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## Education

Jun 2008 **University of Pennsylvania**, Philadelphia.  
Ph.D in *Mechanical Engineering and Applied Mechanics*.  
Advisor: George Biros

Jul 2003 **Indian Institute of Technology (Madras)**, Chennai, India.  
Bachelor of Technology in *Mechanical Engineering*.

## Appointments

2017 – Present **Associate Professor**  
Department of Mathematics, University of Michigan, Ann Arbor.

2011 – 2017 **Assistant Professor**  
Department of Mathematics, University of Michigan, Ann Arbor.

2008 – 2011 **Research Scientist**  
Courant Institute of Mathematical Sciences, New York University.

## Visiting Positions

- Visiting Scholar, Center for Computational Mathematics, Flatiron Institute, New York, NY, 2018–Present.
- Visiting Scholar, Biophysical Modeling Group, Flatiron Institute, New York, NY, 2017-2018.
- Visiting Professor, École Nationale Supérieure de Techniques Avancées (ENSTA), Paris, 2014.  
(visit sponsored by *Fondation Mathématique Jacques Hadamard*)

## Awards and Honors

- Plenary Speaker, Casa Matemática Oaxaca (BIRS), 2017.
- Plenary Speaker, MICDE Annual Symposium, 2016.
- NSF CAREER Award, 2015.
- Ralph E. Powe Junior Faculty Award, 2013.
- ACM Gordon Bell Prize, 2010.
- Best Paper Award Finalist, ACM/IEEE Conference on Supercomputing, 2010.
- Graduate Research Fellowship, University of Pennsylvania, 2003-2008.

## External Grants

- *U.S. Army TARDEC/Automotive Research Center* Award: \$494,132  
2016-2019 “Fast numerical algorithms for high-fidelity simulation of terramechanics.”  
2017-2019 “Data-driven construction of high-fidelity mobility maps.”  
Role: Principal Investigator (Sole)
- “Modeling and Computation of Three-Dimensional Multicomponent Vesicles in Complex Flow Domains.”  
*National Science Foundation DMS - 1719834*, 2017-2020.  
Role: Principal Investigator (Other PIs: Shuwang Li, John Lowengrub) Award: \$34,473
- “CAREER: Fast algorithms for particulate flows.”  
*National Science Foundation DMS - 1454010*, 2015-2020.  
Role: Principal Investigator (Sole) Award: \$420,721
- “I-Corps: High-fidelity simulation software for microfluidics.”  
*National Science Foundation IIP - 1559706*, 2015-2018.  
Role: Principal Investigator (Sole) Award: \$50,000
- “Fast high-order methods for electrohydrodynamics of vesicle suspensions.”  
*National Science Foundation DMS - 1418964*, 2014-2017.  
Role: Principal Investigator (Sole) Award: \$216,637
- “Scalable Numerical Methods for Solving PDEs on Moving Geometries.”  
*Simons Foundation Collaboration Grant for Mathematicians*, 2014-2019.  
Role: Principal Investigator (Sole) Award: \$35,000
- “Mathematical and experimental study of lipid bilayer shape and dynamics mediated by surfactants and proteins.”  
*National Science Foundation DMS - 1224656*, 2012-2015.  
Role: Principal Investigator (Other PIs: Yuan-nan Young, Howard Stone) Award: \$105,728

## Publications

**In Draft** (\* indicates advisee)

1. J. Wang, L. Greengard, S. Jiang and S. Veerapaneni. A new fast algorithm for solving heat equation on moving domains. To be submitted to *Acta Numerica*, 2019.
2. D. Stein, S. Veerapaneni and M. Shelley. A hybrid integral equation method for simulating viscoelastic flows in confined domains. To be submitted to *Journal of Computational Physics*, 2019.

**Under Review**

3. B. Quaife, S. Veerapaneni and Y.-N. Young. Hydrodynamics and rheology of vesicle doublets. Submitted to *Physical Review Fluids*, 2019.
4. M. Bonnet, R. Liu\* and S. Veerapaneni. Shape optimization of Stokesian peristaltic pumps using boundary integral methods. Submitted to *SIAM Journal on Control and Optimization*, 2019.
5. W. Yan, E. Corona\*, D. Malhotra, S. Veerapaneni and M. Shelley. A scalable computational platform for particulate Stokes suspensions. Submitted to *Journal of Computational Physics*, 2019.

