

SUMANTH SWAMINATHAN, PH.D.



EDUCATION

- THE DATA INCUBATOR FELLOWSHIP Mar 2016
Advanced Data Science Certification
Certificate ID: 01456
- NORTHWESTERN UNIVERSITY, EVANSTON, IL Jan 2010
Master's & Ph.D in Applied Mathematics
Thesis – *Mathematical Modeling of Alignment Dynamics in Active Motor-Filament Systems*
- UNIVERSITY OF DELAWARE, NEWARK, DE May 2005
Bachelor of Science and Engineering in Chemical Engineering.

EMPLOYMENT

- FOUNDER, DIRECTOR, AND CHIEF EXECUTIVE OFFICER Jan 2021 – Present
- **Vironix Health, Inc** – Co-Founded Vironix Health during the Covid-19 pandemic to enable early detection and intervention on both covid infections and avoidable exacerbations of other chronic illnesses.
 - Built Vironix's entire company infrastructure in Austin, Tx, developed the business model, invented the algorithm methodology for Vironix's core IP, raised funds, and built a team of the most decorated and professional scientists, engineers, clinicians, and entrepreneurs in the world.
- DIRECTOR Dec 2018 – Dec 2020
- **Iterex Therapeutics** – Secured funding through a corporate spinout of Revon Systems' technology in partnership with Revon's founders.
 - Built Iterex's entire company infrastructure in New York City including customer and business development, product software front and backend systems, state and federal registrations, legal council, accountants, employee benefits, payroll systems, etc.
 - Built, managed, and commercialized Iterex's products
 - Hired 1 PhD and 6 contractors/consultants.
- CHIEF DATA SCIENTIST Mar 2016 – Dec 2018
- **Revon Systems Inc** – Built, managed, and deployed machine-learned mobile applications for at-home management of COPD.
 - Designed and executed the clinical trials that showed the clinically significant health improvement shown in asthma patients resulting from weekly use of the application.
 - Hired and mentored 1 fulltime PhD and two PhD interns to grow
- TECHNOLOGY CONSULTANT Aug 2012 – Mar 2016
- **W.L Gore & Associates** – Developed in-house solvers and applications for expediting technology R&D. Consulted on enterprise wide product development efforts to identify problems, enumerate solutions, and direct efforts at implementing quantitative solutions.
 - Hired and led a team of 6 associates in division and enterprise wide consulting efforts. This team grew out of a team of 2 within the division.
- POSTDOCTORAL FELLOW Jan 2010 – Feb 2012
- **Northwestern University** – Dept. of Materials Science: Used calculus of variations and numerical methods to characterize the conformation and mechanical properties of polymer fibers.
- LABORATORY RESEARCHER July 2006 – Aug 2009
- **Argonne National Laboratory** – Math & Computer Science Division: Modeled and simulated cellular processes. Formed collaborations between simulation experts and experimentalists in different laboratory divisions.

ADDITIONAL PROJECT MANAGEMENT & LEADERSHIP EXPERIENCE

- MANAGING DIRECTOR OF SWAMINATHAN OZ FUND, LLC Nov 2019 – Present
- Gathered 6 qualified investors, established an opportunity zone fund, and purchased a 5 unit mixed-use commercial/residential property in Philadelphia. Investment value has grown by 25% per year since initiation.
- COMMERCIAL MUSICIAN & PERFORMER (WWW.SUMANTHSWAMINATHAN.COM) Jan 2006 – Present
- Negotiated contracts and salaries for myself and accompanying musicians for domestic and international concerts.

- Conducted e-marketing in the form of web development, search engine optimization, and social networking.
- Produced, released, priced, and marketed commercial albums.

TECHNICAL EXPERTISE

Strong Programming abilities in Python, Matlab, and R. Proficient abilities in C, fortran, VBA, Maple, TEX/LATEX

- Used Python to Build Iterex Therapeutics' disease specific machine learning triage algorithms. Products included flare-up detection and user recommendation algorithms for COPD, asthma, and heart failure patients.
- Used Matlab & Python to develop analytical tools and simulations for technologists and product developers.
- Used R in all coursework of the Coursera Data Specialization Certification.
- Programmed numerical solvers for 3-dimensional integro-partial differential equations using Fortran.
- Programmed a 2-dimensional Brownian Dynamics simulation of biofilament self-assembly. Model construction and calculations done in C and visualization done in Matlab & XMGRACE.
- Simulated the movement of a Keratocyte fish cell. Computations done in C and visualization in Matlab.

