

Stephen F. Austin State University
Department of Mathematics and Statistics
Math 354
Nacogdoches, TX 75962
(936) 468-1702 (Office)
beauregama@sfasu.edu



ADMINISTRATIVE POSITIONS

2020 - Present **Interim Chair**, Stephen F. Austin State University; Department of Physics, Engineering, and Astronomy; Nacogdoches, TX

ACADEMIC POSITIONS

2018 - Present **Professor**, Stephen F. Austin State University; Department of Mathematics and Statistics; Nacogdoches, TX
2014 - 2018 **Associate Professor**, Stephen F. Austin State University; Department of Mathematics and Statistics; Nacogdoches, TX
2013 - 2014 **Assistant Professor**, Clarkson University; Department of Mathematics; Potsdam, NY
2010 - 2013 **Postdoctoral Associate Professor**, Baylor University; Department of Mathematics; Waco, TX
2009 - 2010 **Visiting Assistant Professor**, University of Arizona; Department of Mathematics; Tucson, AZ
2009 - 2010 **Online Instructor**, Kaplan University; Department of Mathematics

EDUCATION

Dec. 2008 **Ph.D. Applied Mathematics, Aerospace and Mechanical Engineering Minor**, University of Arizona, Tucson, AZ
Dissertation Title: *Nonlinear Dynamics of Elastic Filaments Conveying a Fluid and Numerical Applications to the Static Kirchhoff Equations*
Dissertation Advisors:
1. *Dr. Michael Tabor, Professor & Head of the Program in Applied Mathematics University of Arizona;*
2. *Dr. Alain Goriely, Professor of Mathematical Modeling & Director of the Oxford Centre for Collaborative Applied Mathematics, Oxford University*
May 2004 **M.S. Applied Mathematics**, University of Arizona, Tucson, Arizona
May 2002 **B.S. Mathematics, Economics Minor**, Magna Cum Laude, University of New Hampshire, Durham, NH

AMS SUBJECT CLASSIFICATIONS

65K20, 65M50, 35K65, 35B40

PUBLICATIONS (bold indicates student coauthor))

19. Antwi-Fordjour, K.; Parshad, R.D.; Beauregard, M. A., Dynamics of a predator-prey model with generalized Holling type functional response and mutual interference, *Math. Biosc.*, Vol. 326, 108407, 2020.

18. Beauregard, M. A.; Parshad, R.D.; **Boon S.**; **Conaway, H.**; **Griffin, T.**; **Lyu, J.**, Optimal control and analysis of a modified trojan Y-Chromosome strategy, *Ecol. Model.*, Vol. 416, 108854, 2020.
17. **Lyu, J.**; Schofield, P.; Reaver, K. M.; Beauregard, M. A.; Parshad, R.D., A comparison of the Trojan Y Chromosome strategy to harvesting models for eradication of nonnative species, *Natural Resources Modeling*, Vol. 33, Iss. 2, 2019.
16. Beauregard, M. A.; Numerical approximations to a fractional Kawarada quenching problem, *Appl. Math. Comput.*, Vol. 349, pp. 14-22, 2019.
15. Beauregard, M. A.; Padgett, J.; A variable nonlinear splitting algorithm for reaction diffusion systems with self- and cross-diffusion, *Numer. Meth Partial Diff. Eqns*, Vol. 35, Iss. 2, pp. 597-614, 2019.
14. Beauregard, M. A.; **Padgett, J.**; Parshad, R.; A nonlinear splitting algorithm for systems of partial differential equations with self-diffusion, *J. Comput. Appl. Math.*, Vol. 321, pp. 8-25, 2017.
13. Beauregard, M. A.; Parshad, R.; **Quansah, E.**; Kouachi, S.; On "small" data blow-up in a three species food chain model, *Comput. Math. Appl.*, Vol. 73, pg. 576-587, 2017.
12. Beauregard, M. A.; Black, K.; Parshad, R.; **Quansah E.**, Biological control via "ecological" damping: A new approach attenuating non-target effects, *Math. Biosci.*, Vol. 273, pp. 23-44, 2016.
11. Beauregard, M. A.; Bordag, M.; Kirsten, K., Casimir energies in spherically symmetric background potentials revisited, *J. Phys. A: Math. Theor.*, Vol. 48, No. 9., 2015.
10. Beauregard, M. A., Approximating reaction diffusion equations of the quenching type over elliptical domains, *Appl. Math. Comput.*, Vol. 254, pp. 75-91, 2015.
9. Beauregard, M. A.; Kasimov, A.; Parshad, R.; Said-Houariz, B., Global existence and finite time blow-up in a class of stochastic nonlinear wave equations, *Communications of Stochastic Analysis*, Vol. 8, No. 3, pp. 381-411, 2014.
8. Beauregard, M. A.; Geiser, J., Extrapolated splitting methods for solving parabolic differential equations, *Int. J. Comput. Math.*, DOI: 10.1080/00207160.2014.909034, 2014.
7. Beauregard, M. A.; Sheng, Q., A fully adaptive method to approximate reaction diffusion equations of the quenching type over circular domains, *Numer. Meth Partial Diff. Eqns*, Vol. 30, No. 2, pp. 472-489, 2014.
6. Beauregard, M. A.; Sheng, Q., Explorations and expectations of equidistribution adaptations for nonlinear quenching problems, *Adv. Appl. Math. Mech.*, Vol. 5, No. 4, pp. 407-422, 2013.
5. Beauregard M., Fucci G., Kirsten K., and Morales P., Casimir effect in the presence of external fields, *J. Phys. A: Math. Theor.* 46 (2013) 115401.
4. Beauregard, M. A.; Sheng, Q., Solving degenerate quenching-combustion equations by an adaptive splitting method on evolving grids, *Comput. Struct.*, Vol. 122, pp. 33-43, 2013.
3. Beauregard, M. A.; Sheng, Q., An Adaptive Splitting Approach for the Quenching Solution of Reaction-Diffusion Equations over Nonuniform Grids, *J. Comput. Appl. Math.*, Vol. 241, pp. 30-44, 2013.
2. Beauregard, M. A.; Sheng, Q., A Semi-Adaptive Compact Splitting Method for the Numerical Solution of 2-Dimensional Quenching Problems, *Appl. Math. Comput.*, Vol. 218, pp. 11240-11254, 2012.