**Peer-reviewed Publications**

6. E. Corona\*, D. Gorsich, P. Jayakumar and S. Veerapaneni. Tensor train accelerated solvers for nonsmooth rigid body dynamics. To appear in *Applied Mechanics Reviews*, 2019.
7. B. Wu\* and S. Veerapaneni. Electrohydrodynamics of deflated vesicles: budding, rheology and pairwise interactions. To appear in *Journal of Fluid Mechanics*, 2019.
8. E. Corona\* and S. Veerapaneni. Boundary integral equation analysis for suspension of spheres in Stokes flow. *Journal of Computational Physics*, Vol. 362, pp. 327-345, 2018.
9. A. Barnett, G. Marple\*, S. Veerapaneni and L. Zhao. A unified integral equation scheme for doubly-periodic Laplace and Stokes boundary value problems in two dimensions. *Communications on Pure and Applied Mathematics*, Vol. 71, pp. 2334-2380, 2018.
10. K. Liu, G. Marple\*, J. Allard, S. Li, S. Veerapaneni and J. Lowengrub. Dynamics of a multicomponent vesicle in shear flow. *Soft Matter*, Volume 13, pp. 3521-3531, 2017.
11. E. Corona\*, L. Greengard, M. Rachh and S. Veerapaneni. Integral equation methods for rigid bodies in Stokes flow in three dimensions. *Journal of Computational Physics*, Volume 332, pp. 504-519, 2017.
12. S. Veerapaneni. Integral equation methods for vesicle electrohydrodynamics in three dimensions. *Journal of Computational Physics*, Volume 326, pp. B740-B772, 2016.
13. G. Marple\*, A. Barnett, A. Gillman and S. Veerapaneni. A fast algorithm for simulating multiphase flows through periodic geometries of arbitrary shape. *SIAM Journal on Scientific Computing*, Volume 38, Issue 5, 2016.
14. O. -S. Pak, Y. -N. Young, G. Marple\*, S. Veerapaneni and H. Stone. Gating of a mechanosensitive channel due to cellular flows. *Proceedings of the National Academy of Sciences*, Volume 112, No. 32, 2015.
15. A. Barnett, B. Wu\*, and S. Veerapaneni. Spectrally-accurate quadratures for evaluation of layer potentials close to the boundary for the 2D Stokes and Laplace equations. *SIAM Journal on Scientific Computing*, Volume 37, Issue 4, 2015.
16. G. Marple\*, P. Purohit and S. Veerapaneni. Equilibrium shapes of planar elastic membranes. *Physical Review E*, Volume 92, No. 1, July 2015.
17. A. Rahimian, S. Veerapaneni, D. Zorin and G. Biros. Boundary integral method for the flow of vesicles with viscosity contrast in three dimensions. *Journal of Computational Physics*, Volume 298, pp. 766-786, 2015.
18. Z. Gimbutas, L. Greengard and S. Veerapaneni. Efficient representations for the fundamental solutions of Stokes flow in a half space. *Journal of Fluid Mechanics*, Volume 776, Aug. 2015.
19. Y. -N. Young, S. Veerapaneni and M. Miksis. Long-wave dynamics of an inextensible planar membrane in an electric field. *Journal of Fluid Mechanics*, Volume 751, pp. 406-431, 2014.
20. Z. Gimbutas and S. Veerapaneni. A fast algorithm for spherical grid rotations and its application to singular quadrature. *SIAM Journal on Scientific Computing*, Volume 35, Issue 6, 2013.
21. S. Jiang, S. Veerapaneni and L. Greengard. Integral equation methods for unsteady Stokes flow in two dimensions. *SIAM Journal on Scientific Computing*, Volume 34, Issue 4, 2012.
22. S. Veerapaneni, Y. -N. Young, P. M. Vlahovska and J. Blawdziewicz. Dynamics of a compound vesicle in shear flow. *Physical Review Letters*, Volume 106, Issue 15, 2011.
23. S. Veerapaneni, A. Rahimian, G. Biros and D. Zorin. A fast algorithm for simulating vesicle flows in three dimensions. *Journal of Computational Physics*, Volume 230, Issue 14, 2011.

