Allen, “Another look at the golden ratio,” (invited keynote address), 15 April 2016, Wyoming Mathematics Articulation Conference, Torrington, WY.

2011, Anton: presented “The UW Online Math Placement Exam”, Math and Stats Articulation Meeting, Western Wyoming Community College

2011, Anton: led multi-college discussion about Math 1000 Problem Solving, Math and Stats Articulation Meeting, Western Wyoming Community College

2013, Anton: invited presentation “A Tale of Transitions”, Wyoming Mathematics Lost in Transition Institute, Sheridan Community College (Gillette campus)

2013, Anton: presented “The Predictive Power of a Placement Exam”, Math and Stats Articulation Meeting, Sheridan Community College (Gillette campus)

2014, Anton: invited presentation “Tracking Student Success Across Levels”, Wyoming Mathematics Lost in Transition Institute, Northwest College

2014, Anton: presented “Happy Trails or High Hurdles: do first year freshmen realize their dream?, Math and Stats Articulation Meeting, Northwest College

Bessaih: Applied Math seminar, Bloomington, Indiana University, November 9th 2015.

Bessaih: Stochastic Seminar Colloquium, University of Jena, June 10th, 2015.

Bessaih: Applied Math Colloquium, NJIT, February 13th 2015.

Bessaih: Applied Math seminar, CSU (Fort Collins), October 16th 2014.

Bessaih: Probability seminar, Rochester, April 25th 2014.

Bessaih: Analysis/Applied/Computational seminar, UW, February 18th 2014.

Bessaih: Applied Math seminar, Guelma (Algeria), June 15th 2013.

Bessaih: Applied Math seminar, Leoben (Austria), June 4th 2013.

Bessaih: Probability seminar, Padova (Italy), May 29th 2013.

Bessaih: Probability seminar, Pisa (Italy), May 3rd 2012.

Bessaih: Paris 1 La Sorbonne, March 16th 2012.

Bessaih: EPFL, Stochastic Analysis and Applications Program (3 lectures), February 24th, March 2nd and 9th 2012.

Bessaih: Differential Equations Seminar, Seville (Spain), May 10th, 2011.

Bessaih: Mini-symposium on "Fluid Models, Turbulence and Data Assimilation", SIAM, Arizona, December 7-10, 2015.

Bessaih: Minisymposium on "Data assimilation for PDE models", SIAM, Arizona, December 7-10, 2015.

Bessaih: ICIAM Mini-symposium on "Multi scale methods with applications in fluid mechanics and materials modeling", Beijing (China), August 10-14, 2015.

Bessaih: The 4th International Conference on Random Dynamical Systems, Xian (China), June 27-30, 2015.

Bessaih: One day workshop on Deterministic and Stochastic PDEs, University of Sevilla, June 18th, 2015.

Bessaih: AWM Research Symposium "Many facets of probability", University of Maryland, April 11-12, 2015.

Bessaih: Special session "Stochastic Analysis and Applications", AMS, Alabama, March 27-28, 2015.

Bessaih: Special session "Stochastic Analysis and Stochastic PDEs", AMS, Washington DC, March 7-8, 2015.

Bessaih: SIAM Minisymposium on Partial Differential Equations and Applications, Joint Mathematics Meetings, San Antonio, January 10-13, 2015.

Bessaih: Mathematical Analysis of Turbulence, IPAM (UCLA), September 29 – October 3, 2014.

Bessaih: Special session "Stochastic and Deterministic Dynamical Systems and Applications", The 10th AIMS conference on dynamical systems, differential equations and applications, Madrid, July 7-11, 2014.

Bessaih: Special session "Infinite Dimensional Stochastic Systems and Applications", The 10th AIMS conference on dynamical systems, differential equations and applications, Madrid, July 7-11, 2014.

Bessaih: Special Session on Stochastic and PDEs (AMS), Albuquerque (NM), April 5-6, 2014.

Bessaih: Infinite dimensional stochastic systems: Theory and applications, Wittenberg (Germany), January 13-16, 2014.

Bessaih: Stochastic Partial Differential Equations and Applications - IX, Trento (Italy), January 5-11, 2014.

Bessaih: Siam Conference on Analysis of PDEs, Orlando (Florida), December 6-10, 2013.

Bessaih: 36th Conference on Stochastic Processes and their Applications, Boulder, July 29-August 2, 2013.

Bessaih: Probability and PDE's, Pisa (Italy), May 20-24, 2013.

Bessaih: AWM Research Symposium, Santa Clara, March 16-17, 2013.

Bessaih: Geophysical Fluid Dynamics, Oberwolfach, February 13-17, 2013, (Chair of session).

Bessaih: Random Dynamical Systems, IMA Minneapolis, October 22-26 2012.

Bessaih: Recent Developments in Stochastic Analysis, January 30-February 3rd 2012.

Bessaih: Siam Conference on Analysis of PDEs, San Diego (California), November 14-17 2011.

Bessaih: Applied Analysis and Applied PDEs, Victoria (Canada), July 12-15 2011.

Bessaih: Second International Conference on Random Dynamical Systems, Nanjing (China), June 20-22 2011.

Bessaih: AMS Sectional Meeting, Interdisciplinary Session on Deterministic and Stochastic Partial Differential Equations, Las Vegas, April 30- May 1st, 2011.

Jacobs, K., & Chamberlin, M. T. (2015, April). Math for elementary teachers roundtable. Wyoming Mathematics, Statistics, and Physics Community College and University Articulation, Session organizer, Laramie, WY.

Chamberlin, M. T. (2015, February). Intertwining the roles of mathematics instructor and mathematics teacher educator: The function of math notebooks in mathematical investigations. Front Range Mathematics Education Seminar (FRaMES), Invited main speaker, Denver, CO.

Candelaria, M., & Chamberlin, M. T. (2014, March). Helping students understand transformations: Motivating the need for reference information. 2014 Mathematical Association of America Rocky Mountain Section Meeting, Laramie, WY.

Goss, M., Breitstein, A., Nair, R., & Chamberlin, M. T. (2013, January). The perspectives of teacher leaders on mathematics, learning, and teaching: Supporting reform-oriented instruction. Seventeenth Annual Conference of the Association of Mathematics Teacher Educators, Orlando, FL.

Chamberlin, M. T. (2012, September). Reflections on offering mathematics professional development for
teachers. Annual Fall Conference of the Rocky Mountain Association of Mathematics Teacher Educators, Denver, CO.

Chamberlin, M. T. (2012, July). Mathematics educators: Their work, research, teaching, and service. REU-Site: Rocky Mountain Mathematical Research and Career Experiences, Laramie, WY.
Chamberlin, M. T. (2011, July). Role of mathematics educators in a mathematics department. REU-Site: Rocky Mountain Mathematical Research and Career Experiences, Laramie, WY.

Chamberlin, M. T., & Schnorenberg, M. (2011, October). Using a lesson experiment to investigate the promise of differentiated instruction for prospective elementary teachers: An area and volume lesson. 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Reno, NV.

Hatfield, L. L., Belbase, S., Chamberlin, M. T., & Schnorenberg, M. (2011, October). Lived and living mathematical experiences of pre-service elementary teachers: An exploratory investigation. 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Reno, NV.

Hatfield, L. L., Belbase, S., Hackenberg, A., & Chamberlin, M. T. (2011, October). Developing investigations of lived and living mathematical experiences: The DIME working group. 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Reno, NV.

Chamberlin, M. T., & Schnorenberg, M. (2011, January). Differentiated activities in measurement: Addressing students' current understandings and the Common Core State Standards. Ninth Annual Mathematics and Science Teachers Conference, Casper, WY.
2011, "Expander graphs in arithmetic geometry," invited lecture in special session "On Recent Directions in Number Theory", at 2011 Fall Central Section Meeting of the American Mathematical Society

2012, Clements: “The Spectrum of a Hypercyclic Operator”, Joint Mathematics Meeting, Baltimore, MD

2014, Clements: “Journey into Flipping the Calculus I Classroom”, Joint Mathematics Meeting, Baltimore, MD

2014, Clements: “What do students at UW get out of Calculus I?”, N. Clements and M. Chamberlin, Laramie, WY

2014 Clements: “ALEKS at the University of Wyoming,” MathFest, Portland, OR

2014 Clements: “Impact of a Large Lecture Model in Multivariable Calculus,” MathFest, Portland, OR

2014 Clements: “Using Pearson Textbooks in Calculus”, University of Wyoming, Laramie, WY

2014 Clements: “The Calculus Program”, University of Wyoming Mathematics Department, Laramie, WY

2014 Clements: “Conversation on Teaching Calculus in Wyoming”, Wyoming Math/Physics Articulation Meeting, Powell, WY

2014 Clements: “Calculus at the University of Wyoming”, Wyoming Lost-in-Transitions Meeting, Powell, WY (Invited)

2015, Clements: Poster: Thomas, M., Gleason, J., Bagley, S., Clements, N., White, D., Psychometric Analysis of the Calculus Concept Inventory, Conference on Research in Undergraduate Mathematics Education, Pittsburgh, PA, 2/18-2/22

2015, Poster: Minear, M., Clements, N., McClure, K., Schaeffer, J., Mecham, D. & Radich, M. *Spatial abilities, mathematical self-efficacy, anxiety and performance*. 56th Annual Meeting of the Psychonomic Society, Chicago, IL. 9/17-9/20

2016, Poster: Minear, M., Lutz, L., Clements, N. & Cowen, M. (2016). Individual and gender differences in spatial ability and three forms of engineering self-efficacy. Poster presented at Spatial Cognition 2015, Philadelphia, Pennsylvania.