Coursera Data Science Certifications

- Exploratory Data Analysis, Practical Machine Learning, Getting and Cleaning Data, R Programming, Statistical Inference, and Regression Models.

Clinical Trial Design

- Executed 4 clinical trials to evaluate the clinical benefit of digital health triage applications. Activities included: development of NIH style trial protocol, successful clearing of Internal Review Board, recruitment of physician specialists, training research staff, and management of operations.

TEACHING & MENTOR EXPERIENCE

OXFORD UNIVERSITY DISSERTATION ADVISOR: DEPT. OF MATHEMATICS Feb 2019 - Present

- Co-Advised James Morrill's doctoral thesis in temporal prediction of disease flare-ups using Path Signatures.

UNIVERSITY OF DELAWARE ADJUNCT FACULTY: DEPT. OF MATHEMATICS Dec 2014 – Present

- Spring semester lecturer for Math 302: Elementary Differential Equations & Boundary Value Problems.

W.L. GORE GRADUATE STUDENT MENTOR Jun 2013 – Jun 2015

- Mentored 4th and 5th year PhD student interns in the summers of 2013 & 2014.
- Hired 4 new associates (three PhDs and one masters level with 7 years industrial experience).

PRIVATE MUSIC TEACHER Jan 2004 – Present

- 20 years of training and mentoring young saxophone players, many of whom are competitive youth performers.

SELECT HONORS & AWARDS

MassChallenge 2021 Awardee Jun 2021

- Selected among 237 companies (out of 3100 applicants) to be a part of the 2021 MC accelerator. Finished the program as a top performing cohort member.

2018-2021 NSF PHASE I & PHASE II SBIR Winner July 2018

- Winner of 2 Small Business Innovation Phase Research Grant valued at \$1.1M for technical validation of Chronic Obstructive Pulmonary Disease triage applications.

Oxford University Center for Collaborative Applied Mathematics Fellowship Winner Jun 2010

- Winner of the Oxford University Center for Collaborative Applied Mathematics Visiting Postdoctoral Fellowship to conduct applied mathematics research at Oxford University.

2003-2005 MCM International Competition Mar 2003 – Mar 2005

- Awarded 3 consecutive meritorious designations in COMAP's (The Consortium of Mathematics and its Applications) international mathematical modeling competitions (placement in top 7% of worldwide teams).
 1. Undergraduate teams of 3-4 had 3 days to model, solve, and write a paper on a broad industry problem.
 2. Project subjects were tumor irradiation (2003), fingerprint identification (2004), & flood damage (2005).

NSF Science & Engineering Scholar May 2004

- Scholarship granted for a research term over the 2003-4 academic year.

SELECT CONFERENCES AND PRESENTATIONS

INVITED TALKS

- *Vironix: remote screening, detection, and triage of viral respiratory illness via cloud-enabled, machine-learned APIs*, European Respiratory Society Global Congress, Sep, 2021.

- *Machine-Learned APIs for Early Detection & Triage of Lung/Heart Disease*, SIAM Gen Conf, June 2021.
- *Adapting Using Analytics to the Changing Landscape of Data*, DATAx Chief Data Officer Summit, Dec 2018.
- *The Law and Policy of AI, Robotics, and Telemedicine in Healthcare*, Yale Soloman Center, Nov 2018
- *Modeling of Industrial Filtration Processes*, IMA workshop on Careers in Mathematics, April 2015.
- *The Mathematics of High Value Solutions*, IMA & NIMS Joint Workshop on Math in Industry, October 2014
- *How to Prepare for a Career in Industry*, U. Minnesota Institute for Mathematics and its Applications, April, 2014
- *Patterns and Intrinsic Fluctuations in Active Motor-Filament Systems*, University of California San Diego Biocircuits Institute, October 2011.
- *Motor-Mediated Self-Organization of Microtubules in Active Particle Suspensions*, University of Notre Dame Department of Mathematics Complexity Center, January 2009.