24. A. Rahimian, I. Lashuk, S. Veerapaneni, A. Chandramowlishwaran, D. Malhotra, L. Moon, R. Sampath, A. Shringarpure, J. Vetterz, R. Vuduc, D. Zorin and G. Biros. Petascale direct numerical simulation of blood flow on 200K cores and heterogeneous architectures. *Proceedings of the 2010 ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*. (Gordon Bell Prize)
25. R. Sampath, H. Sundar and S. Veerapaneni. Parallel fast Gauss transform. *Proceedings of the 2010 ACM/IEEE International Conference for High Performance Computing, Networking, Storage and Analysis*. (Finalist, Best Paper Award)
26. M. Spivak, S. Veerapaneni and L. Greengard. The fast generalized Gauss transform. *SIAM Journal on Scientific Computing*, Volume 32, Issue 5, pages 3092-3107, October 2010.
27. A. Rahimian, S. Veerapaneni and G. Biros. Dynamic simulation of locally inextensible vesicles suspended in an arbitrary two-dimensional domain, a boundary integral method. *Journal of Computational Physics*, Volume 229, Issue 18, Pages 6466-6484, September 2010.
28. S. Veerapaneni, D. Gueyffier, G. Biros and D. Zorin. A numerical method for simulating the dynamics of 3D axisymmetric vesicles suspended in viscous flows. *Journal of Computational Physics*, Volume 228, Issue 19, Pages 7233-7249, October 2009.
29. S. Veerapaneni, D. Gueyffier, D. Zorin and G. Biros. A boundary integral method for simulating the dynamics of inextensible vesicles suspended in a viscous fluid in 2D. *Journal of Computational Physics*, Volume 228, Issue 7, Pages 2334-2353, April 2009.
30. S. Veerapaneni, R. Raj, G. Biros and P. K. Purohit, Analytical and numerical solutions for shapes of Quiescent 2D Vesicles. *International Journal of Non-linear Mechanics*, Volume 44, Issue 3, Pages 257-262, April 2009.
31. S. Veerapaneni and G. Biros. The Chebyshev fast Gauss and nonuniform fast Fourier transforms and their application to the evaluation of distributed heat potentials. *Journal of Computational Physics*, Volume 227, Issue 16, Pages 7768-7790, August 2008.
32. S. Veerapaneni and G. Biros. A high-order solver for the heat equation in 1D domains with moving boundaries. *SIAM Journal on Scientific Computing*, Volume 29, Issue 6, Pages 2581-2606, October 2007.

### Book Chapters

33. A. Rahimian, S. Veerapaneni, D. Zorin and G. Biros. Dynamics of inextensible vesicles suspended in a confined two-dimensional Stokes flow. *Frontiers in Applied and Computational Mathematics Proceedings*, D. Blackmore, A. Bose, and P. Petropoulos, eds, World Scientific, 2008.

### Invited Research Talks

- Apr 2019 CAAM Colloquium, Rice University, Houston.
- Feb 2019 Biomechanics & Mechanobiology Seminar, University of California, San Diego.
- Dec 2018 Numerical Algorithms & Scientific Computing, Courant Institute, New York.
- Jul 2018 Soft Matter Seminar, Nordic Institute for Theoretical Physics, Stockholm.
- Mar 2018 IMA Workshop, University of Minnesota, Minneapolis.
- Oct 2017 CMO Workshop, Oaxaca, Mexico.
- Sep 2017 ARC Research Seminar, University of Michigan, Ann Arbor.
- Aug 2017 Chemical Engineering Seminar, Indian Institute of Technology, Bombay.
- Mar 2017 Active Matter Workshop, Flatiron Institute, New York.

Feb 2017 SIAM Conference on Computational Science and Engineering, Atlanta.

Nov 2016 Applied & Computational Mathematics Seminar, University of California, Irvine.