Douglas: DCABES 2010, Lignan University, Hong Kong, P.R. China, Basket option pricing using GP-GPU hardware acceleration, 2010.

Douglas: The 2010 NIMS Conference and the Third China-Japan-Korea Joint Conference on Numerical Mathematics, Gangneung-Wonju National University, Gangneug, South Korea, Hybrid computational methods, 2010.

Douglas: World Congress on Engineering and Computer Science 2010, San Francisco, CA, L. Deng, H. Lee, H. Yu, D. Cerwinsky, X. Li, and C. C. Douglas, Variable satellite usage in GPS receivers, 2010.

Douglas: The Eighth International Conference on Optimization: Techniques and Applications (ICOTA8), Shanghai, P.R. China, Hybrid computational methods, 2010.

Douglas: Wuhan University of Technology, Wuhan, P.R. China, Hybrid computational methods, 2010

Douglas: National Symposium on High Performance Algorithm and Software, Beijing, P.R. China, GPU supercomputing, 2010.

Douglas: National Academy of Sciences, Beijing, P.R. China, Data driven science, 2010.

Douglas: KAUST Winter Enhancement Program 2011, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia, Data-driven, multiscale, high performance applications with visualization, 9 hour minicourse, joint with Yalchin Efendiev (Texas A&M) and Charles Hansen (University of Utah), 2011.

Douglas: International MultiConference of Engineers and Computer Scientists 2011, Hong Kong, Data driven science and the evolution of computing, 2011.

Douglas: Hong Kong University of Science and Technology, Hong Kong, Data driven science, 2011.

Douglas: Fifteenth Copper Mountain Multigrid Conference, Copper Mountain, CO, Isogeometric multigrid, 2011.

Douglas: International Conference on Information Science and Applications 2011 (ICISA 2011 Jeju, S. Korea), A computational agent-based modeling approach for competitive wireless service market, 2011.

Douglas: Oberwolfach Workshop on Partial Differential Equations, Oberwolfach, Germany, Isogeometric multigrid, 2011.

Douglas: International Conference on Computational Sciences 2011, Singapore, Intelligent fracture creation for shale gas development, 2011.

Douglas: Third Workshop on Modeling and Sensing Environmental Systems, LNCC, Petropolis, Brazil, Intelligent fracture creation for shale gas development, 2011.

Douglas: Hot Topics Conference on the Laplace Transform, National Institutes for Mathematical Sciences, Daejon, S. Korea, Comparing the Laplace transform and parareal algorithms, 2011.

Douglas: North Carolina State University, Raleigh, NC, Hybrid CPU/GP-GPU computational methods with financial and engineering applications, 2012.

Douglas: North Carolina State University, Raleigh, NC, Comparing the Laplace transform and parareal algorithms, 2012.

Douglas: International MultiConference of Engineers and Computer Scientists 2012, Hong Kong, Can We Still Solve a Partial Differential Equation (PDE) Based Application on a Million or More Computer Cores?, 2012.

Douglas: International Workshop on Computational Science and Numerical Analysis, Tokyo, Japan, Comparing the Laplace transform and parareal algorithms, 2012.

Douglas: IAMCS Spring Symposium 2012, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia, Petascale hydrologic modeling: needs and challenges, 2012.

Douglas: International Conference on Computational Sciences 2012, Omaha, U.S., An introduction to a porous shape memory alloy dynamic data driven application system, 2012.

Douglas: Conference on Numerical Software: Design, Analysis and Verification, Santander, Spain, Comparing the Laplace transform and parareal algorithms, 2012.

Douglas: European Multigrid Conference 2012, Germany, Isogeometric multigrid methods and implementation issues, 2012.

Douglas: China-Japan-Korea Workshop on Numerical Mathematics, Kyoto, Japan, Isogeometric multigrid methods and its practicality, 2012.

Douglas: DCABES 2012, Guilin, P.R. China, Comparing the Laplace transform and parareal algorithms, 2012.

Douglas: Chinese Academy of Sciences, Beijing, P.R. China, An introduction to a porous shape memory alloy dynamic data driven application system, 2013.

Douglas: King Abdullah University of Science & Technology, Thuwal, Saudi Arabia, Dynamic data driven apps, 2013.

Douglas: Hong Kong University of Science and Technology, Hong Kong, An introduction to a porous shape memory alloy dynamic data driven application system, 2013.

Douglas: International MultiConference of Engineers and Computer Scientists 2013, Hong Kong, Very long term simulations using dynamic data driven apps, 2013.

Douglas: International Conference on Computational Sciences 2012, Barcelona, Spain, Using shape memory alloys: a dynamic data driven approach, 2013.

Douglas: International Conference on Computational and Information Sciences 2013, Shiyan, P.R. China, A finite element method perturbation expansion for a coupled structural-acoustic system, 2013.

Douglas: Data-Intensive Scientific Discovery 2013, Shanghai, P.R. China, Big Data and Its Applications (Parts 1 and 2), 2013.

Douglas: Data-Intensive Scientific Discovery 2013, Shanghai, P.R. China, Comparing the Laplace transform and the parareal algorithms, 2013.

Douglas: 12th Conference on Fluid Flow through Porous Media, Chinese University of Petroleum, Qingdao, P.R. China, A fast method for predicting moisture movement through porous media, 2013.

Douglas: AFOSR Principal Investigator Meeting, Arlington, VA, Dynamic data driven porous shape memory alloys, 2013.

Douglas: DCABES 2013, London, United Kingdom, Parallel ADI smoothers for multigrid, 2013.

Douglas: North Carolina State University, Raleigh, NC, Big data and dynamic applications, 2014.

Douglas: 2014 NumPor Yearly Meeting, King Abdullah University of Science & Technology, Big data and dynamic applications, Thuwal, Saudi Arabia, March 2014.

Douglas: International MultiConference of Engineers and Computer Scientists 2014, Hong Kong, Big data and dynamic applications, 2014.

Douglas: Japanese Society of Industrial and Applied Mathematics 2014 Meeting, Kyoto, Japan, Roughed aggregation algebraic multigrid, 2014.
Douglas: North Carolina State University, Raleigh, NC, Dynamic big data applications, 2014.

Oberwolfach Workshop on Partial Differential Equations, Oberwolfach, Germany, The Laplace Transform versus Parareal, 2014.

Douglas: University of Frankfurt, Frankfurt, Germany, Incorrect and defective pill detection using a dynamic data-driven application system, 2014.

Douglas: International Conference on Computational Sciences 2014, Cairns, Australia, OpenDBDDAS, 2014.

Douglas: IFIP WG 2.5 Meeting, Vienna, Austria, A fast method for modeling water infiltration in porous media, 2014.

Douglas: Chinese University of Petroleum, Qingdao, P. R. China, A fast method for modeling water infiltration in porous media, 2014.

Douglas: China-Japan-Korea Workshop on Numerical Mathematics, Yinchuan, P. R. China, A fast method for modeling water infiltration in porous media, 2014.
European Multigrid 2014, Leuven, Belgium, A fast method for modeling water infiltration in porous media, 2014.

Douglas: Colorado State University, Fort Collins, CO, Dynamic big data applications, 2014.

Douglas: Colorado State University, Fort Collins, CO, A fast method for modeling water infiltration in porous media, 2014.

Douglas: Scalable Algorithms for Large Scale Systems – ScalA 2014, New Orleans, LA, Dynamic big data applications, 2014.

Douglas: Nanjing Normal University, Nanjing, P. R. China, Dynamic big data applications, 2014.

Douglas: DCABES 2014, Xianning, P.R. China, A fast method for modeling water infiltration in porous media, 2014.

Douglas: Parallel and Fast Solvers of Partial Differential Equations Conference, Shanghai University, Shanghai, P. R. China, A fast method for modeling water infiltration in porous media, 2014.

Douglas: International MultiConference of Engineers and Computer Scientists 2015, Hong Kong, A fast method for modeling water infiltration in porous media, 2015.

Douglas: The Computational and Data-Enabled Science and Engineering Program – CDSE Days, Buffalo, NY, A fast method for modeling water infiltration in porous media, 2015.
Douglas: Kyoto University, Kyoto, Japan, A fast method for modeling water infiltration in porous media, 2015.

Douglas: International Conference on Computational Sciences 2015, Reykjavik, Iceland, OpenDBDDAS toolkit: secure MapReduce and Hadoop-like systems, 2015.

Douglas: Chinese University of Petroleum, Qingdao, China, Big data methods for energy and petroleum engineering, 7 lectures, 2015.

Douglas: High Performance Computation and Applications 2015, Shanghai, P. R. China, A reliable and computationally efficient alternative to the one dimensional Richards equation for variably saturated flow in soils, 2015.

Douglas: Missouri Science and Technology University, Rolla, MO, Dynamic big data applications, 2015.

Douglas: Kyoto University, Kyoto, Japan, A replacement for Richards equation that always converges and is significantly faster, 2015.

2015, Furtado: The displacement problem for immiscible three-phase flow in green reservoirs, 30th Brazilian Colloquium of Mathematics, 26 – 31 July 2015, IMPA, Rio de Janeiro, Brazil.

