

Address: Department of Mathematics  
University of Central Florida  
4000 Central Florida Blvd.  
Orlando, FL 32816-1364, USA

Fax: 407-823-6253  
E-mail: [brian.moore@ucf.edu](mailto:brian.moore@ucf.edu)  
Web: [sciences.ucf.edu/math/bmoore/](http://sciences.ucf.edu/math/bmoore/)

## CV At-A-Glance

- Ph.D. in Mathematics, University of Surrey, 2003
- Associate Professor of Mathematics at the University of Central Florida
- \$6.3M in externally funded grants (NSF, NASA, and Army Research Office)
- 20+ peer-reviewed publications (9 with students under my supervision)
- 50+ seminar presentation at universities and international/national/regional conferences
- 8 theses supervised (1 PhD; 5 MS; 2 Undergraduate) and 17 other student research projects
- 20+ mathematics courses taught, including 4 graduate and 3 large (200-800 students) courses

## Education

### Ph.D. Mathematics, University of Surrey, Guildford, England (2003)

Awards: Overseas Research Student Award from Universities UK (1999 – 2002),

Research Studentship, full tuition and stipend (1999 – 2002)

Thesis: A Modified Equations Approach for Multi-Symplectic Integration Methods

Supervisor: Prof. Sebastian Reich

### M.S. Mathematical and Computer Sciences, Colorado School of Mines, Golden, CO, (1999)

Award: Colorado Research Fellowship, full tuition and stipend (1998 – 1999)

Thesis: Spinodal Decomposition for Spatially Discrete Cahn-Hilliard Equations

Adviser: Prof. Erik Van Vleck

### B.S. Mathematics, Colorado Christian University, Lakewood, CO (1997)

Awards: Scholastic Excellence (1993-1997), Scholastic Honors List (1995 – 1996),

Most Outstanding Student in Humanities & Science (1996)

Deans List (1996 – 1997), Summa Cum Laude

## Academic Work Experience (All appointments are in mathematics departments.)

**Associate Professor** (with tenure), University of Central Florida (Aug. 2013 – Present)

- Associated faculty member of the Center for Research in Computer Vision (2012 – Present)

**Guest Associate Professor**, NTNU, Trondheim, Norway (Aug. 2015 – Dec. 2015)

**Assistant Professor**, University of Central Florida (Aug. 2007 – July 2013)

**Visiting Assistant Professor**, University of Iowa (Aug. 2005 – Jul. 2007)

**Postdoctoral Fellow**, McGill University, Montreal, Canada (Oct. 2003 – Sep. 2005)

- CRM-ISM Postdoctoral Fellowship (2003 – 2005)

- Traveling waves for lattice differential equations (working with Prof. Tony Humphries)

**Research Assistant**, Imperial College, London, UK (Oct. 2000 – May 2003)

- Multi-symplectic integration methods (working with Prof. Sebastian Reich)

**Grants** (Projects for undergraduate education and research are denoted by †.)

**\$2,490,530**<sup>†</sup> Training Grant, Co-PI 25% credit, (Apr 2024 - Mar 2029)

*National Science Foundation, S-STEM: Transfers Opportunities for Nurtured Growth in AI*

**\$1,000** Research Mentoring Grant, PI, UCF Office of Research (Oct 2022 - Jul 2023)

**\$1,459,394** Education Research Grant, Co-PI 15% credit, (Apr 2021 - Mar 2026)

*National Science Foundation, Noyce: Empowering STEM Teachers with Earned Doctorates*

**\$999,994**<sup>†</sup> Education Research Grant, Co-PI 20% credit, (Jan 2018 - Dec 2023)

*National Science Foundation, S-STEM: Transfers Opportunities for Nurtured Growth*

**\$250,000**<sup>†</sup> Education Research Grant, Co-PI 45% credit, (Jun 2015 - Jun 2018)

*National Science Foundation, IUSE: Growing as Adaptive Instructors in STEM*

**\$249,784**<sup>†</sup> Education Research Grant, Co-PI 10% credit, (Jul 2015 - Jun 2018)

*National Science Foundation, IUSE: Coaching for Students with Disabilities*

**\$252,328** Research Equipment Grant, Co-PI 50% credit, (Jun 2012 - Jun 2014)

*Army Research Office, DURIP: Collection and Analysis of Crowd Data*

**\$599,973**<sup>†</sup> Training Grant, Co-PI 25% credit, (Jan 2010 - Dec 2014)

*National Science Foundation, S-STEM: Scholarship Program for Students At-Risk*

**\$24,964** Research/Training Grant, PI 100% credit, (Aug 2009 - May 2010)

*NASA Florida Space Grant Consortium, Simulating the Effects of Rocket Exhaust*

**\$1,200** Travel Grant, Zurich, Switzerland (July 2007)

*International Congress on Industrial and Applied Mathematics*

### Peer Reviewed Publications

(1,009 citations according to Web of Science, average 2.5 citations per article per year, h-index 11)

Students working under my supervision are denoted by \*\* for undergraduate and \* for graduate.