Sep 2016 AMCS Seminar, University of Pennsylvania, Philadelphia.

Aug 2016 Army Research Office Workshop on Geo-Surface Materials, Chicago.

Jul 2016 SIAM Annual Meeting, Boston.

Jul 2016 Computational & Data Sciences Seminar, Indian Institute of Science, Bangalore.

May 2016 SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia.

Apr 2016 MICDE Annual Symposium, University of Michigan, Ann Arbor.

Jan 2016 Applied Mathematics Colloquium, Northwestern University, Evanston.

Nov 2015 Annual Meeting of the APS Division of Fluid Dynamics, Boston.

Apr 2015 Applied Math Colloquium, Central Michigan University, Mt. Pleasant.

Mar 2015 SIAM Conference on Computational Science and Engineering, Salt Lake City.

Jul 2014 SIAM Annual Meeting, Chicago.

Jun 2014 Center for Interdisciplinary Studies, Tata Institute of Fundamental Research, India.

May 2014 Center for Applied Mathematics, École Polytechnique, Paris.

Nov 2013 Applied Mathematics Colloquium, New Jersey Institute of Technology, Newark.

Oct 2013 Applied Mathematics Colloquium, Northwestern University, Evanston.

Oct 2013 Schlumberger–Doll Research Center, Cambridge.

Sep 2013 Applied Mathematics Colloquium, Illinois Institute of Technology, Chicago.

Jul 2013 Society of Engineering Science – 50th Annual Meeting, Providence.

May 2013 Max Planck Institute of Colloids and Interfaces, Potsdam, Germany.

Jun 2013 SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia.

Feb 2013 SIAM Conference on Computational Science and Engineering, Boston.

Jan 2013 Applied & Interdisciplinary Mathematics Seminar, University of Michigan.

Jul 2012 SIAM Annual Meeting, Minneapolis.

May 2011 Computer Science Colloquium, Swiss Federal Institute of Technology (ETH), Zürich.

Apr 2011 Computer Science Colloquium, New York University.

Mar 2011 Mechanical & Aerospace Engineering Seminar, Cornell University.

Mar 2011 Scientific Computing Seminar, Southern Methodist University.

Feb 2011 SIAM Conference on Computational Science and Engineering, Reno.

Feb 2011 Applied & Interdisciplinary Mathematics Seminar, University of Michigan.

Feb 2011 Widely Applied Mathematics Seminar, Harvard University.

Feb 2011 Center for Fluid Mechanics, Turbulence and Computation, Brown University.

Oct 2010 Fluid Mechanics Seminar, New Jersey Institute of Tehnology.

May 2010 SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia.

May 2010 Frontiers in Applied and Computational Mathematics, Newark, NJ.

May 2010 Graphics and Geometry Seminar, New York University.

Nov 2009 Seminars in Engineering Science, Lehigh University.

Mar 2009 SIAM Conference on Computational Science and Engineering, Miami.

Oct 2008 Computational Topology, Algebra & Geometry Seminar, New York University.

## Teaching

MATH 671	<i>Fast Algorithms</i>	W'13, F'15, F'16, F'18
MATH 572	<i>Scientific Computing II</i>	W'16, W'17
MATH 571	<i>Numerical Linear Algebra</i>	F'13
ENGR 471	<i>Numerical Methods</i>	F'18
MATH 454	<i>PDEs &amp; Boundary Value Problems</i>	F'13
MATH 450	<i>Advanced Math for Engineers I</i>	F'15
ENGR 371	<i>Numerical Methods for Engineers</i>	F'12, W'15
MATH 156	<i>Applied Honors Calculus II</i>	F'11

## Mentoring

### Postdoctoral

1. Hanliang Guo 2018 - Present
2. Ruowen Liu 2017 - Present
3. Gary Marple 2016 - Present
4. Clark Bowman (co-mentor: Prof. Forger) 2018 - 2019  
*Later: Tenure-track Assistant Professor, Hamilton College (Department of Mathematics)*
5. Eduardo Corona 2015 - 2018  
*Later: Tenure-track Assistant Professor, NYIT (Department of Mathematics)*
6. Mariana-Carrasco Teja (co-mentor: Prof. Adefeso, ChE) 2012 - 2015  
*Later: Assistant Director for Research, MICDE, University of Michigan*
7. Bogdan Vioreanu 2012 - 2015  
*Later: Associate, Goldman Sachs, NYC*

