CURRICULUM VITAE

Seth H. Weinberg, Ph.D.

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RESEARCH INTERESTS

- Mechanisms of cardiac arrhythmias
- Multiscale modeling of cardiac tissue
- Model variability and machine learning-based analysis

EDUCATION

2012-2014 **The College of William & Mary, Williamsburg, Virginia**
Postdoctoral Research, Biomathematics
Advisor: Gregory D. Smith, Ph.D.

2006-2012 **The Johns Hopkins University, Baltimore, Maryland**
Ph.D., Biomedical Engineering
Thesis: *Cardiac conduction block and arrhythmia termination using high frequency electric fields*
Advisor: Leslie Tung, Ph.D.

2002-2006 **Duke University**, **Durham, North Carolina**
B.S.E., Biomedical Engineering
Minor, Mathematics
Summa cum laude, Graduation with Distinction

ACADEMIC APPOINTMENTS

2024-present **Associate Dean for Research**
College of Engineering
The Ohio State University, Columbus, Ohio

2023-present **Professor**
2019-2023 **Associate Professor**
Department of Biomedical Engineering
Investigator, Davis Heart and Lung Research Institute (DHLRI)
Affiliated Faculty, Biophysics Graduate Program
The Ohio State University, Columbus, Ohio

2016-2019 **Assistant Professor**
Department of Biomedical Engineering
Virginia Commonwealth University, Richmond, Virginia

2014-2016 **Research Assistant Professor**
Virginia Modeling, Analysis and Simulation Center
Old Dominion University, Suffolk, Virginia

FUNDING

CURRENT GRANT SUPPORT

June 2025 – March 2029 National Institutes of Health R01HL174473
Impact of Adaptive Immune System on Cardiac Electrophysiology
Role: co-I (MPI: Deschenes, Bansal)

April 2025 – March 2028 American Heart Association Career Development Award (CDA1436439)
Mechanistic modeling of atrial tissue remodeling and atrial fibrillation progression
Role: Mentor (PI: N. Moise)

April 2024 – March 2028 National Institutes of Health R01HL169610
Therapeutic Targeting of Voltage Gated Sodium Channel Autoregulation
Role: PI (MPI with S. Poelzing)

April 2023 - Jan 2028 National Institutes of Health R01HL165751
Distinct Ion Channel Pools and Intercalated Disk Nanoscale Structure Regulate Cardiac Conduction
Role: PI (MPI with R. Veeraraghavan and T. Hund)

March 2022 - Feb 2027 National Institutes of Health R01HD108839
Off-label drugs in cardiology: evaluating age- and disease-appropriate therapies
Role: co-I (PI: N. Posnack)

PREVIOUS SUPPORT

Sept 2022 - Sept 2024 OSU Translational Data Analytics Institute: Interdisciplinary Research Pilot Award
An in vitro and in silico approach to predict cancer metastasis
Role: PI (co-PI: A. Skardal)

Jan 2022 - Dec 2023 American Heart Association 908824 (Postdoctoral Fellowship)
Regulation of Cardiac Conduction by Intercalated Disk Nanoscale Structure
Role: Mentor (PI: N. Moise)

July 2018 - June 2023 National Institutes of Health R01HL138003
Signaling in inherited and acquired sodium channel gain of function
Role: PI (MPI with S. Poelzing)

May 2022 - April 2023 OSU DHLRI Synergy Seed Program
The Sodium Channel Macromolecular Complex and its Link to Arrhythmias
Role: co-I (PI: I. Deschenes)

Feb 2022 - Jan 2023 OSU College of Medicine Dean's Discovery Program
Activated CD4+ T-cells Alter Cardiomyocyte Electrophysiology during Ischemic Heart Failure
Role: co-I (PI: S. Bansal)

March 2018 - Feb 2023 National Institutes of Health R01GM122855
Mechanochemical signaling dynamics in epithelial-mesenchymal transition
Role: PI (MPI with C. Lemmon)

August 2015 - July 2021 National Institutes of Health R01GM115678
A computational model of traction force-induced fibronectin fibril growth
Role: PI (MPI with C. Lemmon)

PUBLICATIONS

Google Scholar metrics (as of 1 Dec 2025): citation count: 2495 • h-index: 25

Peer-Reviewed Articles (74), Reviews (5), Book Chapters (3), and Editorials (9)

* and $ indicate authors contributed equally and co-corresponding authorship, respectively. #, †, and ‡ indicate undergraduate student, graduate or medical student, and postdoctoral fellow or research scientist under my advisement, respectively.

2026 [92] Moise N‡, Struckman HL, Smyth JW, Hoeker GS, Poelzing S, Veeraraghavan R, and **Weinberg SH,** (2026) "Intercalated disk structure, tissue heterogeneity, and ion channel distribution modulate conduction and local calcium influx." *J Physiology.* In press.

[91] Miller JA†, Moise N‡, Mendez MJ‡, and **Weinberg SH**, (2026) "Interplay Between Variability in Intrinsic Cellular Properties and Heart Failure-Associated Remodeling in a Simulated Population with Human Heart Failure." *J Mol Cell Cardiol.* 211: 1-17.