2014, Furtado:Hysteretic enhancement of carbon dioxide trapping in deep aquifers, 1st IMPA-Interpore Workshop on Porous Media, 19 – 21 October 2014, IMPA, Rio de Janeiro, Brazil.

2014, Furtado:Hysteretic trapping of carbon dioxide in deep aquifers, 14th European Conference on the Mathematics of Oil Recovery, 8 – 11 September 2014, Catania, Sicily, Italy.

2014, Furtado:Hysteretic enhancement of carbon dioxide trapping in deep aquifers, CFSF Workshop: Experimentation, Mathematical Modeling and Numerical Simulation of Porous Media Flows, 19 – 21 May 2014, SER, Univ. of Wyoming.

2013, Furtado:Hysteretic trapping of carbon dioxide in aquifers, 29th Brazilian Colloquium of Mathematics, 21 July—02 August 2013, IMPA, Rio de Janeiro, Brazil.

2013, Furtado:The Riemann problem for three-phase flow, SIAM Conference on Mathematical & Computational Issues in the Geosciences, 17—20 June 2013, University of Padova, Italy.

2012, Furtado: Permeability Hysteresis Effects in Geologic CO2 Sequestration, 4th International Conference on Porous Media & Annual Meeting of the International Society for Porous Media, 14—16 May 2012, Purdue University, West Lafayette, IN, USA.

2012, Furtado:The Riemann problem for three-phase flow with quadratic permeabilities, 14th International Conference on Hyperbolic Problems: Theory, Numerics, Applications, 25—29 June 2012, University of Padova, Italy.

2011, Furtado: Permeability Hysteresis Effects in Geologic CO2 Sequestration, 28th Brazilian Colloquium of Mathematics, 18--19 July 2011, IMPA, Rio de Janeiro, Brazil.

2011, Furtado:Permeability Hysteresis Effects in Geologic CO2 Sequestration, 2nd Joint Meeting of INCT/Mathematics and INCT/Climate Change: Modeling of CO2 storage in the pre-salt, 04 August 2011, LNCC, Petropolis, Brazil.

2011, Furtado: Permeability Hysteresis Effects in Geologic CO2 Sequestration, Brazilian Congress on Applied and Computational Mathematics, 20—23 September 2011, Federal University of Uberlandia, Brazil.

2011, Furtado:Permeability Hysteresis Effects in Geologic CO2 Sequestration, Second CFSF Workshop on Porous Media Flows, 27—29 September 2011, Hilton Garden Inn, Laramie, WY.

2011, Furtado: Scaling Analysis of Multiphase Fluid Flow in Heterogeneous Porous Media, Northwestern University Applied Mathematics Colloquium, 05 December 2011, Evanston, Illinois.

2015, Ginting: A Locally Conservative Stabilized Continuous Galerkin Finite Element Method for Multiphase Flow in Poroelastic Subsurfaces, Applied Mathematics Seminar, Department of Mathematics, Colorado State University, Fort Collins, CO

2015, Ginting: On the Application of Generalized Multiscale Finite Element Method in Multiphase Flow Models, Minisymposium: Numerical Homogenization and Multiscale Model Reduction Methods, ICIAM, Beijing, China

2015, Ginting: A Multi-stage Bayesian Prediction Framework for Subsurface Flows, Minisymposium: Mathematical Models and Numerical Methods for Flow and Transport in Porous Media, SIAM Geosciences, Stanford, CA

2015, Ginting: A Locally Conservative Stress Recovery Technique for Continuous Galerkin FEM in Linear Elasticity, Workshop: Materials, Modeling, Simulation, and Visualization, The Center for Advanced Energy Studies, McCall, ID

2014, Ginting: An A Posteriori Analysis of Multirate and Multiscale Evolution Systems, keynote speaker at seminar on Operation Research and Its Role, College of Mathematics and Sciences, Universitas Sumatera Utara, Medan, Indonesia

2014, Ginting: On the Application of Generalized Multiscale Finite Element Method in Multiphase Flow Models, Seminar at Center for Computational Mathematics, University of Colorado at Denver, CO

2013, Ginting: A Multiscale Method Based on a Nonoverlapping Domain Decomposition Procedure, Minisymposium on Efficient Solvers for Heterogeneous Nonlinear Problems, International Conference on Domain Decomposition Methods, Lugano, Switzerland

2013, Ginting: Application of Generalized Multiscale Finite Element Method in Multiphase Flow Model, Minisymposium on Advanced Numerical Methods for PDEs and Applications, International Conference on Applied Mathematics, Modeling Computational Sciences, Waterloo, Ontario, Canada

2013, Ginting: Higher Order Multiscale Finite Element for Solving Problems With Heterogeneous Coefficients, 4th International Congress on Computational Engineering and Sciences, Las Vegas, Nevada

2013, Ginting: An Adaptive Finite Element for Quasilinear Elliptic Problems, Analysis and Applied Mathematics Seminar, University of Wyoming

2013, Ginting: On the Application of Adjoint Methods in Subsurface Flow Simulations, Minisymposium on Adjoint Methods for Computational PDEs, SIAM Conference on Computational Science and Engineering Boston, Massachusetts
2013, Ginting: A Multiscale Mixed Method Based on a Nonoverlapping Domain Decomposition Procedure, Minisymposium on Numerical Analysis and Computation on Multiscale Problems, SIAM Conference on Computational Science and Engineering Boston, Massachusetts

2013, Ginting: On the Application of the Continuous Galerkin Finite Element Method for Solving Multiphase Flow Problems, invited speaker in Workshop on Numerical Methods for PDEs: In Occasion of Raytcho Lazarov's 70th Birthday, TAMU, College Station, Texas

2012, Ginting: An A Posteriori Analysis of Multirate and Multiscale Evolution Systems, plenary speaker in the 5th LNCC Meeting on Computational Modeling, Petropolis, Brazil

2012, Ginting: Predictive Simulations for Porous Media Flows on GPUs, Minisymposium on Recent Developments In Uncertainty Quantification For Multiphase Flows In Heterogeneous Subsurface Formations, 10th World Congress on Computational Mechanics, Sao Paolo, Brazil

2012, Ginting: Operator Splitting Multiscale Finite Volume Element Method for Two-Phase Flow with Capillary Pressure, Minisymposium on Recent Developments In Uncertainty Quantification For Multiphase Flows In Heterogeneous Subsurface Formations, 10th World Congress on Computational Mechanics, Sao Paolo, Brazil

2012, Ginting: Time Integration Techniques for Richards Equation, International Workshop on Flow and Transport: Computational Challenges, International Conference on Computational Science, Omaha, NE

2012, Ginting: A Multiscale Mixed Method for Porous Media Flows, Minisymposium on CO2 Sequestration: Experimentation, Multiscale Modeling and Simulation, 4th International Conference on Porous Media, Purdue University, West Lafayette, IN

2012, Ginting: A Comparative Study on Reservoir Characterization using Two Phase Flow Model, Minisymposium on Random Media: Models, Simulations, and Applications, SIAM Conference on Uncertainty Quantification, Raleigh, NC

2011, Ginting: A Bayesian MCMC for Efficient Uncertainty Quantification in Permeability and Porosity of Reservoir Models, International Conference on Mathematical Modeling in Industry, University of Sao Paulo, Sao Paulo, Brazil

2011, Ginting: A Posteriori Analysis of Operator Splitting, Computational Mathematics and Multidisciplinary Science Seminar, Dept. of Mathematics, University of Wyoming

2011, Ginting: A Bayesian Framework for Efficient Uncertainty Quantification in Permeability and Porosity of Reservoir Models, The ninth European Conference on Numerical Mathematics and Advanced Applications (ENUMATH), Leicester University, United Kingdom
2011, Ginting: An A Posteriori Analysis of Fixed Point Iteration for System of ODEs, The seventh International Congress on Industrial and Applied Mathematics, Vancouver, British Columbia, Canada (minisymposium co-organizer)

2011, Ginting: A Multiscale Modeling and Uncertainty Quantification in Porous Media Simulation, Col- loquium at the Department of Mathematics, Universitas Sumatera Utara, Medan, Indonesia

2011, Ginting: Model Reduction Techniques for Characterization of Fractured Subsurfaces, International Conference on Computational Science (ICCS), Nanyang Technological University, Singapore

2011, Ginting: Dynamic Data Integration for Characterization of Fractured Subsurface, The fourth International Conference on Approximation Methods and Numerical Modeling in Environment and Natural Resources (MAMERN), Saidia, Morocco.

2011, Ginting: A Bayesian Uncertainty Quantification of Fractured Reservoirs using Surrogate Flow Model, SIAM Conference on Mathematical & Computational Issues in the Geosciences, Long Beach, CA

2011, Ginting: On the Application of a Discontinuous Galerkin Method for Solving Quasi-linear Elliptic Problems, Analysis/Applied Mathematics Seminar, Department of Mathematics, University of Wyoming

2011, Hall: “Ranks in families of elliptic surfaces,” invited lecture in “Group Actions in Number Theory Concluding Workshop” at EPF Lausanne

2011, Hall: “Expander finiteness and expanders in arithmetic geometry,” invited lecture in workshop “Abelian varieties and Galois actions” at Adam Mickiewicz University, Poland

2012 Hall: “Hyperelliptic curves with big monodromy,” FRAGMENT Seminar, Colorado State University

2013 Hall: “Expander families and variation of Galois representations, Number Theory Seminar, Emory University

2013 Hall: “Zeta functions of random graphs,” CEDAR workshop, University of Illinois at Chicago

2013 Hall: “Expander families and variation of Galois representations,” Number Theory Seminar, Penn. State
University

2013 Hall: “Jumping ranks in families of elliptic surfaces,” Special Session on Number Theory and Geometry, 2013 Joint Mathematics Meetings, San Diego.