CONTRIBUTED TALKS

- *A Digital Therapy for Reducing Exacerbations and Improving Health Outcomes in Persistent Asthmatics*, American Thoracic Society International Conference, Dallas Convention Center, Dallas, TX, May, 2019.
- *A Mobile Diagnostic and Triage Application for Reducing COPD Exacerbations*, American Thoracic Society International Conference, San Diego Convention Center, San Diego, CA, May, 2018
- *Configurations of Closed Diblock Fibers*, Society for Industrial and Applied Mathematics, Wyndham Orlando Resort, Orlando, FL, October 2011.
- *Conformation and Mechanical Properties of Closed Diblock Fibers*, American Physical Society March Meeting, Dallas Convention Center, Dallas, TX, March 2011.
- *Characterization of Porous Filtration Media*, Twenty-Fifth Annual Workshop on Math Problems in Industry, University of Delaware Department of Mathematical Sciences, Newark, DE, June 2009.
- *Collective Ordering in Active Biological Systems*, Argonne National Laboratory Division of Mathematics and Computer Science, Lemont, IL, April 2009.

PUBLICATIONS

1. J. Morrill, K. Qirko, J. Kelly, A. Ambrosy, B. Toro, T. Smith, N. Wysham, M. Fudim, **S. Swaminathan.**, *A Machine Learning Methodology for Identification and Triage of Heart Failure Exacerbations*. J Cardiovasc Transl Res. 2021 Aug 28:1–13. doi: 10.1007/s12265-021-10151-7.
2. **S. Swaminathan**, K. Qirko, N. Wysham, E. Corcoran, T. Smith, B. Toro, A. Gerber. *A Therapeutic Machine-Learned Triage Methodology for Persistent Asthmatics*, ERS Proceedings, 2019.
3. **S. Swaminathan**, K. Qirko, T. Smith, E. Corcoran, N. Wysham, G. Bazaz, G. Kappel. *A Machine Learning Approach to Triaging Patients with Chronic Obstructive Pulmonary Disease*, PLoS One, **12(11)**, 0188532, 2017.
4. F. Ziebert, **S. Swaminathan**, I. Aranson. *Model for Self-Polarization and Motility of Keratocyte Fragments.*, Journal of the Royal Society Interface., **9(70)**, 1084 – 1092, 2012.
5. H. Nakanishi, D. Walker, K. Bishop, P. Wesson, Y. Yan, S. Soh, **S. Swaminathan**, B. Grzybowski, *Dynamic Internal Gradients Control and Direct Electric Currents Within Nanostructured Materials.*, Nature Nanotechnology **6**, 740-746, 2011.
6. **S. Swaminathan**, F. Solis, M. Olvera De La Cruz, *Conformation and Mechanical Properties of Closed Diblock Fibers.*, Physical Review E, **83 (6)**, 061912, 2011.
7. **S. Swaminathan**, F. Ziebert, I. Aranson, D. Karpeev, *Motor-Mediated Microtubule Self-Organization in Dilute and Semi-Dilute Filament Solutions.*, MMNP, **6(1)**, 119, 2010.
8. **S. Swaminathan**, F. Ziebert, I. Aranson, D. Karpeev, *Patterns and Intrinsic Fluctuations in Semi-Dilute Motor-Filament Systems.*, Europhysics Letters, **90(2)**, 28001, 2010.
9. **S. Swaminathan**, F. Ziebert, D. Karpeev, I. S. Aranson, *Motor-mediated Alignment of Microtubules in Semi-Dilute Mixtures.*, Physical Review E, **79**, 036207, 2009.
10. **S. Swaminathan**, D. Karpeev, I. Aranson, *Bundle Dynamics of Interacting Polar Rods*, Physical Review E, **77**, 066206, 2008.
11. D. Edwards, **S. Swaminathan**, *The Effect of Receptor Site Nonuniformity on the Measurement of Rate Constants*, Applied Mathematics Letter, **18(10)**, 2005.
12. **S. Swaminathan**, D. Edwards *A Mathematical Model for Blood Clotting*, Dept Mathematical Sciences, University of Delaware, **Technical Report 2004-04**, 2004.
13. **S. Swaminathan**, D. Edwards, *Traveling Waves for Anomalous Diffusion in Polymers*, Applied Math Letter, **17(7)**, 2004.