[90] Sui R†, Moise N‡, and **Weinberg SH**, (2026) "The influence of intercalated disc nanostructure on local ionic currents and cardiac conduction." *Biophysical J*. 125: 1-15.

2025

[89] Ivanovic-Sandth E, Vannucci M, Moise N‡, **Weinberg SH**, and Kucera JP, (2025) "Electrodiffusion in cardiac intercalated disc nanostructures alters cell-cell action potential transmission via ephaptic coupling: a modeling study." *J Physiology.* 211: 1-17.

[88] **Weinberg SH,** (2025) "A Step Forward in Translating Sex-Specific Differences in Cardiac Electrophysiology." *JACC: Clinical Electrophysiol.* 11(9): 2028-2030. Editorial.

[87] Moise N‡ and **Weinberg SH,** (2025) "Calcium homeostatic feedback control predicts atrial fibrillation initiation, remodeling, and progression." *JACC: Clinical Electrophysiol.* 11(7): 1415-1135.

[86] Wu X, King DR, Hoeker G, Wan X, Deschenes I, Johnstone J, Gourdie RG, **Weinberg SH**, and Poelzing S (2025) "Age-associated perinexal narrowing masks consequences of sodium channel gain of function." *JACC: Clinical Electrophysiol.* 11(5): 919-930.

2024

[85] Mendez MJ‡, Cherry EM, Hoeker GS, Poelzing S, and **Weinberg SH,** (2024) "Reconstructing ventricular cardiomyocyte dynamics and parameter estimation using data-assimilation." *Biophysical J*. 123(23): 4050-4066.

[84] Hirway SU†, Nairon KG, Skardal A, and **Weinberg SH** (2024) "A multicellular mechanochemical model to investigate tumor microenvironment remodeling and pre-metastatic niche formation." *Cellular and Molecular Bioengineering.* 17: 573-596. Article highlighted on journal cover.

[83] Salameh S*, Guerrelli D*, Miller JA‡*, Desai M, Moise N‡, Yerebakan C, Sinha P, d'Udekem Y, **Weinberg SH**$, Posnack NG$ (2024) "Connecting transcriptomics with computational modeling to reveal developmental adaptations in the human pediatric atrial myocardium." *Amer J Physiol: Heart Circ Physiol*. 327: H1413–H1430. Article highlighted in editorial.

[82] Blair G, Depman M, Maisonneuve R, Adams W, Hoeker G, **Weinberg**

SH, and Poelzing S, (2024) "Sequence-dependent repolarization is modulated by endogenous APD gradients rather than electrical coupling in ventricular myocardium." *J Amer Heart Assoc.* 14(1): 1-18.

[81] Langthaler S, Zumpf C, Rienmuller T, Fuchs J, Zhou R, Shrestha N, Pelzmann B, Zorn-Pauly K, Frohlich E, **Weinberg SH**, and Baumgartner C, (2024) "The bioelectric mechanisms of local calcium dynamics in cancer cell proliferation: An extension of the A549 in-silico cell model." *Frontiers in Molecular Biosciences.* 1394398

[80] Struckman HL, Moise N‡, Vanslembrouck B, Rothacker N, Chen Z, van Hengel J, **Weinberg SH**, and Veeraraghavan R, (2024) "Indirect Correlative Light and Electron Microscopy (iCLEM): A Novel Pipeline for Multiscale Quantification of Structure from Molecules to Organs." *Microscopy and Microanalysis.* ozae021

[79] King DR, Demirtas M, Tarasov M, Struckman HL, Meng X, Nassal D, Moise N‡, Miller A, Min D, **Weinberg SH**, Hund TJ, Veeraraghavan R, and Radwanski P, (2024) "Cardiac-specific deletion of *Scn8a* mitigates sudden death in an adult mouse model of Dravet Syndrome." *JACC: Clinical Electrophysiol.* 10(5): 829-842.

[78] **Weinberg SH** and Hund TJ, (2024) "Building a pipeline for precision anti-arrhythmic therapy." *JACC: Clinical Electrophysiol.* 10(2): 365-366 Editorial.

2023 [77] Moreno J and **Weinberg SH,** (2023) "Bacterial Sodium Channels as Gene Therapy for Cardiac Arrhythmia: Slow (activation and inactivation kinetics) and steady wins the race." *Amer J Physiol: Heart Circ Physiol*. 325(6): H1412-1414. Editorial

[76] Veeraraghavan R, Moise N‡, and **Weinberg SH**, (2023) "Crossing the great sex-specific divide in cardiac electrophysiology." *JACC: Clinical Electrophysiol.* 9(12): 2649-2651. Editorial

[75] Phadumdeo VM†, Mallare BL#, Hund TJ, and **Weinberg SH**, (2023) "Long-term changes in heart rate and electrical remodeling contribute to alternans formation in heart failure: a patient-specific *in silico* study." *Amer J Physiol: Heart Circ Physiol*. 325(2): H414-431.