2014 Hall: “Sequences of curves with growing gonality,” Algebraic Geometry Seminar, Duke University

2014 Hall: “Hilbert irreducibility for abelian varieties,” Number Theory Seminar, Duke University

2014 Hall: “Families of elliptic surfaces with big monodromy,” invited lecture workshop on ``Statistics and Number Theory,'' CRM, Universite de Montreal

2015 Hall: “Specialization and big monodromy,” invited lecture, RIMS Number Theory Workshop, Kyoto, Japan

2015 Hall: “Arithmetic and graphs,” Number Theory Seminar, University of Colorado at Boulder

2015 Hall: “Arithmetic and graphs,” Number Theory Seminar, University of Bristol

2015 Hall: “Specialization and big monodromy,” invited lecture, Nicholas M. Katz 71st Birthday Conference, Beijing, China

2015 Hall: “Sequences of curves with growing gonality,” Algebraic Geometry Seminar, University of Chicago

2015 Hall: “Expander graphs and gonality of curves,” plenary speaker, Upstate New York Number Theory Conference

2015 Hall: “Hilbert irreducibility for abelian varieties,” Number Theory Seminar, MIT

2015 Hall: “Hilbert irreducibility for abelian varieties,” Number Theory Seminar, Yale University

Heinz: Realizable Dynamic LES Subgrid-Scale Modeling. Ninth International Symposium on Turbulence and Shear Flow Phenomena, Melbourne, Australia, June 2015

Heinz: Unified RANS-LES Method Based on Second-Order Closure. Ninth International Symposium on Turbulence and Shear Flow Phenomena, Melbourne, Australia, June 2015
Heinz: Turbulence Structure Preserving Unified and Dynamic Large Eddy Simulation of Separated Flows, National Institute of Aerospace (NIA), Hampton, VA, July 30, 2015.

Heinz: Turbulent Flow Simulations Based on Stochastic Analysis. University of Oldenburg, Germany, January 8, 2014.

Heinz: Unified RANS-LES Analysis of Turbulent Jets Covering Several Swirl Number Regimes. 52st AIAA Aerospace Sciences Meeting and Exhibit, National Harbor, MD, January 14, 2014.

Heinz: Turbulence Structure Characteristics of LES Methods Implied by Stochastic Turbulence Models. 52st AIAA Aerospace Sciences Meeting and Exhibit, National Harbor, MD, January 14, 2014.

Heinz: Unified RANS-LES Simulations of Turbulent Swirling Jets and Channel Flows. Texas A&M, March 19, 2014.

Heinz: Turbulence Structure Preserving Unified and Dynamic Large Eddy Simulation of Separated Flows, National Institute of Aerospace (NIA), Hampton, VA, August 6, 2014.

Heinz: Realizable Unified RANS-LES and Dynamic LES Methods for Turbulent Flow Simulations. 51st AIAA Conference, Grapevine, Texas, January 9, 2013.

Heinz: Turbulence Structure Preserving Unified and Dynamic Large Eddy Simulation of Separated Flows, National Institute of Aerospace (NIA), Hampton, VA, August 13, 2013.

Heinz: Dynamic Multi-Scale Modeling Applied to Turbulent Flows. Applied Math Seminar, UW, Sept. 14, 2013.

Heinz: Unified RANS-LES and Dynamic LES Simulations of the Atmospheric Boundary Layer. International Conference on Future Technologies for Wind Energy, Laramie, Oct. 9, 2013.

Heinz: Wind Energy Applications of Unified and Dynamic Turbulence Models, EUROMECH Colloquium 528: Wind Energy and the Impact of Turbulence on the Conversion Process, Oldenburg, Germany, February 23, 2012.

Heinz: Turbulence Structure Preserving Unified and Dynamic Large Eddy Simulation of Separated Flows, National Institute of Aerospace (NIA), Hampton, VA, August 9, 2012.

Heinz: The Navier-Stokes Equations: Their Origin, Limitations, and Related Challenges. Applied Math Seminar, UW, October 9, 2012.

Heinz: Stochastic, Dynamic, and Unified Equations for Turbulence, Applied Math Seminar, UW, March 8, 2011.
Heinz: Simulation of Turbulent Channel Flow Using a Linear and Non Linear Realizable Unified RANS-LES Model. 49th AIAA Aerospace Sciences Meeting and Exhibit, Orlando, FL (coauthor).

Heinz: Invited Talk: Stochastic, Dynamic, and Unified Equations for Turbulence: Humboldt-University Berlin, Germany, December 17, 2010.

Heinz: Large Eddy Simulation: Consistency, Generality, and Cost: TU Delft, Delft, The Netherlands, December 1, 2010.

Heinz: Invited Talk: New Developments in Turbulence Modeling. II. Theory: NCAR, Boulder, November 8, 2010.

Heinz: Invited Talk: New Developments in Turbulence Modeling. I. Theory: NCAR, Boulder, November 4, 2010.

Heinz: Invited Talk: Probability Density Function Modeling and Simulation of Premixed Turbulent Combustion: Delft Center for Computational Science and Engineering (DCSE), Delft, The Netherlands, May 26, 2010.

2011, Hobart: Workshop on Algebraic Graph Theory, Banff International Research Station, Banff, Alberta, Canada. I gave a talk “Coherent Configurations, Subset Bounds, and the Erdos-Renyi Graph”.

2011, Hobart: “Constructions of Coherent Configurations from Finite Geometries”, talk, Rocky Mountain Algebraic Combinatorics Seminar, Colorado State University, Fort Collins, Colorado.

2012, Hobart: “Graphs with Three Eigenvalues”, talk, Rocky Mountain Algebraic Combinatorics Seminar, Colorado State University, Fort Collins, Colorado.

2012, Hobart: Discrete Mathematics Days, Colorado State University, Fort Collins CO; presented a talk entitled “Why a Finite Geometer Should Care about Coherent Configurations”.

2012, Hobart: “Association Schemes, Positive Semidefiniteness, and Regular Near Polygons”, talk, Rocky Mountain Algebraic Combinatorics Seminar, Colorado State University, Fort Collins, Colorado.

2014, Hobart: “Krein Conditions for Fun and Profit”, Rocky Mountain Algebraic Combinatorics Seminar, Colorado State University, Fort Collins, Colorado.

2011, Jafari: What do we want our Math Majors to know? Math Articulation Conference, Riverton, WY.

2011, Jafari: How does Tomography work? LCCC, Science Club, Cheyenne, WY.

2011, Jafari: Szego's theorem, prediction theory and several complex variables, Analysis and Applied Math Seminar, University of Wyoming.

2011, Jafari: Commuting Operators and tomography, Macalester College, St Paul, MN, Invited Colloquium.

2011, Jafari: Characterization of submoments of moment sequences, AMS Special Session, Salt Lake City, UT.

2012, Jafari: Graduate Outreach Program in Mathematics, Math Articulation Conference, Rock Springs.

2012, Jafari: Orthogonal Polynomials and Moments, Special Session, AIM Conference. Invited Presentation (presented by S. Aryal), Orlando, FL.

2013, Jafari: Sparse Moment Multi-sequences, Joint AMS-MAA-SIAM Special Session, Invited Presentation, San Diego.

2013, Jafari: Graduate Outreach Program in Mathematics, Math Articulation and Transitions Conference, Gillette, WY.

2014, Jafari: Radon transform and the Hamburger Moment Problem (joint with Hayoung Choi), 7th International Conference on Function Spaces, Southern Illinois University at Edwardsville.

2015, Jafari: Invited talk, AMS Special Session, Memphis TN.

2015, Jafari: Invited talk, Math-Physics Seminar, University of Minnesota, Minneapolis, MN.

2015, Jafari: Invited talk, IMA, University of Minnesota, Minneapolis, MN.

2015, Lee: ICIAM Beijing. Paper presented: Numerical renormalization group methods for asymptotically self-similar dynamics,

2014, Lee: SIAM Annual Meeting, Chicago, Paper presented: *Solitary waves and N-particle algorithms for a class of Euler-Poincare equations.*

2014, Lee: Taiwan, Invited speaker of the International Conference on Progress in Fluid Dynamics and Simulations. Title of the talk*: Fast geodesic shooting algorithms for template deformation and its applications via the N-particle system of the Euler-Poincare equations.*

2011, Lee: National Center for Theoretical Sciences, Taiwan, Workshop on Fluid-Structure Interaction Problems. Title: A class of Cartesian grid embedded boundary algorithms for incompressible flow with time-varying complex geometries.

2011, Liu: The Interaction of Migratory Birds and Domestic Poultry and its Role in Sustaining Avian Influenza, ICIAM, Vancouver, Canada.

2011, Liu: Modeling the dynamics of woody plant-herbivore interactions with Age-Dependent toxicity, Delay Differential Equations in Applications: Common Themes and Methods, University of British Columbia, Vancouver, Canada.

2011, Liu: Modeling the Interaction of migratory birds and domestic poultry and its role in sustaining avian influenza, Fudan University.

2011, Liu: Series lectures on diseases modeling, Harbin Institute of Technology, State Administration of Foreign Experts Affairs (SAFEA).