#### *Refereed Mathematics Journal Articles*

1. B.E. Moore and K. Swanson\*\*, Stability of Conformal Symplectic Integrating Factor Runge-Kutta Methods, *submitted and under review*, 2024.
2. F. McIntosh\*\*, L. Amirzadeh\*\*, and B.E. Moore, Structure-Preserving Exponential Time Differencing Methods for Modeling Josephson Junctions, *Applied Mathematics Letters*, 2024.
3. B.E. Moore, Exponential integrators based on discrete gradients for linearly damped-driven Poisson systems, *Journal of Scientific Computing*, 87:56, 2021.
4. A. Bhatt\* and B.E. Moore, Exponential Integrators Preserving Local Conservation Laws of PDEs with Time-Dependent Damping/Driving Forces, *Journal of Computational and Applied Mathematics*, 352:341-351, 2019.
5. A. Bhatt\* and B.E. Moore, Structure Preserving Exponential Runge-Kutta Methods, *SIAM Journal of Scientific Computing*, 39(2):A593-A612, 2017.
6. B.E. Moore, Multi-Conformal-Symplectic PDEs and Discretizations, *Journal of Computational and Applied Mathematics*, 323:1-15, 2017.
7. E. Lydon\* and B.E. Moore, Propagation Failure of Fronts in Discrete Inhomogeneous Media with a Sawtooth Nonlinearity, *Journal of Difference Equations and Applications*, 22(12):1930-1947, 2016.

8. F. McDonald, R.I. McLachlan, B.E. Moore, and G.R.W. Quispel, Traveling Wave Solutions of Multisymplectic Discretizations of Nonlinear Wave Equations, *Journal of Difference Equations and Applications*, 22(7):913-940, 2016.
9. A. Bhatt\*, D. Floyd\*, and B.E. Moore, Second Order Conformal Symplectic Schemes for Damped Hamiltonian Systems, *Journal of Scientific Computing*, 66(3):1234-1259, 2016.
10. B.E. Moore and J.M. Segal\*, Stationary Bistable Pulses in Discrete Inhomogeneous Media, *Journal of Difference Equations and Applications*, 20(1):1-23, 2014.
11. B.E. Moore, L. Noreña\*\*, and C. Schober, Conformal Conservation Laws and Geometric Integration for Damped Hamiltonian PDEs, *Journal of Computational Physics*, 232(1):214-233, 2013.
12. A.R. Humphries, B.E. Moore, and E.S. Van Vleck, Front Solutions for Bistable Differential-Difference Equations with Inhomogeneous Diffusion, *SIAM Journal on Applied Mathematics*, 71(4):1374-1400, 2011.
13. B.E. Moore, Conformal Multi-Symplectic Integration Methods for Forced-Damped Semi-Linear Wave Equations, *Mathematics and Computers in Simulation*, 80:20-28, 2009.
14. J. Frank, B.E. Moore, & S. Reich, Linear PDEs and Numerical Methods that Preserve a Multi-Symplectic Conservation Law, *SIAM Journal of Scientific Computing*, 28:260-277, 2006.
15. S. Maier-Paape, B.E. Moore, and E.S. Van Vleck, Spinodal Decomposition for Spatially Discrete Cahn-Hilliard Equations, *Dynamics of Continuous, Discrete and Impulsive Systems, Series A: Mathematical Analysis*, 12:529-554, 2005.
16. B.E. Moore and S. Reich, Multi-Symplectic Integration Methods for Hamiltonian PDEs, *Future Generation Computer Systems*, 19:395-402, 2003.
17. B.E. Moore and S. Reich, Backward Error Analysis for Multi-Symplectic Integrators, *Numerische Mathematik*, 95:625-652, 2003.

*Refereed Education Journal Articles and Conference Proceedings*

18. S.B. Bush, J.K. Dixon, L.A. Brooks, B.E. Moore, M. Boston, T. Rutledge, M.B. Butler, Catalyzing the Courage to Lead: A Two-Pronged Approach to Empowering Mathematics Teachers as Leaders, *Revision under review*, 2024.
19. G. Haile, D. Fakhro\*, M.B. Butler, S.K. Butler, B. Moore, Effective interventions for counselors working with STEM transfer students, *submitted and revision in preparation*, 2023.
20. M.A. Dagley, M. Gill, E. Saitta, B.E. Moore, J. Chini, and X. Li, Using Active Learning Strategies in Calculus to Improve Student Learning and Influence Mathematics Department Cultural Change, *Proceedings of the Interdisciplinary STEM Teaching and Learning Conference: Vol. 2*, Article 8, 2018.

*Refereed Computer Science Journal Articles and Conference Proceedings*

21. B. Solmaz\*, B.E. Moore, and M. Shah, Identifying Behaviors in Crowded Scenes through Stability Analysis for Dynamical Systems, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 34(10):2064-2070, 2012.
22. B.E. Moore, S. Ali, R. Mehran, and M. Shah, Visual Crowd Surveillance through a Hydrodynamics Lens, Featured cover article for *Communications of the ACM*, 54(12):64-73, 2011.