1. Beauguard, M. A.; Goriely, A.; Tabor, M., Nonlinear Dynamics of an Elastic Tube Conveying a Fluid, *Int. J. Solids Struct.*, Vol. 47, Iss. 1, pp. 161-168, 2010.

PUBLICATIONS - PROCEEDINGS (bold indicates student coauthor)

2. **Nguyen, H.**; Beauguard, M.A.; Morgan, R., Improving the speed of convergence of GMRES for certain perturbed tridiagonal systems, *In 45th Southeastern Symposium on System Theory (SSST)*, pp. 63-67, 2013.
1. Beauguard, M. A., Compact Schemes in Application to Singular Reaction-Diffusion Equations, *In 44th Southeastern Symposium on System Theory (SSST)*, pp. 135-140, 2012.

PUBLICATIONS - MONOGRAPHS

1. Beauguard, M. A., *Analysis of Elastic Filaments Conveying a Fluid and a Numerical Study*, VDM publishing, ISBN 978-3-639-33621-4, 2011.

PUBLICATIONS - SUBMITTED

4. **Takyi, E.**; Bhattacharyya, J.; Beauguard, M. A.; Parshad, R.D., Mimicing the TYC strategy: Weak Allee effects, and a "non" hyperbolic extinction boundary, arxiv.org/abs/2006.10115
3. de Silva, K.; Basheer, A.; Antwi-Fordjour, K.; Beauguard, M. A.; Chand, V.; Parshad, R.D., The higher status language doesn't always win: The fall of English in India and the rise of Hindi, <https://arxiv.org/abs/2002.05787>.
2. Beauguard, M. A.; Parshad, R.D.; **Takyi, E.**; **Griffin, T.**; **Bobo L.**, Large and small data blow-up solutions in the Trojan Y Chromosome model, arxiv.org/abs/1907.06079
1. Beauguard, M. A.; Selcuk, B.; Quenching behavior for a heat equation with singular boundary conditions, arxiv.org/abs/1907.03796.

PUBLICATIONS - IN PREPARATION

1. Beauguard, M. A.; Numerical approximations to the static Kirchhoff equations, in preparation.

CONFERENCES (w/ PRESENTATION TITLES)

22. Large and Small Data Blow-Up Solutions in the Trojan Y Chromosome Model, Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, Arizona State University, AZ, 2019.
21. Biological Modeling through Machine Learning, Computational and Mathematical Population Dynamics, Florida Atlantic University, FL, 2019.
20. Numerical realizations of nonlinear population models with self and cross diffusion, 4th SIAM Central States Sectional Meeting, Norman, OK, 2018.
19. Attended, Biology and Medicine through Mathematics, Virginia Commonwealth University, Richmond, VA, 2018.
18. A variable nonlinear splitting algorithm for a generalized SKT-model, Joint Mathematical Meetings, San Diego, CA, 2018.

17. A variable nonlinear splitting algorithm for reaction diffusion systems with self and cross-diffusion, 3rd SIAM Central States Sectional Meeting, Ft. Collins, CO, 2017.
16. A Nonlinear Splitting Algorithm for Systems of Partial Differential Equations with self-Diffusion, 2nd SIAM Central States Sectional Meeting, Little Rock, AR, 2016.
15. Multiproduct Expansions in Application to Singular Partial Differential Equations, Joint Mathematical Meetings, San Antonio, TX, 2015.
14. Attended, Texas Undergraduate Research in Mathematics Conference, Stephen F. Austin State University, Nacogdoches, TX, 2014.
13. Numerical Analysis of Quenching-Combustion Numerical Approximations Over Elliptical Domains, David A. Walsh's Arts & Sciences Mini-Conference on Applied Statistics and Computational Mathematics, Clarkson University, Potsdam, NY; October, 2013.
12. Solving Degenerate Quenching-Combustion Equations by an Adaptive Splitting Method on Evolving Grids, Seventh M.I.T. Conference on Computational Fluid and Solid Mechanics, Massachusetts Institute of Technology, Cambridge, MA; June, 2013.
11. Solving Degenerate Quenching-Combustion Equations Via Exponentially Evolving Grids, 14th SIAM International Conference on Numerical Combustion, San Antonio, TX; April, 2013.
10. Adaptive Splitting Algorithms in Application to Singular Reaction-Diffusion Equations Over Elliptical Domains, Eighth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia; March, 2013.
9. Improving the speed of convergence of GMRES for certain perturbed tridiagonal systems, 45th Southeastern Symposium on System Theory, Baylor University, Waco, TX; 2013.
8. Attended Joint Mathematical Meetings at San Diego, CA, 2013.
7. Expectations and limitations of the compact splitting method for quenching-combustion problems, The Eighth International Conference on Scientific Computing and Applications (SCA2012), University of Nevada, Las Vegas, NV, 2012.
6. Compact Schemes in Application to Singular Reaction-Diffusion Equations, 44th Southeastern Symposium on System Theory, University of North Florida, Jacksonville, FL; 2012.
5. A Semi-Adaptive Compact Splitting Method for the Numerical Solution of 2-Dimensional Quenching Problems, Joint Mathematical Meetings, Boston, MA, 2012.
4. Attended, Baylor Workshop on Splitting and Multiscale Methods for Computational PDEs, Waco, TX, 2011.
3. Stability Analysis of Elastic Tubes, Joint Mathematical Meetings, San Francisco, CA, 2010.
2. Nonlinear Dynamics of Elastic Filaments, Arizona Days Conference, Center for Nonlinear Studies, Los Alamos National Laboratory, 2006.
1. Implicit Runge-Kutta and the Actively Mode-Locked Laser, Arizona Days Conference, Center for Nonlinear Studies, Los Alamos National Laboratory, 2004.