2011, Liu: Spatiotemporal distributions of migratory birds: patchy models with delay, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah.

2011, Liu: Modeling the Dynamics of Woody Plant-Herbivore Interactions with Age-Dependent Toxicity, Department of Mathematics, College of William and Mary.

2011, Liu: Spatiotemporal variation of mistletoes: a dynamic modeling approach, SIAM Minisymposium on Applications of Difference and Differential Equations in Ecology and Epidemiology at Joint Mathematics Meetings, New Orleans, LA.

2012, Liu: Spatiotemporal Mutualistic Model of Mistletoes and Birds, CAIMS, Toronto, Canada.

2012, Liu: Resistance to larvicides in mosquito populations and its implications for malaria control, CAIMS, Toronto, Canada.

2013, Liu: Modeling the Dynamics of Woody Plant-Herbivore Interactions with Age-Dependent Toxicity, ICMA IV, Texas Tech University, Lubbock, Texas.

2013, Liu: Reistance to larvicides in mosquito populations, the Fourth Conference on Computational and Mathematical Population Dynamics, North University of China, Taiyuan, China.

2013, Liu: Resistance to Larvicides in Mosquito Populations and How It Could Benefit Malaria Control, SIAM Conference on Application of Dynamical Systems, Snowbird, Utah.

2013, Liu: Modeling the dynamics of woody plant-herbivore interactions mediated by plant toxicity, Seminar of Women in Mathematics, MIT.

2013, Liu: Delayed action insecticides and their role in mosquito and malaria control, Workshop on Models and Methods in Ecology and Epidemiology, Centre de recherches mathematiques (CRM), Montreal, Canada.

2014, Liu: An advection and age-structured approach to modeling bird migration and in- direct transmission of avian influenza, the Workshop on Mathematical Biology and Nonlinear Analysis, Miami, FL.

2014, Liu: Modeling the Dynamics of Woody Plant-Herbivore Interactions with Age-Dependent Toxicity, the Eighth International Conference on Recent Advances in Applied Dynamical Systems, Guilin, Guangxi, China.

2014, Liu: Spatiotemporal distributions of migratory birds, the 2014 Annual Rocky Mountain Section Conference, MAA.

2015, Liu: Delayed action insecticides and their role in mosquito and malaria control, PSU, Mathematical Biology seminar.

2015, Liu: Mathematics inspired by immuno-epidemiology, AIM workshop, organizer.

Lyng: Computational Evans-function techniques for the spectral stability of viscous detonation waves. SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ (December 2015).

Lyng: Computational Evans-function techniques for the spectral stability of viscous detonation waves. SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ (December 2015).

Lyng: Spectral and nonlinear stability of viscous detonation waves in Majda's qualitative model, 25th International Colloquium on the Dynamics of Explosions and Reactive Systems, University of Leeds: Leeds, United Kingdom (August 2015).

Lyng: Viscous hyperstabilization of detonation waves, Shock Waves and Beyond, Institut Henri Poincaré: Paris, France (June 2015).

Lyng: Viscous hyperstabilization of detonation waves, 9th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia: Athens, GA (April 2015).

Lyng: Spectral (and nonlinear) stability of viscous detonation waves, SIAM Southeastern Atlantic Section Conference, University of Alabama: Birmingham, AL (March 2015).

Lyng: Spectral and nonlinear stability of viscous detonation waves, Nonlinear Partial Differential Equations Seminar, Texas A&M University: College Station, TX (February 2015).

Lyng: Spectral and nonlinear stability of viscous detonation waves, Applied & Interdisciplinary Mathematics Seminar, University of Michigan: Ann Arbor, MI (January 2015).

Lyng: Spectral and nonlinear stability of viscous detonation waves, Colorado Nonlinear Day, University of Colorado: Colorado Springs, CO (November 2014).

Lyng: Computing the refined stability condition for shock waves, NW14: SIAM Conference on Nonlinear Waves and Coherent Structures, University of Cambridge: Cambridge, United Kingdom (August 2014).

Lyng: The Gaussian semiclassical soliton ensemble, AN14: SIAM Annual Meeting, Chicago, IL (July 2014).

Lyng: Viscous hyperstabilization of detonation waves, Applied Mathematics & Statistics Colloquium, Colorado School of Mines: Golden, CO (April 2014).

Lyng: Viscous hyperstabilization of detonation waves, Applied Mathematics Seminar, Colorado State University: Fort Collins, CO (March 2014).

Lyng: Stability of viscous strong and weak detonation waves for Majda's model, PD13: SIAM Conference on Analysis of Partial Differential Equations, Orlando, FL (December 2013).

Lyng: Viscous hyperstabilization of detonation waves, Applied Mathematics Colloquium, Universidad Nacional Autónoma de México: Mexico City, Mexico (May 2013).

Lyng: The Gaussian semiclassical soliton ensemble, AMS Sectional Meeting, University of Colorado: Boulder, CO (April 2013).

Lyng: The Evans function and stability of viscous detonation waves: an overview, Analysis & Convexity Seminar, University of Oklahoma: Norman, OK (February 2013).

Lyng: The Gaussian semiclassical soliton ensemble, Applied Math Seminar, Michigan State University: East Lansing, MI (November 2012).

Lyng: The Gaussian semiclassical soliton ensemble, Applied & Interdisciplinary Mathematics Seminar, University of Michigan: Ann Arbor, MI (September 2012).

Lyng: The semiclassical limit of the focusing nonlinear Schrödinger equation: overview and recent developments, PDE/Applied Math Seminar, Indiana University: Bloomington, IN (August 2012).

Lyng: Refined stability for combustion waves, AMS Sectional Meeting, University of Kansas: Lawrence, KS (March 2012).

Lyng: The Evans function and the stability of viscous shock and detonation profiles, Colloquium, University of Colorado: Colorado Springs, CO (December 2011).

Lyng: Refined stability for gas-dynamical shocks, Nonlinear Waves Seminar, University of Colorado: Boulder, CO (December 2011).

Lyng: (Refined) stability for Navier–Stokes shocks, NW10: SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA (August 2010).

Lyng: Spectral stability of combustion waves, DSPDEs'10: Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona, Spain (May 2010).

Moorhouse: March 2015, 'Some general remarks on isomorphism testing', invited 1-hour seminar, Colorado State University.

Moorhouse: October 2014, 'Semifinite Generalized Quadrangles', invited 1-hour seminar, Colorado State University.

Moorhouse: June 2014, 'Planes and their Codes', invited 1-hour plenary address, International Conference on Groups, Computation and Geometry, Pingree Park, Colorado.

Moorhouse: March 2014, 'Two-graphs and finite geometries', invited 20-minute seminar, Sectional AMS Meeting, University of Tennessee.

Moorhouse: August 2013, 'Octonionic ovoids', invited 20-minute seminar, Third Mile High Conference on Nonassociative Mathematics, University of Denver.

Moorhouse: April 2013, 'Counting ovoids in the triality quadric', invited 1-hour seminar, Colorado State University.

Moorhouse: October 2012, 'Automorphism groups of projective planes with arbitrarily many point and line orbits', invited 1-hour seminar, Colorado State University.

Moorhouse: June 2012, 'Colouring the plane', invited 1-hour seminar, Ryerson University, Toronto, Canada.

Moorhouse: May 2012, 'On the computational complexity of embedding configurations in finite planes', invited 30-minute seminar, Rocky Mountain Discrete Math Day, Colorado State University.

Moorhouse: April 2012, ‘What can mathematical logic do for you?’, invited 1-hour seminar, University of Delaware.

Moorhouse: February 2012, ‘What can mathematical logic do for you?’, invited 1-hour seminar, Colorado University at Denver.

Moorhouse: April 2011, ‘Open problems concerning automorphism groups of projective planes’, invited 60-minute seminar, Algebraic Graph Theory workshop (11w5119), Banff International Research Station.

Moorhouse: March 2011, ‘Orbits on infinite planes’, invited 60-minute seminar, University of Delaware.

Moorhouse: August 2010, ‘Projective planes and their substructures’, invited 1-hour seminar, Colorado State University.

Moorhouse: March 2010, ‘Colouring the plane’, invited 30-minute seminar, International Conference on Designs, Codes & Geometries, Delaware.
March 2010, ‘Colouring the plane’, invited 1-hour seminar, University of Delaware.

Niu: Mini-course “Classification of AF algebras and beyond”, I, II, III. TianYuan Summer School on Functional Analysis, East China Normal University, Shanghai, China, July 11–July 29, 2016.

Niu: “Tracial approximation and the classification of C*-algebras”, International conference on structure of C*-algebras and tracial approximation, Hebei Normal University, ShiJiaZhuang, Hebei, China, July 4–July 8, 2016.

Niu: Lecture Series “The Classification of simple separable unital C*-algebras”, I, II, III. Canadian Annual Symposium on Operator Algebras and Their Applications (COSy), CRM, Montreal, Canada, June 13–June 17, 2016.

Niu: “The classification of simple separable unital C*-algebras with finite nuclear dimension”, 27th Nordic Congress of Mathematicians, Stockholm, Sweden, March 18, 2016

Niu: “The classification of simple separable unital C*-algebras with finite nuclear dimension”, Noncommutative Geometry and K-theory, Chongqing University, Chongqing, China, December 19–21 2015.

Niu: “The classification of simple separable unital C*-algebras with finite nuclear dimension”, CMS Winter Meeting, Montreal, Canada, December 4–7, 2015.