23. S. Wu, B.E. Moore, and M. Shah, Chaotic Invariants of Lagrangian Particle Trajectories for Anomaly Detection in Crowded Scenes, *IEEE Conference on Computer Vision and Pattern Recognition*, 2010. (acceptance rate 27.7%)
24. R. Mehran\*, B.E. Moore, and M. Shah, A Streakline Representation of Flow in Crowded Scenes, *European Conference on Computer Vision*, 6313:439-452, 2010. (acceptance rate 22.3%)

### Invited Publications (Blogs and Newsletters)

1. B.E. Moore, Framing Our Perspectives Over Tea, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 10, November/December 2024.
2. B.E. Moore, Suffering in the Studio, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 9, October 2024.
3. B.E. Moore, Our Real Enemies, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 8, September 2024.
4. B.E. Moore, Gateway to Livelihood, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 7, April 2024.
5. B.E. Moore, Gateway to Wonder, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 6, March 2024.
6. B.E. Moore, Gateway to Truth, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 5, February 2024.
7. B.E. Moore, Gateway to Revelation, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 4, January 2024.
8. B.E. Moore, Gateway to Understanding, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 3, November/December 2023.
9. B.E. Moore, Gateway to Meaning, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 2, October 2024.
10. B.E. Moore, Mathematics is a Gateway, *Noyce News: UCF–Orange County Public Schools–City Year*, Vol. 1, September 2024.
11. S.B. Bush, L.A. Brooks, J.K. Dixon, T. Rutledge, M.B. Butler, & B.E. Moore. Elevating voices, catalyzing change: A partnership approach to supporting K-8 mathematics teacher leaders. American Association for the Advancement of Science: Advancing Research & Innovation in the STEM Education of Preservice Teachers in High-Need School Districts (2022).

### Refereed Conference Seminars

1. S.B. Bush, J.K. Dixon, L.A. Brooks, B.E. Moore, M.B. Butler, Catalyzing the Courage to Lead: Mathematics Classroom Teachers as Leaders, Annual Meeting and Exposition of the National Council for Teachers of Mathematics, Chicago 2024 (general acceptance rate 20-30%).
2. S. Wiggan, D. Boote, B.E. Moore, Motivations to Teach: Why So Few Black Men, Annual Meeting and Exposition of the National Council for Teachers of Mathematics, Washington, D.C. 2023 (general acceptance rate 20-30%).
3. L.A. Brooks, S.B. Bush, J.K. Dixon, M.B. Butler, B.E. Moore, T. Rutledge, Empowering K-8 Mathematics Teachers to Catalyze Change. Paper presented at the International Consortium for Research in Science and Mathematics Education, 2022.

### Invited University Colloquium Talks and Seminars

1. Wave Propagation and Its Failure for Lattice Equations, Oregon State University, 2024
2. An Untrained Teacher Teaching Trained Teachers, Oregon State University, 2024
3. Structure-Preserving Exponential Integrators, Oregon State University, 2018
4. Traveling Waves for Lattice Equations, Colorado School of Mines, 2018
5. Structure-Preserving Exponential Integrators, University of Iowa, 2016
6. Structure-Preserving Exponential Integrators, Colorado School of Mines, 2016
7. Conformal Symplectic Integrators, Norwegian University of Science and Technology, 2015
8. Bistable Waves in Discrete Inhomogeneous Media, Florida Institute of Technology, 2013
9. Mathematical Models for Multiple Sclerosis, Stetson University, Florida, 2012
10. Visual Crowd Surveillance, West Virginia University, ACM Skype Guest Lecture, 2012
11. Standing Waves in Discrete Inhomogeneous Media, Massey University, New Zealand, 2010
12. Propagation Failure of Fronts in Discrete Inhomogeneous Media, University of Iowa, 2008
13. Bistable Waves in Discrete Inhomogeneous Media, McGill University, Canada, 2008
14. Backward Error Analysis for Multi-Symplectic Integrators, Univ. of Central Florida, 2007
15. Multi-symplectic Integration Methods, Colorado School of Mines, 2005
16. Multi-symplectic Integration Methods, McMaster University, Canada, 2005
17. Multi-symplectic Integration Methods, University of Kansas, 2005
18. Modified Equations Approach for Multi-Symplectic Integrators, University of Kansas, 2003

### Invited Conference Seminars

1. Backward Error Analysis for Some Numerical Integrators, 7th Annual Meeting of the SIAM Texas-Louisiana Section Conference, Baylor University, 2024.
2. Constructing Dissipation-Preserving Exponential Integrators, AMS/MAA Joint Mathematics Meetings, San Fransisco, 2024.
3. Exponential Discrete Gradient Schemes for Linearly Damped/Driven Poisson Systems, 12th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, 2022.
4. Exponential Discrete Gradient Schemes for Linearly Damped/Driven Poisson Systems, The 4th Annual Meeting of the SIAM Texas-Louisiana Section, South Padre Island, Texas, 2021.
5. Structure-Preserving Exponential Integrators with Application to Damped/Driven NLS Equations, AMS/MAA Joint Mathematics Meetings, Denver, 2020.
6. Structure-Preserving Exponential Integrators for Damped-Driven PDEs, Annual Meeting of the SIAM Central States Section, Colorado State University, 2017.
7. Structure-Preserving Exponential Integrators and Damped-Driven NLS, International Conference on Scientific Computing and Differential Equations, University of Bath, UK, 2017.
8. Structure-Preserving Exponential Integrators, 10th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation & Theory, University of Georgia, 2017.
9. Traveling Waves for Fully Discrete Multi-Symplectic Equations, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, 2016.
10. Structure-Preserving Algorithms for Perturbed Nonlinear Schrödinger Equations, 11th AIMS International Conference, Orlando, 2016.