COLLOQUIUM AND SEMINAR PRESENTATIONS

22. Remind - A Useful Approach to Increase Student Communication, Mathematics Colloquium & Center for Teaching and Learning, Stephen F. Austin State University, 2017.

21. Swarm Intelligence: Agent-Based Modeling in Engineering and Biology, Keynote Speaker, STEM-N-Ar, Texas A & M at Texarkana, 2016.
20. Modeling and Analysis of Ecological Controls of Invasive Species, Mathematics Colloquium, Baylor University, 2016.
19. Jobs, Jobs, Jobs!, American Mathematical Society Graduate Chapter Meeting, Baylor University, 2016.
18. Controlling the Population Growth of an Invasive Species through Ecological Damping, Mathematics Colloquium, University of Texas at Tyler, 2015.
17. Surgical Splitting, Mathematics Colloquium, Stephen F. Austin State University, 2014.
16. Numerical linear algebra: How eigenvector information can point you in the right direction in applications, SIAM Student Chapter, Clarkson University, 2013.
15. A Cautionary Tale from Numerical Approximations to Singular Reaction-Diffusion Equations, Mathematics Colloquium, West Chester University, 2013.
14. Adaptive Splitting Methods in Application to a Solid Fuel Ignition Model, Mathematics Colloquium, Clarkson University, 2013.
13. Adaptive Splitting Methods in Application to Quenching-Combustion Equations, Mathematics Colloquium, California Poly-technic University, 2013.
12. Caution! A Tale from Numerical Analysis, Mathematics Colloquium, Stephen F. Austin University, 2013.
11. Numerical Approximations to Quenching Combustion Equations Employing Exponentially Evolving Grids, Center of Astrophysics, Space, and Engineering Research (CASPER), Baylor University, 2013.
10. A Cautionary Tale from Numerical Approximations to Singular Reaction-Diffusion Equations, Mathematics Colloquium, Creighton University, 2012.
9. Quenching in Reaction-Diffusion Equations over a Nonuniform Mesh, Mathematics Colloquium, Baylor University, 2011.
8. Instabilities of an Elastic Tube Conveying a Fluid, Mathematics Colloquium, Baylor University, 2010.
7. Analysis of Elastic Tubes, Analysis Seminar, University of Arizona, 2010.
6. Finite Element Approximations to the Kirchhoff Equations, Computational Science Seminar, University of Arizona, 2008.
5. Nonlinear Dynamics of Elastic Filaments, Graduate Brown Bag Seminar, University of Arizona, 2006.
4. The Power of Latex, Research Tutorial Group, Program in Applied Mathematics, University of Arizona, 2005.
3. Transport and Small Diffusion in Steady Flow, Partial Differential Equations Seminar, University of Arizona, 2005.
2. Implicit Runge-Kutta and the Actively Mode-Locked Laser, Computational Science Seminar, University of Arizona, 2004.

1. Spectral Hermite Approximation to the Actively Mode-Locked Laser, Applied Mathematics Colloquium, Department of Mathematics, University of New Hampshire, 2003.

GRANTS AND FUNDING - POSTGRADUATE (2008-Present)

