Edward W. Swim

Department of Mathematics & Statistics
Sam Houston State University
Huntsville TX 77341-2206

Curriculum Vitae

September 5, 2017
(936) 294-1576
edward.swim@shsu.edu

Education:

Ph.D. **Applied Mathematics**, August 2005, Texas Tech University
Dissertation: Nonconforming finite element methods for fluid-structure interaction
Advisor: Dr. Padmanabhan Seshaiyer

M.S. **Mathematical and Computer Sciences**, December 1999, Colorado School of Mines
Thesis: Numerical computation of rough surface scattering polarization ratios
Advisor: Dr. John A. DeSanto

B.S. **Mathematics**, May 1994, Angelo State University, Cum laude

Employment:

2016 - Present **Associate Professor**
Department of Mathematics & Statistics, Sam Houston State University,
Huntsville, Texas

2010-2016 **Assistant Professor**
Department of Mathematics & Statistics, Sam Houston State University,
Huntsville, Texas

2007-2010 **Assistant Professor & Davies Fellow**
Department of Mathematical Sciences, United States Military Academy,
West Point, New York

2005-2007 **Visiting Assistant Professor**
Department of Mathematics & Statistics, Air Force Institute of Technology,
Wright-Patterson AFB, Ohio

Research Interests:

- **Numerical Analysis:**

  numerical solutions of partial differential equations,
  multiscale approximations for coupled problems,
  nonconforming finite element methods.

- **Modeling and Simulation:**

  mathematical modeling of environmental systems,
  simulation-based medical planning,
  aerodynamic simulation of thin membrane materials.

- **Computational Mechanics:**

  fluid-structure interactions,
  membrane mechanics for biological and aerodynamic applications,
  stochastic models for thermodynamic systems.

Articles in Print:

2016 **Mathematical modeling of continuous and intermittent androgen suppression for the treatment of advanced prostate cancer**, A. M. Voth, J. G. Alford & E. W. Swim, *Mathematical Sciences and Bioengineering*, Vol. 14, No. 3, (2017), pp. 777-804.

2015 **Reconciling the least-squares and point-slope forms of a line for the two point problem**, S. M. Scariano & E. W. Swim, *Mathematics and Computer Education*, Vol. 49, No. 3 (2015).

2014 **Bifurcations**, E. W. Swim, *Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations*, (2014), https://www.simiode.org/resources/599.

2012 **Multilevel non-conforming finite element methods for coupled fluid-structure interactions**, E. Aulisa, S. Garcia, E. Swim, & P. Seshaiyer, *International Journal of Numerical Analysis and Modeling, Series B*, Vol. 3, No. 3, (2012), pp. 307-319.

2010 **Disinfection of common waterborne pathogens**, E. Swim, *Problems, Resources, and Issues in Mathematics Undergraduate Studies*, Vol. 20, Issue 2 (2010), pp. 95-108.

2009 **An integrative learning experience within a mathematics curriculum**, B. Melendez, S. Bowman, K. Erickson, & E. Swim, *Teaching Mathematics and Its Applications*, Vol. 28 (2009), pp. 131-144.

2006 **A nonconforming finite element method for fluid-structure interaction problems**, E. Swim & P. Seshaiyer, *Computer Methods in Applied Mechanics and Engineering*, Vol. 195 (2006), pp. 2088-2099.

2001 **Theoretical and computational aspects of scattering from periodic surfaces: two-dimensional perfectly reflecting surfaces using the spectral-coordinate method**, J. DeSanto, G. Erdmann, W. Hereman, B. Krause, M. Misra, & E. Swim, *Waves in Random Media*, Vol. 11 (2001), pp. 455-487.

2001 **Theoretical and computational aspects of scattering from periodic surfaces: two-dimensional transmission surfaces using the spectral-coordinate method**, J. DeSanto, G. Erdmann, W. Hereman, B. Krause, M. Misra, & E. Swim, *Waves in Random Media*, Vol. 11 (2001), pp. 489-526.

Conference Proceedings:

2010 **Computational methods for multi-physics applications with fluid-structure interaction**, K. Nong, E. Aulisa, S. Garcia, E. Swim, & P. Seshaiyer, COMSOL Conference 2010 Boston.

2008 **Nonlinear models for biologically inspired elastic membrane wings**, AIAA Paper 2008-2008, E. Swim & P. Seshaiyer, 49th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Schaumburg IL, April 7-10, 2008.