### Graduate Students

8. Ryan Kohl (Ph.D.) In progress
9. Saibal De (Ph.D.) In progress
10. Hai Zhu (Ph.D.) In progress
11. Bowei Wu (Ph.D.) In progress  
(MICDE Fellow '16, Rackham Predoctoral Fellowship '17)
12. Gary Marple (Ph.D. 2016). *Thesis title:* Fast, high-order algorithms for simulating vesicle flows through periodic geometries. *Later:* Postdoctoral Assistant Professor, UM Math & US Army TARDEC (Co-winner, 2016 Peter Smereka Award for Best Applied Math Thesis).
13. Hao Zheng (M.S. 2015). *Later: Doctoral student at GSSI, Italy*

### Ph.D. Thesis Committee Member

14. Leighton Wilson (UM Math, Advisor: Prof. Krasny) In progress
15. Bikash Kanungo (UM Mech Engg., Advisor: Prof. Gavini) In progress
16. Nathan Vaughn (UM Math, Advisor: Prof. Krasny) In progress
17. Morgan Whitcomb (UM Applied Physics, Advisor: Prof. Bassis) In progress
18. Zhenlin Wang (UM Mech Engg., Advisor: Prof. Garikipati) In progress
19. Ben Yee (UM Nuclear Engg., Advisor: Prof. Larsen) Apr 2018

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| 20. Aaron Graham (UM Nuclear Engg., Advisor: Prof. Downar)    | Jul 2017 |
| 21. Shaobo Wang (NJIT Applied Math, Advisor: Prof. Jiang)     | Jul 2016 |
| 22. Ang Zhu (UM Nuclear Engg., Advisor: Prof. Downar)         | Jun 2016 |
| 23. Lin Zhao (Dartmouth Applied Math, Advisor: Prof. Barnett) | May 2015 |
| 24. Yuxuan Liu (UM Nuclear Engg., Advisor: Prof. Martin)      | Nov 2014 |
| 25. Herve Nganguia (NJIT Applied Math, Advisor: Prof. Young)  | Apr 2014 |

## Department/University Service

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|---|----------------|
| • MICDE Education Committee                         | 2016 - Present |
| • AIM Graduate Admissions and Fellowships Committee | 2012 - Present |
| • Undergraduate Research Committee                  | 2013 - 2017    |
| • Co-organized the REU Seminar Series               | 2013 - 2017    |

## External Service

- Panelist for National Science Foundation – 2013, 2015, 2016 (2), 2018, 2019.
- Panelist, XSEDE Research Allocation Committee (XRAC), 2015–2017.
- Journal referee: Journal of Fluid Mechanics, SIAM Journal on Scientific Computing, Journal of Computational Physics, Applied Mathematical Modelling, Journal of Computational and Applied Mathematics, Communications in Mathematical Sciences, Communications in Computational Physics, SIAM Journal on Applied Mathematics, French Academy of Science, Journal of the Royal Society Interface.
- Co-organized the minisymposium, “Integral Equation Methods for Particulate Flows”, SIAM conference on Computational Science and Engineering, Atlanta, February 2017.
- Co-organized the minisymposium, “Computational Algorithms for Simulating Particulate Flows”, SIAM Annual Meeting, Boston, July 2016.
- Co-organized the symposium, “Computational Mechanics of Biomembranes”, Society of Engineering Science – 50th Annual Meeting, Brown University, July 2013.
- Co-organized the minisymposium, “Computational Algorithms for Simulating Particulate Flows”, SIAM conference on Computational Science and Engineering, Reno, February 2011.
- Co-organized the minisymposium, “Numerical Methods for Complex Fluids”, SIAM conference on Computational Science and Engineering, Miami, March 2009.
- Reviewed grant proposals for the City University of New York (CUNY) Research Foundation.