6. **National Science Foundation Research Grant - Pending** (NSF 16-1266) (\$500,000): **PI**, Lynn Greenleaf (Co-PI SFASU), Rana Parshad (PI, Iowa State University), David Harrison (Co-PI Swarthmore College), Kwadwo Antwi-Fordjour (Co-PI Samford University) Collaborative Research: A Finite Time Extinction Approach To Endangered Languages - Modeling, Applied Analysis and Data, 2019-2022.
 - Description: This a three year NSF research grant researching new mathematical models of endangered languages and studies the efficacy of government policies to promote language rebound and adoption. The grant funds a post-doctoral research, graduate, and multiple undergraduate students.
5. **National Science Foundation Research Grant** (NSF 12-7334) DMS-1715377/DMS-1715044 (\$420,000): **PI**, Rana Parshad (PI, Iowa State University), Collaborative Research: A Novel Control for Invasive Species - Modeling, Analysis, and Experiments, 2017-2020.
 - Description: This a three year NSF research grant researching the Trojan-Y-Chromosome eradication strategy to invasive aquatic species. The grant funds graduate students and multiple undergraduate students.
4. **Faculty Research Grant - 150030-26423-150**, Stephen F. Austin State University, *Nonlinear Splitting Algorithms for Systems of PDEs with Self and Cross Diffusion*, 1-month summer support, 2017.
 - Description: A nonlinear operator method that is stable and high accurate is to be developed in application to systems of pdes with self and cross diffusion.
3. **Faculty Research Grant Development Award**, Stephen F. Austin State University, *Mathematical Modeling and Analysis of Ecological Controls of Invasive Species*, course release, Fall, 2015.
 - Description: This award provided release time to develop a collaborative and interdisciplinary research grant to the National Science Foundation.
2. **Faculty Research Grant - 107552-26423-150**, Stephen F. Austin State University, *Nonlinear Operator Splitting for Multiscale Combustion Equations*, 1-month summer support, 2015.
 - Description: A nonlinear operator method that is stable and high accurate is to be developed.
1. **David A Walsh's 67 Arts & Sciences Mini-Conference** (Spring 2015): **PI**, (PI: Rana Parshad, Clarkson University), *A Mini-Conference on Mathematical Modeling in Biology and Bioengineering*, 2015, \$3000.
 - Description: A mini-conference promoting collaborations between mathematicians, biologists, and engineering.

GRANTS AND FUNDING RECEIVED AS A STUDENT (<2008)

5. **VIGRE Graduate Student Fellowship**, University of Arizona; 2006-2008
 - Description: Analyzed and further developed amplitude equations governing the dynamics of an elastic tube conveying a fluid.
 - Sponsor: Alain Goriely (Oxford University)

4. **NSF Summer Research Grant DMS 0307427**, University of Arizona, Summer 2006
 - Description: Designed and implemented numerical algorithms to simulate the static equations that model an elastic filament.
 - Advisor: Alain Goriely (Oxford University)
3. **NSF Summer Research Grant DMS 0307427**, University of Arizona, Summer 2005
 - Description: Developed amplitude equations governing the dynamics of an elastic tube conveying a fluid subject to a twisting moment beyond threshold.
 - Advisor: Alain Goriely (Oxford University)
2. **Department of Energy Research Assistantship DEFG0302ER25533**, University of Arizona, 2004-2005
 - Description: Calculated the lift, drag, and moment on a rotating, fixed sphere subject to an oscillatory boundary layer flow.
 - Advisor: Juan Restrepo (University of Arizona)
1. **Student Undergraduate Research Fellowship Grant**, University of New Hampshire, Summer 2000
 - Description: Designed, implemented, and analyzed a spectral hermite approximation to the actively mode-locked laser.
 - Advisors: Kelly Black (University of Georgia) and John Geddes (Franklin Olin College of Engineering)

UNFUNDED RESEARCH PROPOSALS

10. National Science Foundation (NSF 16-1266): **PI**, Lynn Greenleaf (Co-PI, SFASU), Rana Parshad (PI, Iowa State University), Kwadwo Antwi-Fordjour (Co-PI, Samford University), David Harrison (Co-PI, Swarthmore College), Collaborative Research: Finite Time Extinction Approach To Endangered Languages – Modeling, Applied Analysis and Data, submitted, 2018.
9. National Science Foundation (NSF 16-1271): **PI**, Rana Parshad (PI, Clarkson University), Collaborative Research: Nonlinear Splitting Algorithms for Biological Systems of Partial Differential Equations with Self and Cross Diffusion, 2015.
8. National Science Foundation (NSF 12-7334): **PI**, Rana Parshad (PI, Clarkson University), Collaborative Research: A Novel Control for Eradication of Invasive Species: Mathematical Modeling, Analysis and Experiment, 2015.
7. National Science Foundation (NSF 13-542): **Co-PI**, Nick Long (PI), Jane Long (Co-PI), Jeremy Becnel (Co-PI), REU Site: REU in Mathematics at SFA, 2015.
6. National Science Foundation (NSF 12-7334): **PI**, Rana Parshad (PI, Clarkson University), Kelly Black (Co-PI, Clarkson University), A novel mathematical method for the biological control of invasive species, 2014.
5. National Science Foundation (NSF 13-542): **Co-PI**, Nick Long (PI), Jane Long (Co-PI), Jeremy Becnel (Co-PI), REU Site: REU in Mathematics at SFA, 2014.
4. David A Walsh's 67 Arts & Sciences Mini-Conference (Spring 2014): **PI**, (PI: Rana Parshad, Clarkson University), *A Mini-Conference on Mathematical Modeling in Biology and Bioengineering*, 2014.

3. National Science Foundation (NSF 16-1271): **PI**, Qin Sheng (Co-PI, Baylor University), Collaborative Research: High Order Nonlinear Adaptive Operator Splitting for Multiscale Kawarada Equations, 2013.
2. Department of Energy (DOE): **PI**, Qin Sheng (Co-PI, Baylor University), Collaborative Research: Multiscale Splitting Methods for Solving Nonlinear Partial Differential Equations in Multiphysics Energy Applications, 2013.
1. National Science Foundation (NSF 16-1271): **Co-PI**, Qin Sheng (PI, Baylor University), *Adaptive Splitting Methods Employing Exponentially Evolving Grids (EEG) for Degenerate Singular Reaction-Diffusion Equations*, 2012.