11. Conservation Laws and Structure-Preserving Integration Methods for a Special Class of PDEs, 11th AIMS International Conference, Orlando, 2016.
12. Multi-Conformal-Symplectic Integration Methods, International Conference on Scientific Computing and Differential Equations, Potsdam, Germany, 2015.
13. Fronts and Pulses That Fail to Propagate in Discrete Inhomogeneous Media, Progress On Difference Equations, Covilha, Portugal, 2015
14. From Molecules to Mars and Back to the Everyday, Mu Alpha Theta National Convention, Orlando, Florida, 2014
15. Structure Preserving Methods for Damped Hamiltonian PDEs, 2nd International Workshop on Nonlinear and Modern Mathematical Physics, University of South Florida, 2013
16. Geometric Integration for Damped Hamiltonian PDEs, SIAM Conference on Nonlinear Waves and Coherent Structures, University of Washington, 2012
17. When Diffused Gas Causes Soil Failure, 2nd Workshop on Lunar and Martian Plume Effects, Kennedy Space Center, 2011
18. Solutions and Behavior of Lattice Differential Equations, Cha-Cha Days Workshop for Young Scientists, College of Charleston, 2010
19. Propagation Failure of Fronts in Discrete Inhomogeneous Media, 8th MSU-UAB Conf. on Differential Equations and Computational Simulations, Mississippi State Univ., 2009
20. Propagation Failure of Fronts in Discrete Inhomogeneous Media, 7th AIMS International Conf. on Dynamical Systems, Differential Equations and Applications, Univ. of Texas, 2008
21. Conformal Multi-Symplectic Integration Methods, NSF-CBMS Regional Research Conference on Numerical Methods for Nonlinear Elliptic Equations, University of Iowa, 2007
22. Bistable Waves for Differential-Difference Equations with Inhomogeneous Diffusion, Workshop on Lattice, Delay and Functional Differential Equations, McGill University, 2005

### **Contributed Conference Seminars**

1. 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, 2012
2. International Conference on Scientific Computation and Differential Equations, The Fields Institute, 2011
3. International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, 2007
4. International Conference Scientific Computation and Differential Equations, Saint-Malo, France, 2007
5. IMACS International Confernce on Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, 2007
6. SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, 2005
7. International Conference on Nonlinear Dynamics and Evolution Equations, Memorial University of Newfoundland, 2004
8. X-th Numerical Analysis Summer School, University of Durham, UK, 2002
9. Mechanics and Symmetry in Europe Summer School, Peyresq, France, 2001
10. IX-th Numerical Analysis Summer School, University of Durham, UK, 2000

## Conference Posters or Videos

1. Perspectives on Mathematics for Teachers, with Julia Keith and Nisha Phillip-Malahoo, Noyce Summit, Washington D.C. 2024.
2. STEM Transfer's Opportunities for Nurtured Growth (STRONG), Virtual S-STEM Fall Forum, 2021
3. Bistable Fronts in Discrete Inhomogeneous Media, 9th AIMS Conf. Dynamical Systems, Differential Equations & Applications, Orlando, 2012
4. Bistable Fronts in Discrete Inhomogeneous Media, SIAM Conf. on Nonlinear Waves and Coherent Structures, University of Washington, 2012
5. Conformal Conservation Laws and Geometric Integration, IMA Workshop on Numerical Solutions of PDE, University of Minnesota, 2010
6. A Streakline Representation of Flow in Crowded Scenes, 11th European Conference on Computer Vision, Hersonissos, Crete, Greece, 2010
7. Multi-Symplectic Integration for Linear PDE, Workshop on Computational Methods and Applied PDE, Iowa State University, 2005
8. Multi-Symplectic Integration for Linear PDE, Frontiers in Applied and Computational Mathematics, New Jersey Institute of Tech. 2005
9. Numerical Methods that Preserve a Multi-Symplectic Conservation Law, Montreal Scientific Computing Days, Le Centre de Recherches Mathématiques, 2004
10. Numerical Methods that Preserve a Multi-Symplectic Conservation Law, Young Mathematicians Conference in PDE & Dynamical Systems, The Fields Institute, 2004

## Academic Awards and Honors

- Teaching Incentive Program Award (for excellence in teaching), U. of Central Florida (2021)
- John Hancock Award, for highly collaborative interdisciplinary grant, UCF (2015)
- Initiatives in STEM Fellowship (for advances in STEM education practice and research), University of Central Florida (Aug. 2014 – May 2015)
- Teaching Incentive Program Award (for excellence in teaching), U. of Central Florida (2014)
- Recognized by the Fraternity and Sorority Community as an outstanding professor (2006)

## Supervision of Research as Primary Advisor

### *Post-Doctoral Research*

- Yuyue Qin (Feb. 2016 – Jan. 2017) Currently faculty at Chang'an University in China  
Project: Structure-preserving algorithms for damped-driven NLS equations