2005 **Fluid-structure interaction using nonconforming finite element methods**, E. Swim & P. Seshaiyer, Proceedings of the 15^{th} International Conference on Domain Decomposition Methods in Science and Engineering, *Lecture Notes in Computational Science and Engineering, R. Kornhuber, et al. (eds.)* Vol. 40 (2005), pp. 217-224.

Technical Reports:

2011 **Coupled mixed finite element methods for fluid-structure interaction problems**, E. Swim, *Sam Houston State University Faculty Research Grant Report*, Sam Houston State University.

2005 **Nonlinear models for elastic membrane wings**, E. Swim, *AFRL Summer Research Final Report*, Air Force Research Laboratory, AFRL/VASD, Wright-Patterson AFB, Ohio.

2001 **Modeling control of HIV infection through structured treatment interruption**, S. Kubiak, H. Lehr, R. Levy, T. Moeller, A. Parker, & E. Swim, *2001 Industrial Mathematics Modeling Workshop for Graduate Students*, CRSC-TR03-27, North Carolina State University, Nov. 2001.

Conference Presentations:

2016 **It takes just six questions** (with B. Cory), 2016 Conference for the Advancement of Mathematics Teaching, San Antonio TX (July)

2015 **Mathematical modeling of androgen deprivation therapy for advanced prostate cancer**, MathFest 2015, Washington DC (August)

2015 **Piecewise polynomial approximations to the standard normal cumulative distribution function**, Joint Mathematics Meetings, San Antonio TX (January)

2014 **It takes just six questions** (with B. Cory), 2014 NCTM Regional Conference & Exposition, Houston TX (November)

2013 **Coupled mixed finite element methods for fluid-structure interaction problems**, 12^{th} U.S. National Congress on Computational Mechanics, Raleigh NC (July)

2012 **A coupled mixed finite element method for fluid-structure interaction**, MathFest 2012, Madison WI (August)

2011 **Stochastic models for heat flow in a cylinder**, AMS Session on Theory and Application of Stochastic Differential Equations and Stochastic Partial Differential Equations, Joint Mathematics Meetings, New Orleans LA (January)

2010 **Delaunay refinement methods for FSI systems undergoing changes in topological properties**, AMS Session on Computational Mathematics, Joint Mathematics Meetings, San Francisco CA (January)

2010 **Can instructors award partial credit on multiple choice questions?** (with J. Braunstein) Joint Mathematics Meetings, San Francisco CA (January)

2009 **An integrative learning experience within a mathematics curriculum**, MAA Panel Discussion: Multidisciplinary projects that hook those not usually interested in mathematics, Joint Mathematics Meetings, Washington DC (January)

2008 **Mathematica in the military: using CAS tools at the United States Military Academy** Project NExT Panel Session: Using computer algebra systems in courses such as single and multivariable calculus, Madison WI (July)

2008 **Nonlinear models for biologically inspired elastic membrane wings**, 49th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Schaumburg IL (April)

2006 **Nonlinear fluid-structure interaction models for biologically inspired elastic membrane wings**, 2006 Fall Central Section Meeting of the AMS, Cincinnati (October)

2005 **Numerical simulation of blood flow near early-stage atherosclerotic lesions** 2005 SIAM Annual Meeting, New Orleans (July)

2005 **A three-field computational methodology for fluid-structure interaction** Third M.I.T. Conference on Computational Fluid and Solid Mechanics, Boston (June)

2005 **Consistency and stability of a nonconforming finite element method for fluid-structure interaction**, 2005 Spring Central Section Meeting of the AMS, Lubbock (April)

2003 **A mortar finite element method for fluid-structure interaction problems** 7^{th} U.S. National Congress on Computational Mechanics, Albuquerque (August)

2003 **Fluid-structure interaction with nonconforming finite elements** 15^{th} International Conference on Domain Decomposition Methods, Berlin (July)

2000 **Numerical computation of polarization dependent scattering anomalies from simulated ocean surfaces**, National Radio Science Meeting, Boulder CO (January)

Teaching Experience:

Department of Mathematics and Statistics, Sam Houston State University

Scientific Computing, Fall 2016
Statistical Methods in Practice, Fall 2015
Numerical Methods, Fall 2014
Topics in Applied Mathematics I, Spring 2014
Calculus II, Spring 2014, Fall 2016 & Spring 2017
Differential Equations, Fall 2013, Spring 2015 & Fall 2017
College Mathematics, Spring 2013, Summer 2015 & Summer 2016
Numerical Methods for Solutions of Differential Equations, Spring 2012
Math for Managerial Decision Makers, Fall 2011, Fall 2012, Summer 2014, Spring 2015 & Spring 2016
Calculus III, Fall 2011, Fall 2012 & Fall 2015
Numerical Linear Algebra, Fall 2011 & Fall 2012
Calculus I, Spring 2011, Spring 2012, Spring 2013, Fall 2013, Fall 2014, Spring 2016 & Fall 2017
Foundations of Analysis II, Spring 2011 & Spring 2014
Foundations of Analysis I, Fall 2010 & Fall 2013
Elementary Statistics, Fall 2010

Department of Mathematical Sciences, United States Military Academy

Probability and Statistics, Fall 2009
Numerical Methods for Differential Equations, Spring 2009
Differential Calculus, Spring 2008 & Spring 2009
Integral Calculus and Introduction to Differential Equations, Fall 2007

Department of Mathematics and Statistics, Air Force Institute of Technology

Numerical Linear Algebra, Winter 2006 & Winter 2007
Calculus for Engineering Managers, Fall 2006
Numerical Analysis for Partial Differential Equations, Summer 2006
Mathematical Methods in the Physical Sciences, Fall 2005 & Spring 2006

Department of Mathematics and Statistics, Texas Tech University

Calculus III, Summer 2004 & Fall 2004
Calculus II, Spring 2004 & Spring 2005
Analytic Geometry, Fall 2003
Calculus I, Spring 2002
Precalculus, Fall 2001
Introductory Mathematical Analysis II, Spring 2001 & Fall 2002
Introductory Mathematical Analysis I, Fall 2000

Department of Mathematical and Computer Sciences, Colorado School of Mines

Programming Concepts in C++, Spring 2000
Calculus II, Fall 1999
Differential Equations, Summer 1999 & Summer 2000

Department of Mathematics, San Angelo Central High School

Algebra I, Algebra II, 1996-1997
Algebra I, Geometry, 1994-1996

Recent Service Activities:

- Graduate Coordinator, Mathematics Program, Department of Mathematics & Statistics, SHSU.
- Undergraduate Advisor, Department of Mathematics & Statistics, SHSU.
- REU Advisor, Department of Mathematics & Statistics, SHSU, 2015 & 2016.
- Member of the Calculus Textbook & Placement Exam Committees, Dept. of Mathematics & Statistics, SHSU.
- Mentor, Graduate Studies Bridge Program, SHSU.
- Coordinator for regional UIL Calculator Applications competition, SHSU.
- Referee for *Applications and Applied Mathematics*, *Electronic Journal of Differential Equations*, *Journal of Applied Mathematics*, *PRIMUS*, and *SIMIODE*.
- Faculty Advisor for COMAP Mathematical Contest in Modeling, 2008, 2009, 2011-2016.

Professional Organization Memberships:

- Society of Industrial and Applied Mathematics (SIAM), member since 1999.
  Vice president of Texas Tech chapter, 2001-03
  President of Texas Tech chapter, 2003-04
- American Mathematical Society (AMS), member since 2000.
- Mathematical Association of America (MAA), member since 2006.
- American Institute of Aeronautics and Astronautics (AIAA), member since 2008.
- United States Association of Computational Mechanics, member since 2013.

Academic Honors/Awards:

2015 **EURECA Summer 2016 Faculty and Student Team Award**, co-PI for $10,000 award to support summer research with three SHSU undergraduate students, along with J. Alford and J. Wozniak.

2013 **NSF Award** (WPMS #1247985, DMS), co-PI for $15,833 award in support of ECO-IMPACS (Enhancing Career Opportunities - Integrative Mathematical Program for Analyzing Coastal Systems)

2011 **SHSU Faculty Research Grant**, award in support of research on Coupled Mixed Finite Element Methods for Fluid-Structure Interaction Problems

2010 **Commander's Award for Civilian Service**, Department of the Army, United States Military Academy

2008 **Army Research Travel Award**, award in support of research on Computational Tools for Coupled Fluid-Structure Interaction Systems

2007 **Dean's Research Award**, travel grant from the United States Military Academy

2007 **NRC Davies Fellows Postdoctoral Teaching and Research Award**, a three year associateship sponsored by the United States Military Academy, the U.S. Army Research Laboratory, and the Natick Soldier Research, Development, and Engineering Center