ADDITIONAL PROFESSIONAL EXPERIENCE

- 2006-2009 **Buyer; Director of Bicycle Internet and Retail Sales**, TriSports.com;
 Researched and statistically analyzed SKU performance, coordinated purchases, managed inventory levels, responsible for staff education.
 Supervisor: Seton Claggett, President & CEO
- Summer 2004 **Research Internship**, Argonne National Laboratory; Argonne, IL;
 Designed and implemented code for the TAO optimization project. See <http://www.mcs.anl.gov/research/projects/tao/> .
 Advisor: Steve Benson
- Summer 2001 **Research Internship**, Eigensoft, Inc.; Portsmouth, NH;
 Designed and implemented source code for the development of a Windows CE application called *ClaimsAgent*.

TEACHING EXPERIENCE

- **Stephen F. Austin State University**, 2014-PRESENT
 - Graduate Courses Taught:*
 - Numerical Analysis, Linear Algebra, Partial Differential Equations
 - Undergraduate Courses Taught:*
 - College Algebra, Trigonometry, Analytic Geometry, Precalculus, Calculus I-III, Linear Algebra, Computational Linear Algebra, Applied Partial Differential Equations, Spatial Geology
- **Clarkson University**, 2013-2014
 - Undergraduate Courses Taught:*
 - Numerical Methods, Applied Linear Algebra, Advanced Mathematical Analysis
- **Baylor University**, 2010-2013
 - Graduate Courses Taught:*
 - Methods of Applied Mathematics I
 - Undergraduate Courses Taught:*
 - Calculus I & II, Ordinary Differential Equations, Partial Differential Equations
- **University of Arizona**, 2003-2010
 - Undergraduate Courses Taught:*

- College Algebra, Precalculus, Applied Calculus, Elements of Calculus, Calculus I with Applications, Calculus II, Multivariate Calculus, Introduction to Mathematical Modeling

Graduate Courses Assisted:

- Methods of Applied Mathematics

Undergraduate Courses Assisted:

- Mathematical Analysis for Engineers

- **Kaplan University**, 2009-2010

(MOC¹) Courses Taught:

- Survey of Mathematics

- **University of New Hampshire**, 2001-2002

Courses Assisted:

- Calculus II and Linearity (a two-semester course integrating differential equations, linear algebra, and multivariate calculus)

UNDERGRADUATE RESEARCH ADVISING

16. Sara Boon, Meredith Clayton, Kaylee Coffey, Optimal Control of a Revised TYC Pairing Model (2020)
15. Sara Boon, Fourier analysis of discrete optimal controls of the TYC strategy (2019)
14. Landrey Bobo and Thomas Griffin, Large and small data blow-up solutions in the Trojan Y Chromosome model (2019)
13. Sara Boon, Harley Conaway, Thomas Griffin, Investigations of models of the Trojan Y-Chromosome Strategy (2018)
12. Stephen Janovsky, Spectral Analysis of Exchange Traded Funds (2017)
11. Thomas Griffin, Icosystems - Modeling a Swarm (2017)
10. Keely Armstrong, Spatial Geology (2016)
9. Brandi Williams, A Tricky Linear Algebra Example (2016)
8. Art Kazmierczak, Modeling the Interaction of Neutral and Terrorist Populations (2016)
7. Brandon Sutton, Euler's Formula (2016)
6. Abigail Eck, Student Perceptions of Collegiate Textbook Use (2015)
5. Abena Afowaa, Analytic Geometry Extensions in Three Dimensions (2014)
4. Keynee Johnson, Approximating the Matrix Exponential (2014)
3. Kristofor Whitworth, Matrix Factorizations (2014)
2. Tracy Finner, Mathematical modeling of traffic flow; Investigating the effect of turning (2009-2011)

¹Massive Online Course

- Finner, Tracy and Beaugard, Matthew A. "A Cellular Automaton Model for Traffic Flow - Investigating the Effect of Turning," American Journal of Undergraduate Research: Vol. 12: Iss. 1, Article 3, 2014.

1. Isai Chavarri, Applications of Singular Perturbation Theory (2013)

GRADUATE STUDENT ADVISING

1. Thesis advisor - Master of Science in Mathematics, Christopher Turner, SFASU 2019-2020.
2. Thesis advisor - Master of Science in Mathematics, Emily Weymier, SFASU, 2015-2018.
3. Committee member - Master of Science, Abigail Rickards, SFASU, 2016-2019.
4. Committee member - Master of Science in Mathematical Sciences, Jonathan Hill, SFASU, 2016.
5. Committee member - Doctor of Philosophy in Applied Mathematics, Emmanuel Quansah, Clarkson University, 2014-2016.
6. Committee member - Master of Science in Physics, Aditi Mukhopadhyay, Baylor University, 2014
7. Committee member - Master of Science in Physics, Tara Scarborough, Baylor University, 2012
8. Committee member - Master of Engineering, Jimmy Becker, Baylor University, 2011

TEACHING, RESEARCH, & SERVICE AWARDS

1. **Teaching Excellence Award**, SFASU, TX, 2019.
2. **Distinguished Faculty Research Award**, SFASU, TX, 2018.
3. **Phi Eta Sigma Leadership Award**, Orlando, Florida, 2016.
4. **National Society of Collegiate Scholars Distinguished Member Honorary for Teaching Excellence**, Washington, D.C., 2013.
5. **Mortor Board Circle of Achievement Award for Teaching Excellence**, Baylor University, 2011.