### *Ph.D. Thesis*

- Ashish Bhatt (May 2012 – Dec 2016) Post-grad placement: Post-doc University of Stuttgart  
Project: Structure-preserving algorithms for damped Hamiltonian PDEs  
**Presentations:** at SciCADE 2015, Potsdam, Germany; AIMS Int. Conf. 2016, Orlando, FL  
**Publications:** appeared in *SIAM Journal of Scientific Computing*; *Journal of Scientific Computing*; *Journal of Computational and Applied Mathematics*  
**Award:** UCF Research Excellence Award 2015

*Master of Science Thesis*

- Elizabeth Lydon (May 2014 – Jun 2015) Post-grad placement: Eastern Florida State College  
Project: Propagation failure in discrete inhomogeneous media with sawtooth nonlinearity  
**Presentations:** SIAM CSE 2015, Salt Lake City; Graduate Research Forum 2015, UCF  
**Publication:** Appeared in *Journal of Difference Equations and Applications*  
**Award:** Provost's Merit Fellowship 2015
- Dwayne Floyd (Jan. 2013 – Nov. 2014) Post-grad placement: U.S. Department of Defense  
Project: Linear stability analysis for second order conformal symplectic schemes  
**Publication:** Appeared in *Journal of Scientific Computing*  
**Award:** Best Master's Thesis in the Department of Mathematics 2015
- Kristina Kraakmo (Jan. 2011 – Nov. 2013) Post-grad placement: Instructor Valencia College  
Project: Alternating direction implicit methods for simulating diffusion driven flow  
**Presentations:** ChaCha Days, College of Charleston, 2010; IMA workshop, Minnesota, 2010
- Brian Brennan (Aug. 2009 – Jul. 2010) Post-grad placement: PhD at Baylor University  
Project: Numerical computations for PDE models of rocket exhaust flow in soil
- Joe Segal (Jun. 2008 – Oct. 2009) Post-grad placement: software developer  
Project: Propagation failure of FitzHugh-Nagumo waves in discrete media  
**Publication:** Appeared in *Journal of Difference Equations and Applications*  
**Award:** Best Master's Thesis in the Department of Mathematics 2009

*Honors Undergraduate Thesis*

- Taylore Keesler, UCF (Aug. 2024 – May 2025)  
Project: Backward Error Analysis for Conformal Symplectic ETD Methods
- Lily Amirzadeh, UCF (Jan. 2023 – Dec. 2023)  
Project: Higher Order Exponential Time Differencing for Conformal Symplectic Systems  
**Publication:** Appeared in *Applied Mathematics Letters*
- Fiona McIntosh, UCF (Aug. 2022 – Dec. 2023) Post-grad placement: NYU Medical School  
Project: Structure-Preserving Explicit Exponential Time Differencing Methods  
**Award:** Outstanding Presentation, Florida Academy of Sciences 86th Annual Meeting  
**Award:** Judge's Choice Prize, Poster at UCF Showcase of Undergraduate Research  
**Publication:** Appeared in *Applied Mathematics Letters*

*Graduate Directed Research*

- Dania Fakhro, Ph.D. Counselor Education (Jan. '22 – May '23)  
Project: Self-regulated learning of STEM transfer students  
**Publication:** Submitted and under review
- Johann Veras, Ph.D. Mathematics (Aug. '10 – Dec. '10) Post-grad: Lockheed Martin  
Project: Numerical computation of wave speeds in discrete inhomogeneous media
- Ramin Mehran, Ph.D. Comp. Sci. (Jun. '09 – Aug. '10) Post-grad placement: Microsoft  
Project: Streakline representations of fluid flow for crowded visual scenes  
**Publications:** Appeared in *ECCV 2010* and *Communications of the ACM*
- Berkan Solmaz, Ph.D. Comp. Sci. (Jun. '09 – Apr. '10) Post-grad: Texas Instruments  
Project: Using Jacobian matrices to identify crowd behaviors in video scenes  
**Publication:** Appeared in *IEEE Transactions on Pattern Analysis and Machine Intelligence*



- Jonathan Fraine, M.S. Mathematics (Jan. '09 – Apr. '09) Post-grad: PhD at U. of Maryland  
Project: Numerical computations for traveling waves in discrete inhomogeneous media