Niu: “The classification of C*-algebras with finite decomposition rank”, Noncommutative Dimension Theory, University of Hawaii at Manoa, Nov 22–25, 2015.

Niu: “The classification of Elliott algebras with finite decomposition rank”, C*-Algebras and Dynamical Systems, Hebei Normal University, ShiJiaZhuang, Hebei, China, June 29–July 3, 2015.

Niu: “The classification of unital separable simple ASH algebras”, Great Plains Operator Theory Symposium, Purdue University, West Lafayette, IN, May 26–30, 2015.

Niu: “The classification of A SH algebras”, Workshop on C*-algebras: Structure and Classification, Mu¨nster, Germany, April 20–14, 2015.

Niu: “The C*-algebra of a minimal homeomorphism with zero mean dimension”, CMS Winter Meeting, Hamilton, ON, December 6–8, 2014.

Niu: “The C*-algebra of a minimal homeomorphism with zero mean dimension”, Dynamics and C*-Algebras: Amenability and Soficity, BIRS, Banff, Alberta, October 19–24, 2014.

Niu: “A classification of approximately subhomogeneous C*-algebras”, C Star: Classification, Structure, Amenability and Regularity, University of Glasgow, Glasgow, Scotland. September 1–5, 2014.

Niu: “The C*-algebra of a minimal homeomorphism with zero mean dimension”, Canadian Annual Symposium on Operator Algebras and Their Applications (COSy), Fields Institute, Toronto, Canada. June 23–27, 2014.

Niu: “The C*-algebra of a minimal homeomorphism with zero mean dimension”, Spring Program in Operator Algebras, Eastern China Normal University, Shanghai, China. May 22, 2014.

Niu: “Irrational Extended Rotation Algebras”, Spring Program in Operator Algebras, Eastern China Normal University, Shanghai, China. May 15, 2014.

Niu: “Classification of approximately subhomogeneuous C*-algebras, I, II, III.”, 6th Korea Operator Algebra Seminar, Ulsan, Korea, March 27–29, 2014.

Niu: “A classification of approximately subhomogeneuous C*-algebras”, Analysis Seminar, University of Waterloo, Waterloo, ON, Canada. February 14, 2014.

Niu: “Extended algebras”, Fields Operator Algebra Seminar, Fields Institute, Toronto, ON, Canada. January 7, 2014.

Niu: “All irrational extended rotation algebras are AF”, West Coast Operator Algebra Symposium, UC Davis, Davis, CA, October 26–27, 2013.

Niu: “C*-algebras of certain non-minimal homeomorphism of Cantor set”, C*-algebras, Structures, and Classification, Jilin University, ChangChun, Jilin, China. July 23–28, 2013.

Niu: “C*-algebras of certain non-minimal homeomorphism of Cantor set”, Special Week on Operator Algebras, Eastern China Normal University, Shanghai, China. June 17–22, 2013.

Niu: “A classification of approximate subhomogeneous C*-algebras”, Canadian Annual Symposium on Operator Algebras and Their Applications (COSy), Fields Institute, Toronto, Canada. May 27–31, 2013.

Niu: “C*-algebras of certain non-minimal homeomorphism of Cantor set, II”, Eastern China Normal University, Shanghai, China. May 22, 2013.

Niu: “C*-algebras of certain non-minimal homeomorphism of Cantor set”, Eastern China Normal University, Shanghai, China. May 15, 2013.

Niu: “A classification of approximate subhomogeneous C*-algebras”, University of Tokyo, Tokyo, Japan. December 19, 2012.

Niu: “Mean dimension and AH-algebras”, Eastern China Normal University, Shanghai, China. May 24, 2012.

Niu: “Mean dimension and AH-algebras”, CMS Winter Meeting, Toronto, ON, December 10–12, 2011.

Niu: “Comparison radii for commutative C*-algebras”, Eastern China Normal University, Shanghai, August 24, 2011.

Niu: “Homomorphisms between simple Z-stable C*-algebras”, CMS Summer Meeting, University of Alberta, Edmonton, AB, June 3–5, 2011.

Niu: “Dimension growth in the classification of AH-algebras”, Colloquium, University of Wyoming, Laramie, Wyoming, February 22, 2011.

2014, Polyakov: “Explicit Hodge-type decomposition on projective complete intersections”, Seminar of the Department of Mathematics, University Paris VI,

2012, Polyakov: “Cahn-Hilliard equation. Theory and computations”, NEUP Research Project Workshop, SAMSI, NC.

2012, Polyakov: D-bar-equation and formulas for solutions of systems of linear PDE, Seminar at University Paris VI, Paris, France.

2012, Selden: Wyoming School – University Partnership, Mathematics Lost in Transition Initiative, Mathematics Transition Meeting, Invited discussion leader, March 29-30, Rock Springs.

2013, Selden: “Some thoughts on the use of math in physics”, Undergraduate Physics Student Group, University of Wyoming, Laramie, WY.

2012, Shader: Combinatorics & Nonnegative Matrix Theory, opening talk of BIRS conference on Theoretical Aspects of Nonnegative Matrices, Banff, CA.

2013, Shader: The Lambda-Mu problem, Linear Algebra and its Applications Meeting, Madison, WI.

2013, Shader: The λ-τ problem for symmetric matrices with a given graph, International Linear Algebra Society Conference, Providence RI.

2013, shader: Construction of real symmetric matrices with prescribed second order interlacing sets of eigenvalues and graph. Invited plenary talk at the AMS sectional meeting, Iowa State University.

2013, Shader: The NCAR Wyoming Supercomputing Center, Senior Lycuem, Laramie, WY.

2012, C. Shader: Combinatorics & Nonnegative Matrix Theory, BIRS conference on Theoretical Aspects of Nonnegative Matrices, Banff, CA.

2011 Spitler: Wyoming School – University Partnership, Mathematics Lost in Transition Initiative, Mathematics Transition Meeting, Invited discussion leader, February 17-18, Riverton.

2011 Spitler: Wyoming Students “Academically Adrift”, response piece solicited by Dean Walter, A&S You Like It, March.

2012, Spitler: Overview of the UW-Team Compositional Simulator with a Two-Phase Flow Fractured Reservoir Example, A. Jan, M. Mendes, J. Spitler, C. Zemtsop, Workshop on Porous Media Flows: Experimentation, Multi-Scale Modeling and Simulation, Center for Fundamentals of Subsurface Flow, May 9, Laramie.

2012 Spitler: Wyoming School – University Partnership, Mathematics Lost in Transition Initiative, Mathematics Transition Meeting, Invited discussion leader, March 29-30, Rock Springs.

2013 Spitler: Wyoming School – University Partnership, Mathematics Lost in Transition Initiative, Mathematics Transition Meeting, Invited discussion leader, April 4-6, Gillette

2014 Spitler: Wyoming School – University Partnership, Mathematics Lost in Transition Initiative, Mathematics Transition Meeting, Invited discussion leader, Spring, Powell

2014 Spitler: Cowboy Connect, It's the Experience, Freshmen Orientation for the entire entering freshmen class, Invited speaker, A&S Auditorium, University of Wyoming, Laramie, Sept. 2

2015 Spitler: Wyoming School – University Partnership, Mathematics Lost in Transition Initiative, Mathematics Transition Meeting, Invited discussion leader, Laramie, Wyoming, Spring

2015, Weber: How to Weigh a Parabola, Spring 2016 Section Meeting of the Rocky Mountain Section of the Mathematical Association of America, Grand Junction, Colorado
2015, Weber: Rainbows are Conic Sections, Wyoming 2015 Mathematics Statistics Physics Articulation Meeting, Laramie Wyoming.

2015, Weber: How to Weigh a Parabola, Wyoming 2015 Mathematics Statistics Physics Articulation Meeting, Laramie Wyoming.

2011, Weber: Expectations for College Algebra Students at UW, Mathematics Transitions Meeting, Riverton, WY

2011, Williford: “Graphs derived from generalized Kac-Moody algebras,” Rocky Mountain Discrete Mathematics Days, University of Wyoming, Laramie, WY.

2011 Williford: “Graphs Derived from Generalized Kac-Moody Algebras”, Combinatorics seminar, University of California at San Diego, San Diego, CA

2011 Williford: “Extensions of the Theory of Association Schemes to Coherent Configurations”, Geometric and Algebraic Combinatorics 5, Oisterwijk, Netherlands.

2011 Williford: “Association Schemes and Coherent Configurations”, Discrete Mathematics Seminar, University of Delaware, Newark, DE.

2011 Williford: “Nonexistence Conditions for Coherent Configurations”, Banff workshop on Algebraic Combinatorics, Banff, Canada.

2011 Williford: “Graphs and Geometries Derived from Kac-Moody Algebras”, University of Ghent Seminar on Incidence Geometry, Ghent, Belgium.

2012 Williford: “Subset bounds in association schemes and coherent configurations”, speaker, Rocky Mountain Discrete Mathematics Days, University of Denver, Denver, CO.