UNIVERSITY AND DEPARTMENT SERVICE

- University Committees Served:

3. Center for Undergraduate Research Initiatives and Programs - Representatives from each college were appointed to discuss how to institutionalize transformative experiences through undergraduate and interdisciplinary research. (2016 - 2017)
2. Regent's Professor Lecture Committee - Developed our annual regent's lecture in conjunction with the induction ceremony for Phi Eta Sigma members. (2016 - 2017)
1. Regent's Professor Lecture Committee - Developed our annual regent's lecture in conjunction with the induction ceremony for Phi Eta Sigma members. (2015 - 2016)

- College Committees Served:

4. Tenure/Promotion to Full Professor Committee (Chair) - Reviewed and organized a recommendation for or against the tenure/promotion to full professor for candidates within the college. (2018 - 2020)

3. Hispanic Serving Institution Committee - Instituting and formulating strategies to encourage recruitment and retention of Hispanic STEM students. (2018 - present)
 2. College of Science and Mathematics Council - Analyzes and makes recommendations for course proposals or modifications. (2014 - 2016)
 1. Undergraduate Research Conference Committee - Read and ranked submitted abstracts for our undergraduate research conference. (Spring, 2016)
- Department Committees Served:
7. Department Advisory Council - Investigates faculty applications and provides council over various needs of the department. (2017 - Present)
 6. Major Pathways - Investigate pathways toward earning a degree in mathematics with different emphases (2017 - 2018)
 5. Recruitment Committee - Investigate and coordinate recruitment strategies of undergraduate and graduate students (2017 - Present)
 4. Precalculus Advisory Committee - Investigate the effectiveness and facilitation of our pre-calculus course. (2017 - 2018)
 3. Calculus Textbook Committee - Analyzes and makes department decision for textbook use in our Calculus I thru III sequence. (Spring, 2016)
 2. Graduate Advisory Committee - Analyzed applicants to our graduate program in mathematics and statistics. Made a recommendation for acceptance or rejection to chair. (2015 - 2016)
 1. Undergraduate Exit Interview Committee - Developed a survey and delivery method that obtains feedback from graduating majors about their experiences at Stephen F. Austin State University. (Spring, 2015)
- Student Work Advisory Council for Baptist Student Ministry (BSM) at SFASU, Nacogdoches, TX - The advisory council is made of patronages from the surrounding region that provides advice to the Baptist Student Ministry concerning budget, staffing, intern, applications, outreach, fundraising efforts, etc.
- Committee Member (Spring, 2015)
 - Committee Chair (Summer, 2015- Present)
- Seminar and Colloquium Organization:
- *Local Organizer* - University of Arizona graduate student seminar, 2006.
- Curriculum Development:
- Computational Linear Algebra (Undergraduate); Stephen F. Austin State University, Nacogdoches; 2018, 2020.
 - Precalculus MTH 140 (Undergraduate); Stephen F. Austin State University, Nacogdoches; 2017-2018.
 - Numerical Analysis MTH 305/505 (Undergraduate/Graduate); Stephen F. Austin State University, Nacogdoches; 2015-2018.
 - Fluid Mechanics; (Undergraduate) Stephen F. Austin State University, Nacogdoches; 2014.
 - Applied Mathematics I; (Graduate) Baylor University, Waco, TX; 2011-2012.
 - Mathematical Analysis for Engineers; (Undergraduate) University of Arizona, Tucson, AZ; 2007.

- Training
 - *Teaching Assistant Training* : facilitated training sessions for first time graduate student teachers, Clarkson University, 2013.
- Undergraduate Student Advising, 2015-Present, 10 current students.
- Student Organization Advising:
 - Super Smash Brothers, Stephen F. Austin State University, 2018-Present
 - Cycling Club, Stephen F. Austin State University, 2015-Present
 - Phi Eta Sigma, Stephen F. Austin State University, 2015-2020
 - Pi Mu Epsilon, Stephen F. Austin State University, 2014-2020
- Showcase Saturday - 2015, 2016, 2017, 2018, 2019, 2020.
- Summer Freshman Orientation - Discussed opportunities to become involved in the STEM residential learning community and our Student Teacher Test Pilot Program to parents and students - 2016, 2017.
- Recruiting Efforts
 - Gulf States Mathematics Alliance - hosted and manned a table representing SFASU's graduate program in mathematics and statistics, Southern University, Baton Rouge, LA, 2020.
 - Gulf States Mathematics Alliance - hosted and manned a table representing SFASU's graduate program in mathematics and statistics, University of Texas at Arlington, 2019.
 - Texas Undergraduate Mathematics Conference - hosted and manned a table representing SFASU's graduate program in mathematics, 2018.
 - University of Houston Downtown - Job fair coordinating by UHD for students interested in pursuing advanced degrees, 2018.
 - University of Houston Downtown - Job fair coordinating by UHD for students interested in pursuing advanced degrees, 2017.
 - Texas A&M at Texarkana - Met with students and faculty to discuss graduate offerings in biology, mathematics, and statistics, 2016.
 - East Texas Baptist University - Met with students and faculty to discuss graduate offerings in mathematics and statistics, 2015.
 - Wiley College - Met with students and faculty to discuss graduate offerings in mathematics and statistics, 2015.