#### *Undergraduate Directed Research*

- Mikayla Fischer, Mathematics, UCF (Jan. 2023 – Apr. 2023)  
Project: Numerical Simulations of Oscillators with Conformal Symplectic Methods
- Kimberly Swanson, Mathematics, UCF (May 2019 – Dec. 2019)  
Project: Structure-Preserving Exponential R-K Methods: A Computational Comparison  
**Publication:** Submitted and under review
- Juliana White, Mathematics, UCF (Jan. 2019 – Apr. 2019)  
Project: Propagation failure of 2-dimensional discrete fronts
- Brooke Papa, Mathematics, UCF (May 2017 – Apr. 2018)  
Project: Computing intervals of propagation failure for discrete fronts  
**Presentation:** Showcase of Undergraduate Research, UCF 2018
- Jared Wasserman, Mathematics and Computer Science, UCF (Aug. 2013 – Dec. 2013)  
Project: Numerical predictions of gradient catastrophe in the focusing NLS equation
- Cyndi Beltran, Miranda Craig, Leah Fortier, Nick Kaufman, Vanessa Lepe, Nick Mele, Chris Peterman, GAUSS Program UCF (May '12 – Aug. '12) Time series prediction in traffic scenes  
**Presentations:** GAUSS Seminar Series
- Casey Van Buren, GAUSS program UCF (May 2011 – Dec. 2011)  
Project: Action prediction in video sequences of vehicular traffic  
**Presentation:** GAUSS Seminar Series
- Whitney Keith, Florida Space Grant Project (Jan. 2010 – Dec. 2010)  
Project: Simulating the effects of rocket exhaust on soil cratering  
**Presentation:** Showcase of Undergraduate Research, UCF 2010  
**Award:** Astronaut Scholarship - Highest monetary award in U.S. for academic achievement
- Laura Noreña, GAUSS program UCF (May 2009 – Dec. 2010)  
Project: Conformal multi-symplectic integration methods  
**Presentation:** CSUMS Conference, St. Paul, Minnesota, 2009  
**Publication:** Appeared in *Journal of Computational Physics*
- Nicole Lopez, Mathematics, UCF (May 2010 – Jul. 2010)  
Project: Standing waves for a spatially discrete FitzHugh-Nagumo equation
- Jessica Long, Mathematics, University of Iowa (Jan. 2006 – Dec. 2006)  
Project: Steady states for inhomogeneous bistable differential-difference equations
- Lory Ajamian, Mathematics, McGill University (May 2005 – Jul. 2005)  
Project: Standing waves for spatially discrete Nagumo equations with differing nonlinearities  
**Presentations:** Lattice, Delay, and Functional Differential Equations Seminar Series, McGill

#### **NSF Funded Synergistic Education Related Activities**

*S-STEM program (STRONG-AI) (2024 – Present) [www.crcv.ucf.edu/nsf-projects/strong-ai/](http://www.crcv.ucf.edu/nsf-projects/strong-ai/)*

##### **Enhanced support for academically talented transfer students in AI;**

- Coordinating faculty and peer mentors for students and organizing group activities
- Supervising student selection and award disbursement, and monitoring student progress

*Noyce program* (2021 – Present) <https://ccie.ucf.edu/noyce-mathematics-education/>  
**Empowering mathematics teachers with earned doctorates**

- Conducting seminars on math as gateway; supporting doctoral research in math education

*S-STEM program (STRONG)* (2018 – 2023) [www.crcv.ucf.edu/nsf-projects/strong/](http://www.crcv.ucf.edu/nsf-projects/strong/)

**Enhanced support for transfer student success;**

- Coordinating mentors for 45 students and organizing group activities
- Supervising student selection and award disbursement, and monitoring student progress
- Mentoring students majoring in mathematics and computer engineering

*IUSE program (Math-GAINS)* (2016 – 2018)

**Transforming department culture: teaching practices and math education research**

- Prepared teaching assessment tools and administered faculty surveys
- Coached 3 mathematics faculty and 5 graduate teaching assistants on adaptively applying evidence-based teaching practices in Calculus classes

*IUSE program (iCAN)* (2017 – 2018)

**Improving educational experiences of STEM students with disabilities**

- Recruited and trained peer mentors

*S-STEM program (STATESS)* (2009 – 2015)

**Providing opportunity/support for high-need, at-risk STEM majors**

- Coordinated faculty mentors for 66 students from 14 different STEM disciplines
- Supervised student selection and award disbursement, and monitored student progress
- Organized group activities, and mentored five mathematics students

*CSUMS program (GAUSS)* (2009 – 2012)

**Training mathematics majors in computational science;** <http://crcv.ucf.edu/gauss/>

- Mentored students, supervised research, and taught advanced mathematics techniques

*STEP program (COMPASS)* (2013 – 2018)

**Recruiting undergraduates into STEM fields;** <http://compass.ucf.edu/>

- Taught Calculus courses and regularly engaged students outside the classroom

*STEP program (EXCEL)* (2008 – 2018)

**Establishing mathematical foundations of first-year undergrads;** <http://excel.ucf.edu/>

- Taught Calculus courses and regularly engaged students outside the classroom

## **Courses Taught** (\* denotes graduate course development)

*University of Central Florida* (Aug. 2007 – Present)

- Intermediate Algebra (MAC 1033) Fall 2019  
 Special Programs: Global class designed for a diverse population of international students  
 Web Enhancements: Use of an adaptive learning platform
- Foundations of Discrete Mathematics (MAD 2104) Fall 2022
- Calculus I (MAC 2311) Fall: 2007–08, 2010, 2012–14, 2016, 2024; Spring: 2012–14, 2018  
 Special Programs: EXCEL classes in '08 and '10 designed to increase student success rate.  
 Large Lectures: Between 200 and 750 students with multiple GTAs to supervise in 2012–2024.  
 Web Enhancements: WebAssign and MyLabsPlus for assignments and interactive figures.  
 Course coordinator: organized 4 faculty and 10 GTAs for over 900 students each semester.