2012 Williford: “Graphs derived from generalized Kac-Moody algebras”, speaker, Midwestern Graph Theory LIII, Ames, Iowa.

2014 Williford: “Extremal graphs with no four-cycles” (invited seminar), University of Delaware

2014 Williford: “Q-Polynomial Association Schemes” (plenary speaker), Modern Trends in Algebraic Graph Theory, Villanova University

2014 Williford: “Examples of Q-Polynomial Association Schemes” (invited seminar), Eastern Kentucky University

2014 Williford: “Matrix Theoretic Techniques in Classical Finite Geometry” (invited colloquium), Eastern Kentucky University

2014 Williford: “Nonexistence conditions for directed strongly regular graphs” (invited seminar), Shanghai Jiao Tong University

2014 Williford: “Q-Polynomial Association Schemes” (plenary speaker), Algebraic Combinatorics Workshop, University of Science and Technology of China

2015 Williford: “Directed Strongly Regular Graphs”, University of Delaware, Newark, DE

2015 Williford: “Graphs With Schur-Closed Adjacency Algebras”, Worcester Polytechnic Institute, Worcester, MA

2015 Williford: “Graphs With Schur-Closed Adjacency Algebras”, Fall Southeastern Sectional Meeting of the AMS, University of Memphis, Memphis TN

2015 Williford: “Nonexistence Conditions fro Directed Strongly Regular Graphs”, Central Fall Sectional Meeting of the AMS, Loyola University Chicago, Chicago, IL

National/International Awards

1. CAREER Award, National Science Foundation, **Lyng**, 2009 – 2014
2. von Neumann Fellowship, Institute for Advanced Study, (Princeton), **Hall**, 2014-2015
3. Israel Halperin Award, Canadian Operator Theory Symposium, **Niu**, 2015
4. Fellow of the Hanse-Wissenschaftskolleg, Institute for Advanced Study (Delmenhorst, Germany), **Heinz**, 2015

Program Reputation

Ranking: UW Math Graduate Program: US News & World Report #126 (UW Overall Rank: #168 National Universities)

Curriculum

The following six 3-credit courses (grade of B or higher) are required for the MA/MS degree.

- MATH 5200: Real Variables I
- MATH 5230: Complex Variables I

- MATH 5310: Computational Methods in Applied Sciences I
- MATH 5400: Methods of Applied Mathematics I
- MATH 5500: Advanced Linear Algebra
- MATH 5550: Abstract Algebra I

In addition, students must complete 12 additional hours of formal mathematics coursework at the 5000 level. There is also a professional development requirement, and students must also pass the department's foundation exam covering linear algebra and advanced calculus. Finally, students must also complete a Plan A Master's Thesis or a Plan B paper/project and pass a final oral exam covering material in their thesis/paper/project. Requirements for the MAT/MST program involve a bit less mathematics. The department has also supported the MSNS program in SMTC; this latter program is aimed at middle school teachers of mathematics and has its own curriculum.

Distance Delivery

The entire program is not offered online or at UW-Casper. However, for the last 5 or so years, the department has been offering 5000-level courses through UW's Outreach Video Network (OVN). These OVN courses (1 per semester) have been aimed at Wyoming Community College Faculty as professional development opportunities. More recently, the department (PI: Lyng, Co-PI: Allen) has received an NSF grant in the *Enriched Doctoral Training* (EDT) program. These grants are intended to broaden the experience of doctoral students in mathematics. Although the major emphasis of this grant is on PhD students, our MA/MS students benefit as well. In particular, the grant is joint with Colorado School of Mines (CSM), and we have developed a course sharing agreement with CSM; select courses, delivered at a distance (either in Laramie to Golden or vice versa) will be available to all graduate students in the department.

Quality of Assessment Plan

In 2016, the department's graduate assessment rating was elevated to Tier 2. The basic assessment plan is based on two main elements. The first, an indirect measurement, is based on annual surveys and one-on-one interviews that the department's graduate committee conducts each fall. As part of this process, the department gathers information about grad students and their perceptions of the program, and their learning. These surveys and interviews have a direct impact on the department's graduate program. Advanced, research courses (those beyond the core courses listed above) are typically designed in response to student input garnered during the survey and interview. The second, direct measurement, is based on rubrics established for Master's defenses, PhD Preliminary Exams, and PhD final exams. These juried exams give the department an excellent chance to check on important learning goals (e.g., written and oral communication, quality of research). While assessment of graduate programs is relatively new in the math department, the department is making strides in making these processes an integral part of our culture. Future assessment efforts will likely focus on the core courses listed above. (These courses are also required of all of our PhD students.)

Strategic Plan

Four goals articulated in the department's draft UP4 plan touch the graduate program in mathematics and, in particular, the MA/MS program. They are copied in red below.

Goal 2: Enhance the utility of upper-division and graduate math courses to disciplines outside the department.

UW's supercomputing partnership with the National Center for Atmospheric Research has begun to change the way UW does science and engineering. Mathematical modeling is far more prominent in UW's STEM programs than it was even five years ago. To support this trend, Math will undertake a comprehensive review of upper-division and graduate courses to import concepts from computational science where appropriate. This review will involve faculty members in engineering and the sciences. The department will make special efforts to attract UW students from outside the Math MS and PhD programs. The goal will be to have, by 2018, at least four 4000-level courses and at least four 5000-level courses in which non-mathematics majors constitute at least one third of the enrollments.

Goal 3: Increase the fraction of Math graduate students who are women.

Nationwide, representation of women among new PhDs in mathematics hovers around 30 percent. Women represent the nation's largest under-tapped pool of mathematical talent, at a time when the US seeks to produce more STEM professionals. At UW, the fraction of Math graduate students has been lower even than the national average: it is now 14 percent. Changing the overall percentage of women in these programs will take time, since students currently in the pipeline need to finish to free the foreseeable sources of financial support for new students. As current graduate students finish their degrees, Math will (1) focus graduate recruitment on attracting more women and (2) seek new resources for this purpose, not only internally but also externally. The department's goal will be to match the 30 percent target by 2017 and the 40 percent target by 2020.

Goal 4: Sustain recent increases in PhD production.

In the past five years, the Mathematics Department at UW has gone from producing one or two PhDs per year to about five PhDs per year. This growth has:

- led to a significant rise in the department's stature among PhD-granting math departments in the US;
- improved our recruitment, both in quality of the incoming graduate students and quantity; and
- placed our graduates in excellent postdoctoral, tenure-track, and industry positions.

However, with an average of 20-22 graduate students, a typical time-to-degree of four years, and a highly marketable MS degree, recent PhD production rates are not sustainable. In the

next five years, we will aim to sustain an average of five PhDs per year by 2020. This will require a 35-40 percent increase in the department's graduate student pool, achieved through (1) grant funding, including individual faculty grants and infrastructure grants, (2) Women and Minority scholarships, GA mentoring awards, and additional A&S GA awards where possible, and (3) admitting more self-funded students.

Goal 5. Maintain strong teaching and research in areas relevant to the state.

Math currently has 12 faculty members whose expertise links directly with at least one of the following areas of importance to Wyoming's future:

- Numerical modeling of subsurface fluid flows (energy and water resources)
- Computational science (the UW-NCAR partnership)
- Mathematical biosciences (the Program in Ecology)

Other UW mathematicians work in areas that have significant applications in robotics, cryptography, and seismology. In addition, to have a respected program the department needs to maintain its strength in the core areas of algebra and analysis, as well as in applied mathematics. As retirements and resignations create vacancies, the Math Department will remain connected with other UW researchers through its future hiring requests, to maintain a strong interdisciplinary culture, while continuing its strength in theoretical areas.

In sum, these goals directly impact UW Math's Master's programs. First, the core curriculum (6 courses listed above) and other 5000-level courses will be reviewed with the aim of enhancing their utility to high-end users of mathematics in other disciplines. The obvious candidates are MATH 5310 and MATH 5400. For example, the enrollment in MATH 5400 in Fall '14 was approximately one-half engineering grad students. Second, the recruitment of women to our graduate programs (PhD and MA/MS) is a high priority. The department has benefited from Academic Affairs GA-ships for women and other under-represented groups, but our numbers are still disturbingly low. Our new NSF EDT project has a recruiting component with funds dedicated to the recruitment of under-represented groups. Third, our traditional MA/MS program is a key component that feeds into our PhD program (see placement data below). Fourth and finally, our graduate students (MA/MS and PhD) play central roles in the department's research activities, and these activities have direct impact on topics and issues that are important for Wyoming and the region.

Mission Centrality

UW Mission and Strategic Goals

Mathematics is often called the "language of the sciences," and it plays a central, though often hidden role, in our modern, data-rich technological society. Given this, the math department is, understandably, at the center of UW's mission and goals, both at the level of providing appropriate coursework in support of the myriad of programs of study available ay UW and also

at the level of rigorous, original scholarship and more advanced teaching in support of initiatives to enhance UW's standing in engineering and science.

UW Math is a teaching workhorse for the College and the University. According to OIA, in 2013–14 we taught 18,946 Student Credit Hours (SCH) on the Laramie campus. (By contrast, the entire College of Agriculture and Natural Resources taught 17,486 SCH on the Laramie campus over the same period.) Our lower-division program touches nearly every undergraduate, and these courses are foundational for many programs of study across the campus. As is the case in math departments at public universities across the nation, most of the GAs in mathematics (MA/MS and PhD) are state-funded, and they earn their stipends as Teaching Assistants for lower-division USP "Q" courses. These courses are often labeled as obstacles to college completion; whether or not this is fair, GAs in our program are (perhaps mostly invisible) players in UW efforts to increase student success, retention, and graduation rates broadly on campus.