PROFESSIONAL SERVICE

- Conference and Workshop Organization:
 - *Mini Symposium Organizer*, Modeling and Analysis in Ecology and Epidemiology, SIAM Annual (Virtual) Meeting, Toronto, 2020.
 - *Symposium Organizer*, Modeling and Analysis in Ecology and Epidemiology - 5th Annual SIAM Central States Sectional Meeting, Iowa State University, 2019.
 - *Symposium Organizer*, Modeling and Analysis in Ecology and Epidemiology - 4th Annual SIAM Central States Sectional Meeting, University of Oklahoma, 2018.
 - *Special Session Organizer* - 2nd Annual SIAM Central States Sectional Meeting, University of Arkansas at Little Rock, 2016.

- *Technical Editor* - 45th Southeastern Symposium on System Theory, Baylor University, 2012-2013.
- *Local Organizer* - Baylor Workshop on Splitting and Multiscale Methods for Computational PDEs, 2011.
- Editorial Work:
 - Associate editor: IEEE Special Issue - In 45th Southeastern Symposium on System Theory (SSST), 2012-2013.
- Reviews:
 - Journal Reviewer for:
 1. Advances in Mathematical Physics
 2. Applied Mathematics & Computation
 3. Applied Mathematics Letters
 4. British Journal of Mathematics & Computer Science
 5. Electronic Journal of Differential Equations
 6. International Journal of Bifurcation and Chaos
 7. International Journal of Computer Mathematics
 8. Journal of Applied Mathematics and Computing
 9. Journal of Computational and Applied Mathematics
 10. Journal of Nonlinear Science
 11. Journal of Numerical Methods for Partial Differential Equations
 12. Mathematics and Computers in Simulation
 13. Proceeding to the Royal Society A
 - Book Reviews:
 1. Juergen Geiser, *Multicomponent and Multiscale Systems - Theory, Methods, and Applications in Engineering*, Springer Science and Business Media, 2015.
 2. John Davis, *Applied Partial Differential Equations*, 2011, W.H. Freeman and Company, 2011
- UTMOST: Undergraduate Teaching in Mathematics with Open Software and Textbooks, NSF IUSE-Award #1624634.
 - Description: Facilitated a linear algebra pilot section that aided in developing the research methods, tools, and protocols for UTMOST, a mathematics education research grant studying the efficacy of open source technology in the classroom. This involved collaboration with faculty from University of Michigan, State University of New York at Geneseo, and New York University.

CONTRACT & CONSULTING

- TriSports.com, Tucson, Arizona (2014-2015)
 - Contact: Seton Claggett, owner and president.
 - Description: Developed a data-driven marketing model for new customers.
- Flowers Davis, PLLC, Tyler, Texas (2015)
 - Contact: Chad Rook, Attorney

- Description: This report detailed the derivation and analysis of a mathematical model that determined the sustained wind velocity required to displace a tree limb a specified horizontal distance. My analysis was used as evidence in **Sagers v. Black**.
- W.H. Freeman and Company (2012)
 - Description: Created a solutions manual of *Applied Partial Differential Equations*, by John Davis.

PUBLIC SERVICE AND OUTREACH

- Outreach Talks:
 17. *Exploring Probabilities*, East Texas Math Teacher Circle, Nacogdoches, TX, 2020.
 - Description: Led a 90 minute active discovery in conditional probability for middle to high school teachers.
 16. *Can you take the Risk?*, Regents Academy, Nacogdoches, TX, 2019, 2020.
 - Description: Lead a discovery session on probability in the game of Risk. Audience consisted of thirteen 5th grade students.
 15. *Exploding Dots*, Regents Academy, Nacogdoches, TX.
 - Description: Lead a discovery session on counting and arithmetic in other number systems such as binary. Audience consisted of thirteen 5th grade students.
 14. *Swarm*, Julia Robinson Mathematics Festival, Stephen F. Austin State University, May, 2018.
 - Description: An hour discovery session exploring autonomous swarm development. The audience consisted of 150 grade school children from the East Texas area.
 13. *Swarm*, STEM Academy, Stephen F. Austin State University, September, 2017 & 2018.
 - Description: A two and half hour discovery session guiding students into formulating a mathematical model of three different icosystems. The audience was 30 junior high school students from Nacogdoches High School.
 12. *Swarm*, STEM Academy, Stephen F. Austin State University, September, 2017.
 - Description: A two and half hour discovery session guiding students into formulating a mathematical model of three different icosystems. The audience was 30 junior high school students from Nacogdoches High School.
 11. *Swarm Intelligence*, Middle School STEM Day, Stephen F. Austin State University, May, 2017.
 - Description: A one 1 hour discovery session on emerging behaviours of rule based agents. The audience was comprised of 80 middle school students from the greater East Texas region.
 10. *Swarm Intelligence*, STEM Day, Stephen F. Austin State University, February, 2017.
 - Description: Two 1 hour and 20 minutes discovery session on emerging behaviours of rule based agents. The audience was comprised of 40 high school students from the greater East Texas region.
 9. *Swarm, Swarm, Swarm*, STEM RLC Day, Stephen F. Austin State University, October, 2016.
 - Description: Led a 1 hour and 20 minutes discovery session out of doors on emerging behaviours of rule based agents. Invitations were sent out to the biology, math, engineering, and physics clubs in addition to the STEM residential learning community.
 8. *Swarm Intelligence*, STEM Day, Stephen F. Austin State University, February, 2016.