- Honors Calculus I (MAC 2311H) Fall 2018 (2 sections), Spring 2019, 2020
- Calculus II (MAC 2312) Spring: 2009, 2011, 2015, 2017  
Special Programs: EXCEL classes designed to increase student success rate.  
Web Enhancements: WebAssign for student assignments.
- Honors Calculus II (MAC 2312H) Spring 2019
- Calculus III (MAC 2313) Fall 2017, EXCEL class designed to increase student success.
- Honors Calculus III (MAC 2313H) Fall 2020, Spring 2021, 2022
- Differential Equations (MAP 2302) Spring 2010, 2022; Fall 2011
- Matrix and Linear Algebra (MAS 3105) Spring 2020
- Logic and Proof in Mathematics (MHF 3302) Spring 2023 (2 sections)
- Introduction to Partial Differential Equations (MAP 4341) Fall 2019
- Numerical Methods for Computational Science (MAP 4384) Fall 2021, 2024
- Applied Numerical Mathematics\* (MAP 6385) Spring: 2008, 2009, 2012, 2013, 2014, 2017
- Scientific Computing\* (MAT 5712) Fall: 2007, 2008, 2011, 2012, 2013, 2016  
Web Enhancements: Video capture 2011 – 2016; *All* course content available on-line.
- Independent Studies: Numerical Methods for PDEs, Summer 2009; Simulating Hamiltonian Dynamics, Spring 2012; Geometric Integration, Spring 2017; Deep Learning, Fall 2017; Stability of Numerical Integrators, Fall 2020; Exponential Time Differencing, Fall 2022

*Norwegian University of Science and Technology (NTNU)* (Fall 2015)

- Numerical Solution of Time Dependent Differential Equations\* (MA8404)

*University of Iowa* (Aug. 2005 – May 2007)

- Theory of Arithmetic (22M:012), Linear Algebra (22M:033), Differential Equations (22M:034), Elementary Numerical Analysis (22M:072), Simulating Hamiltonian Dynamics\* (22M:321)

*McGill University* (Jan. 2004 – Dec. 2004)

- Intermediate Calculus (MATH 262), Advanced Calculus (MATH 265)

## Service on Student Dissertation, Thesis, and Project Committees at UCF

*Ph.D. Dissertations*

- Ranses Alfonso Rodriguez, Mathematics, Inverse problems of calculus of variations, 2022
- Matthew Russo, Mathematics, Lax integrable variable-coefficient PDEs, 2016
- Maria Strawn, Mathematics, Modeling rogue waves in deep water, 2016
- Akbar Wizin, Physics, Dusty disk dynamics and terrestrial planet formation, 2016
- Laura Seward, Physics, Low velocity impact of rigid bodies on granular beds, 2014
- Subhabrata Bhattacharys, Computer Vision, Recognition of complex events in video, 2013
- Curtis Groves, Mechanical Eng., Computational fluid dynamics uncertainty analysis, 2013
- Kishore Reddy, Computer Vision, Action recognition using spatio-temporal volumes, 2012
- Ramin Mehran, Computer Vision, Streakline representations of fluid flow for crowds, 2012
- Berkan Solmaz, Computer Vision, Jacobian matrices to identify crowd behaviors, 2012

*Ed.D. Dissertations*

- Deborah Blakslee, School of Teacher Education, A case study on the impact of intermediate elementary teachers' pedagogical content knowledge and expectancy beliefs of students on scaffolding practices in mathematics intervention, 2024.
- Nisha Phillip-Malahoo, School of Teacher Education, Lesson study as a catalyst for integrating conceptual and procedural components in fraction-based mathematics tasks: An elementary school case study, 2024.
- Joslyn Vilabrera, School of Teacher Education, Exploring mathematics teachers' understanding and implementation of effective questioning as a pedagogical tool, 2024.
- Julia Keith, School of Teacher Education, The role of mathematics anxiety on the cognition and metacognition of middle school Algebra I students during cognitively demanding tasks, 2024.
- Kayla Blankenship, School of Teacher Education, Mindful approaches, transforming hearts: Cultivating elementary students' positive mathematics identity development through an equity based morning mathematics club, 2024.
- Laura Pimentel, School of Teacher Education, An ethnographic study on how mandated curriculum influences mathematics instruction at a state-supervised school, 2024
- Lori Hart, School of Teacher Education, Exploring the challenges of first grade students non-exit from mathematics intervention: A comparative analysis of mathematics instruction during intervention and best practices, 2024.
- Sarah Lumpkin, School of Teacher Education, An ethnographic study examining teachers MTSS knowledge influence on Tier 2 mathematics intervention, 2024.
- Shane Wiggan, School of Teacher Education, A narrative inquiry on lived experiences that support recruitment and retention of black male mathematics teachers, 2024.