In addition, substantial undergraduate and graduate coursework in mathematics is an intrinsic element of many programs of study in engineering and science. Thus, courses our GAs teach (at the undergraduate level) and courses designed for them and their peers in partner disciplines (at the graduate level) are likely to contribute to the success of UW's Science and Engineering initiatives. Our department also has strong research and collaborative connections to SER, to the NCAR partnership, to the Program in Ecology, Statistics, Physics, and to a number of departments in the College of Engineering and Applied Science. (Indeed, one of our recent PhD graduates now serves in Mechanical Engineering as a tenure-track Assistant Professor.)

Finally, UW Math is also a PhD- and MA/MS-degree granting unit in A&S, and a quality graduate program cannot exist without a strong contingent of research-active faculty. Our faculty take great pride in doing mathematics, and we have strengths both in pure mathematics (math for its own sake) and applied mathematics (directed toward the challenges in our partner disciplines). We are poised to contribute (and are contributing) to UW's planned growth in computing, water resources, data science, imaging, and ecology, to name a few.

Finally, our department philosophy has always been that research supports teaching; faculty who are contributing to the growth of the discipline are positioned to infuse their courses, at any level, with insights garnered from new, cutting-edge developments. Thus, our research activity is the backbone of our entire program.

Cross-campus support

As noted above, the MA/MS program contributes to campus broadly through the teaching of such courses as MATH 1000: Problem Solving, MATH 1400: College Algebra, & MATH 2200: Calculus I. Hundreds of UW students take these courses each year. Through their teaching, our MA/MS GAs provide substantial support for the "Q" USP requirement.

Placement Data for Graduates

Below, we provide data for the graduates who earned MA/MS degrees in our standard, residential program. Additional graduates computed by OIA were in programs designed specifically for teachers. Thus, we expect all of those graduates to pursue secondary teaching careers.

2014-15
Hui Gao (Summer 2015) – Unknown
Dephence Mwangoe (Spring 2015) – Math Teaching

2013-2014
Kristy Katein-Taylor (Summer 2014) – US Air Force
Russell Johnson (Spring 2014) – PhD Program, Math, Wyoming
Alex Karanevich (Spring 2014) – PhD Program, Biostatistics, Kansas
Brad McCaskill (Spring 2014) – PhD Program, Math, Wyoming
George Shakan (Spring 2014) – PhD Program, Math, Illinois
Steven Kumer (Spring 2014) – Unknown
Stephen Garth (Fall 2013) – PhD Program, Math, Clemson

2012-13
Jared Skinner (Spring 2013) – Programmer, Dart Transit

2011-12
Xin Li (Summer 2012) – PhD Program, Math, Tulsa
Anurud Wijerathne (Fall 2011) – PhD Program, Math, Wyoming
Debra Swedberg (Fall 2011) – Math Faculty, Casper College
Keivan Hassani-Monfared (Fall 2011) – PhD Program, Math, Wyoming
Saroj Aryal (Fall 2011) – PhD Program, Math, Wyoming

2010-11
Allan Leal (Fall 2010) – PhD Program, Petroleum Engineering, Imperial College of London
Cara Wiblemo (Summer 2010) – PhD Program, Math, Wyoming

Uniqueness

While high-level mathematics is used in any number of technical disciplines, there is no program on campus that can boast the combination of pure and applied mathematics expertise that is housed in UW Math.

Other

An important feature of our MA/MS program is its intimate connection to our PhD program. As described above, the MA/MS curriculum is simply the first two years of the PhD curriculum, and very few students enroll in our program with the express goal of earning a MA/MS. Indeed, the vast bulk of our MA/MS production consists of students who opt to earn one on the way to PhD (here or elsewhere) or of students who are leaving the PhD program. This is well illustrated

in the placement data above. *Indeed, in the future we will ensure that all of our PhD students earn an MA/MS as they pass through the program*. This should provide a modest bump in our MA/MS production. Currently, this is left up to individual students, and some of them go straight from BA/BS to PhD.

However, in recent years, the department has placed a special emphasis on PhD production, and our total PhD production during the review period (26) places us, with Chemistry (26), Psychology (25), & Zoo/Phys (27), among the largest PhD producers in the College of Arts & Science, and, indeed, at UW. Indeed, given the intertwining of curricula for our MA/MS and the beginning of our PhD program, the department views and administers the two programs as a single whole.

Cost

Information about program cost (mostly derived from OIA data) is compiled below.

Student Credit Hours per FTE (OIA)

Year	FTE FAC	FTE APL	FTE TOTAL	SCH	SCH Summer	TOTAL SCH	SCH/FTE
2010-11	23.5	4.75	28.25	18702	1744	20446	723.75
2011-12	22.5	5	27.5	18821.5	1609	20430.5	742.93
2012-13	23.75	6	29.75	19725.5	1742.5	21468	721.61
2013-14	24.75	5.5	30.25	19553	1785	21338	705.39
2014-15	23	4.5	27.5	19485	1452	20937	761.35

Direct Instructional Expenditures (OIA)

	Direct Expenditures	Total SCH	$/SCH	Degrees	$/Degrees
FY14	$3,910,588.00	21338	$183.27	51	$76,678.20
FY15	$4,973,438.00	20937	$237.54	42	$118,415.19

Non-personnel expenditures		FTE	$/FTE
FY14	$123,579.00	30.25	$4,085.26
FY15	$145,207.00	27.5	$5,280.25

Course Enrollments (Department Records)

Recent enrollments for our core courses are shown in the table below.

	MATH 5230	MATH 5400	MATH 5500
Fall 2010	6	11	9
Fall 2011	10	12	8
Fall 2012	9	14	12
Fall 2013	8	10	6
Fall 2014	9	14	8
Fall 2015	13	15	12
	MATH 5200	**MATH 5310**	**MATH 5555**
Spring 2011	7	14	9
Spring 2012	8	15	12
Spring 2013	10	14	11
Spring 2014	7	10	6
Spring 2015	8	11	7
Spring 2016	9	27	10

None of them falls below UW minimums for 5000-level courses. Lower-division courses are not part of this program.

Other Instructional Cost Drivers

Section Fill Rates (Core Courses, department records)

Historically, the department has not tracked section fill rates. (Indeed, in the math department, course caps for upper-division and graduate-level courses have been used to primarily to ensure quality classrooms and not as a representation of maximum faculty effort.) However, for the enrollment data above, fill rates are computed based on full enrollment of 15 students; this is the capacity of the department's main seminar room, and it also represents a reasonable upper bound on the number of students that can be accommodated in these intensive, graduate-level mathematics courses. Of course, since funding for graduate students in mathematics is primarily through state-funded TA-ships (to support Math's extensive lower-division teaching program)[4], UW support for GAs has a huge impact on our ability to run our graduate program at capacity.

	MATH 5230	MATH 5400	MATH 5500
Fall 2010	40.0%	73.3%	60.0%
Fall 2011	66.7%	80.0%	53.3%
Fall 2012	60.0%	93.3%	80.0%
Fall 2013	53.3%	66.7%	40.0%

[4] Research funding for graduate students in mathematics is quite limited in comparison to other disciplines in the natural sciences. According to the American Mathematical Society, "mathematics students are typically supported as teaching assistants by the department rather than as research assistants for the major professor. See http://www.ams.org/meetings/CultureStatement12.pdf

Fall 2014	60.0%	93.3%	53.3%
Fall 2015	86.7%	100.0%	80.0%
	MATH 5200	**MATH 5310**	**MATH 5555**
Spring 2011	46.7%	93.3%	60.0%
Spring 2012	53.3%	100.0%	80.0%
Spring 2013	66.7%	93.3%	73.3%
Spring 2014	46.7%	66.7%	40.0%
Spring 2015	53.3%	73.3%	46.7%
Spring 2016	60.0%	180.0%	66.7%

Course Completion Rates (department records)

Course completion rates $(1 - DFW)$ are quite high for the graduate-level courses that make up the core of our MA/MS program.

	MATH 5230	**MATH 5400**	**MATH 5500**
Fall 2010	83.0%	82.0%	89.0%
Fall 2011	100.0%	100.0%	100.0%
Fall 2012	100.0%	100.0%	83.0%
Fall 2013	100.0%	100.0%	83.0%
Fall 2014	100.0%	100.0%	100.0%
Fall 2015	100.0%	93.0%	100.0%
	MATH 5200	MATH 5310	MATH 5555
Spring 2011	100.0%	93.0%	89.0%
Spring 2012	100.0%	100.0%	92.0%
Spring 2013	100.0%	100.0%	100.0%
Spring 2014	86.0%	90.0%	67.0%
Spring 2015	88.0%	91.0%	86.0%
Spring 2016	100.0%	92.0%	90.0%

Research Expenditures per tenured/tenure-track FTE (OIA)

	Research $	T/TT FTE	$/FTE
FY14	$728,660.00	24.75	$29,440.81
FY5	$609,226.00	23	$26,488.09

Academic Program Review: **Mathematics MS**

Section 8 – Cost

a) Ratio of student credit hours per FTE (AY 2014/15): **724**

b) Direct instructional expenditures (FY 2015): **$4,269,547**

i) Per student FTE: **$6,357**

ii) Per total degrees awarded: **$101,656**

iii) Non-personnel expenditures / total academic FTE: **$5,095**

c) Course enrollment (AY 2014/15)

i) Classes falling under university minimums: **24**

ii) Lower-division courses falling under university minimums: **6**

e) Research expenditure per tenure-track FTE (FY 2015): **$25,386**