- Description: Two 1 hour and 20 minutes discovery session on emerging behaviours of rule based agents. The audience was comprised of 40 high school students from the greater East Texas region.
- 7. *Farkle*, Math Blitz, McMichael Middle School, January, 2016.
 - Description: Two 40 minute discovery based sessions focused on the game Farkle. The discovery sessions were for two separate middle school classes.
- 6. *Let's Count Together*, Gifted and Talented Program, McMichael Middle School Mathematics Circle, May, 2015.
 - Description: A one hour and half problem session focused on probabilities and counting in popular games. The audience was comprised of 40 middle school age children from the Nacogdoches area.
- 5. *Mathematical Ringers*, STEM Day, Stephen F. Austin State University, February, 2015.
 - Description: Two 1 hour and 20 minutes discovery sessions on counting and probabilities found in traditional games. The audience of each session had 40 – 50 high school students from the greater East Texas region.
- 4. *Counting Games*, STEM Leaders of Tomorrow, Stephen F. Austin State University, February, 2015.
 - Description: A 45 minute presentation on counting and probabilities found in traditional games. The audience was fifteen 8th grade students from the Nacogdoches area.
- 3. *Mathematical Ringers*, East Texas Math Teachers' Circle, Stephen F. Austin State University, December, 2014.
 - Description: A two hour problem session focused on understanding probabilities that occur in games, such as Risk. The audience contained high-school teachers from the Nacogdoches area.
- 2. *A Journey into Academia*, Mandaville Camp and Retreat Center, Winthrop, NY, 2014.
 - Description: This invited talk highlighted Clarkson University's mathematics program and offered my personal journey into academia. The audience consisted of fifty high-school age students.
- 1. *Competitive Cycling in a Fallen World*, Woodway Rotary Club, Woodway, TX, 2012.
 - Description: This invited talk explored competitive cycling and the role of statistical analysis in drug-testing of athletes.
- Moody's Mega Math Challenge (2014-present)
 - Description: National high-school competition sponsored by the Moody foundation and SIAM. The competition is a one day event offered to high school teams across the nation. The teams are given a mathematical modeling problem. They then are given 18 hours to submit a professional write-up of the problem, modeling efforts, analysis, and conclusions. The event features over \$100,000 in scholarships that are awarded to the top performing teams. The top performing teams are solicited to give a talk presenting their results in a national broadcasted event.
 - 12th M^3 Challenge (2017) - pre-triage and triage judge. Pre-triage director and regional coordinator.
 - 11th M^3 Challenge (2016) - pre-triage and triage judge. Regional coordinator. Director in training.
 - 10th M^3 Challenge (2015) - pre-triage and triage judge. Regional coordinator.

- 9th M^3 Challenge (2014) - triage judge.
- Panel Discussions:
 3. *The Life and Times of an Academic*, Clarkson University, 2013.
 - Description: discussed the rigors of academic life to an undergraduate mathematics modeling course.
 2. *Pursuing a Graduate Degree in Mathematics*, Clarkson University, 2013.
 - Description: discussion about graduate study in mathematics. This was offered to all SUNY-Potsdam and Clarkson University REU students.
 1. *Exploring Faith & Science*, Baylor University, 2011.
 - Description: organized and served on a panel that discussed the synergy between faith and scientific discovery. The event was kicked off by a lecture by IEEE Fellow, Dr. Robert Marks II. This event was held a residential dormitory and was open to the public and students.
- *STEM Residential Learning Center Advisor*, SFASU (2016-present)
 - Description: worked with residence hall director and community leaders to foster mentorship and enrichment for first year STEM students.
 - Faculty co-advisor (2017-present)
 - Faculty co-advisor (2016-2017)
- *Residential Life Faculty Advisor*: worked with residence hall directors and community leaders to facilitate dynamic connections between students and professors, Baylor University, 2012-2013.
- *Invitation to Excellence*: recruitment workshop for prospective undergraduate students, Baylor University, 2010-2012.
- *BU1000 Facilitator*: led interactive discussions with new freshman students on dealing with the transition to the university, Baylor University, 2011.
- *Grade School Visitations*:
 - Tucson Magnet High School, Tucson, AZ; April, 2006, 2007, 2008. Brief presentation on current research in elastic filaments. In addition presented an overview of academic study in applied and pure mathematics degree requirements at the University of Arizona to a senior AP calculus course.
 - Rincon High School; Tucson, AZ, April, 2005. Description: Brief presentations on fluid mechanics. In addition presented an overview of academic study in applied and pure mathematics degree requirements at the University of Arizona to two senior AP calculus courses.
 - La Cholla Magnet High School, Tucson, AZ; April 2004. Description: Brief presentation on liquid crystals.
- *2nd Annual Exploring Mathematics Night*, aided in the organization of a panel to discuss career paths and opportunities in applied and pure mathematics, University of New Hampshire, 2001.
- *Inaugural Exploring Mathematics Night*, developed the inaugural event that organized a panel to discuss career paths and opportunities in applied and pure mathematics, University of New Hampshire, 2000.

PROFESSIONAL RESEARCH GROUPS

1. Center for Astrophysics, Space, and Engineering Research (CASPER), Affiliated Faculty, 2013-Present.
2. Splitting in Action Group, Member, 2011-Present.

PROFESSIONAL SOCIETIES

1. Society of Industrial and Applied Mathematics, member since 2003
2. American Mathematical Society, member since 2003
3. National Society of Collegiate Scholars, distinguished and honorary member, 2013