*Master of Science Theses*

- Chad Mallot, Mathematics, The Parker problem in Hall magnetohydrodynamics, 2022
- William Hilton, Mathematics, Investigations of the Kudryashov generalized KdV, 2018
- Daniel Marulanda, Mathematics, Approximations and exact discrete solitons, 2016
- Jill Dickerson, Mathematics, Curvelets and the Radon transform for imaging, 2013
- Dimitry Popov, Mathematics, Iteratively re-weighted least squares minimization, 2011

*Honors in the Major Theses*

- Jeffery Jorge, Physics, Studies on Planet Formation, 2016
- David Thomas, Computer Vision, Recognition of Predicted Time Series, 2010

*Engineering Senior Design Projects*

- Kristin Crist; DS (Down Syndrome) Navigator, 2022
- Katlin Joachim; Magic mirror, 2017
- Loubens DeCamp; Robotic air hockey, 2014
- Marc Bianco, Andrew Boyles; Autopilot cooler, 2013
- Keith Walls; Portable wind and solar energy generation, 2012

### Other Student and Junior Faculty Mentoring

- 1 National Merit Scholar (2008 – 2009)
- 13 Instructors: class observations and coaching on teaching/assessment (2014 – Present)
- 1 Tenure-Track Assistant Professor (2017 – Present)

### In-House Seminars

1. Math and Truth, UCF Noyce Teacher Leader Academy, 2023
2. Math, Understanding, and Exploration, UCF Noyce Teacher Leader Academy, 2022
3. Math and Metaphor, UCF Noyce Teacher Leader Academy, 2022
4. Math and Play, UCF Noyce Teacher Leader Academy, 2021
5. Math and Courage, UCF Noyce Teacher Leader Academy, 2021
6. Journey talk, UCF EXCEL STEM Seminar, 2021
7. All problems are eigenvalue problems?, UCF Collegiate Mathematical Society Seminar, 2019
8. Propagation Failure of Traveling Waves in Lattice Equations, UCF Analysis Seminar, 2016
9. Math and Work, UCF Initiatives in STEM Camp Connect Seminar, 2016
10. Discrete Dynamics: As Models or Methods, Math Colloquium at UCF, 2012
11. Dynamical Systems to Visually Interpret Crowd Behavior, UCF GAUSS Seminar, 2012
12. Tools of Fluid Mechanics for Interpreting Crowd Behavior, Fluids Seminar at UCF, 2011
13. Visual Crowd Surveillance, GAUSS Seminar at UCF, 2011
14. Using Math to Understand Multiple Sclerosis, Math Day at UCF, 2007
15. Bistable Waves in Discrete Inhomogeneous Media, Math Colloquium at UCF, 2007
16. A Modified Equations Approach for Multi-Symplectic Integrators, McGill University, 2003
17. A Modified Equations Approach for Multi-Symplectic Integrators, University of Surrey, 2003
18. Symplectic Numerical Integration, Imperial College, 2003
19. Multi-Symplectic Integration Methods for Hamiltonian PDEs, University of Surrey, 2002
20. Backward Error Analysis for Multi-Symplectic Integrators, Imperial College, 2001

### Service and Leadership on Department, College, and University Committees

- Department of Mathematics: Computing Committee (2007 – Present), Faculty Search Committee (2013, 2018, 2022, 2024), Math Education Committee (2017 – 2019), Calculus Committee (2016 – Present), Undergraduate Curriculum Committee (2016-2017, 2024), Recruitment Committee (2015), Calculus Textbook Selection Committee (2013), Promotion and Tenure Committee (2016 – Present), Undergraduate Assessment Committee (2020 – Present), Student Affairs Committee (2024-2025), External Funding Mentoring (2024-2025), Mathematics Assistance and Learning Lab Committee (2024-2025), Teaching Award Committee (2024-2025)
- Center for Research in Computer Vision: Faculty Search Committee (2018 – 2021)
- College of Science: Scholarship Committee (2013 – 2015), Technology Advisory Committee (2017 – 2020), Sabbatical Committee (2024)

**Referee for Academic Articles** (Numbers indicate the number of articles reviewed.)

- *Advances in Computational Mathematics* (3)
- *Applied Mathematics and Computation* (2)
- *Applied Mathematics Letters* (1)
- *Calcolo* (1)
- *Communications in Nonlinear Science and Numerical Simulation* (3)
- *Computers and Mathematics with Applications* (2)
- *Computer Physics Communications* (1)
- *EuroPhysics Letters* (1)
- *Journal of Computational and Applied Mathematics* (7)
- *Journal of Computational Dynamics* (1)
- *Journal of Computational Physics* (2)
- *Journal of Difference Equations and Applications* (3)
- *Journal of Geometric Mechanics* (2)
- *Mathematics and Computers in Simulation* (4)
- *Mathematics in Applied Sciences and Engineering* (1)
- *National Council for Teachers of Mathematics* (2)
- *Numerical Methods for Partial Differential Equations* (1)
- *Physics Letters* (1)
- *Proceedings of the Royal Society A* (1)
- *School Science and Mathematics* (1)
- *SIAM Journal on Scientific Computing* (4)

**Other Professional and Leadership Activities**

- Active participant in STEM education research seminar and reading group (2016 – Present)
- Presentations for recruiting local high school students into math at UCF (2012 – Present)
- Supervisor of Graduate Teaching Assistants (2008 – Present)
- Faculty adviser for student organization Reformed University Fellowship (2008 – 2012)
- Reviewer for book proposals (2008, 2014)
- Active participant in the McGill applied mathematics working seminar (2003 – 2005)
- Member of the Association of Computational Mathematics (1998 – 1999)