[74] Struckman HL, Moise N‡, King DR, Soltisz A, Buxton A, Dunlap I, Chen Z, Radwanski PB, **Weinberg SH**, and Veeraraghavan R, (2023) "Unraveling Impacts of Chamber-specific Differences in Intercalated Disc Ultrastructure and Molecular Organization on Cardiac Conduction." *JACC: Clinical Electrophysiol.* 9(12): 2425-2443.

[73] **Weinberg SH**, (2023) “Sodium channel subpopulations with distinct biophysical properties and subcellular localization enhance cardiac conduction.” *J Gen Physiology.* 155(8): e202313382.

[72] Mair DB, Elmasli C, Barreto AD, Ding S, Gu L, **Weinberg SH**, Kim T, Kim D-H, and Li R. (2023) “The Arp2/3 complex enhanced cell migration on soft elastic substrates.” *Molecular Biology of Cell.* 34(7): e22-06-0243.

[71] Moise N‡ and **Weinberg SH**. (2023) “Emergent electrical activity, tissue heterogeneity, and robustness in a calcium feedback regulatory model of the sinoatrial node.” *Biophysical J*. 122(9): 1613-1632. Article featured in the journal’s *New and Notable.*

[70] Otani NF, Figueroa E, Garrison J, Hewson M, Munoz L, Fenton FH, Karma A, and **Weinberg SH**. (2023) “The role of ephaptic coupling in discordant alternans domains size and action potential propagation in the heart.” *Physical Review E.* 107: 054407.

[69] Otani NF, Figueroa E, Garrison J, Hewson M, Munoz L, Fenton FH, Karma A, and **Weinberg SH**. (2023) “Ephaptic coupling as a resolution to the paradox of action potential wave speed and discordant alternans spatial scales in the heart.” *Physical Review Letters*. 130: 218401.

[68] Grandi E*, Navedo MF*, Saucerman J*, Bers DM, Chiamvimonvat N, Dixon RE, Dobrev D, Gomez AM, Harraz OF, Hegyi B, Dr. Jones DK, Krogh-Madsen T, Murfee WL, Nystoriak MA, Posnack NG, Ripplinger CM, Veeraraghavan R, and **Weinberg SH.** (2023) “White Paper: Diversity of Cells and Signals in the Cardiovascular System.” *J Physiology.* 601(13): 2547-2592. Editorial.

[67] **Weinberg SH** and King DR. (2023) “When it comes to the heart, age and sex matter (sometimes).” *Amer J Physiol: Heart Circ Physiol*. 324(2): H226-H228. Editorial.

[66] Hirway SU† and **Weinberg SH.** (2023) “A review of computational modeling, machine learning, and image analysis in cancer metastasis dynamics.” *Computational and Systems Oncology.* 3(1): e1044. Review.

[65] Miller JA†, Moise N‡, and **Weinberg SH**. (2023) “Modeling incomplete penetrance in long QT syndrome type 3 (LQT3) through ion channel heterogeneity: an *in silico* population study.” *Amer J Physiol: Heart Circ Physiol.* 324(2): H179-H197.

2022 [64] Mendez MJ†, Hoffman MJ, Cherry EM, Lemmon CA, and **Weinberg SH**. (2022) “A data-assimilation approach to predict population dynamics during epithelial-mesenchymal transition.” *Biophysical J*. 121(16): 3061-

3080.

[63] Ly C and **Weinberg SH**. (2022) “Automaticity in ventricular myocyte cell pairs with ephaptic and gap junction coupling.” *Chaos*. 32(3):033123.

[62] Winkle AJ, Nassal DM, Shaheen R, Thomas E, Mohta S, Gratz D, **Weinberg SH**, and Hund TJ. (2022) “Emerging therapeutic targets for tuning cardiac hypertrophy.” *Exp Opin Ther Targets*. 26(1): 29-40. Review.

[61] Langthaler S, Sajic JL, Rienmuller T, **Weinberg SH**, and Baumgartner C. (2022) “Ion channel modeling beyond state of the art: A comparison with a system-theory based model of the shaker-related voltage-gated potassium channel Kv1.1.” *Cells*. 11(2): 239.

[60] Yu JK, Liang JA, **Weinberg SH**, and Trayanova NA. (2022) “Computational modeling of aberrant electrical activity following remuscularization with intramyocardially injected pluripotent stem cell-derived cardiomyocytes.” *J Mol Cell Cardiol.* 162: 97-109.

[59] Oomen PJA, Phung TN, **Weinberg SH**, Bilchick KC, and Holmes JW. (2022) “A rapid electromechanical model to predict reverse remodeling following cardiac resynchronization therapy.” *Biomech Modeling Mechanobio.* 21:231-247

2021 [58] Poelzing S, **Weinberg SH**, and Keener JP. (2021) “Initiation and entrainment of multicellular automaticity via diffusion limited extracellular domains.” *Biophysical J*. 120:1-16.

[57] Hirway SU[†], Lemmon CA, and **Weinberg SH**. (2021) “Multicellular Mechanochemical Hybrid Cellular Potts Model of Tissue Formation During Epithelial-Mesenchymal Transition.” *Computational and Systems Oncology.* 1(4):e1031.

[56] Wu X, Hoeker GS, Blair G, King DR, Gourdie R, **Weinberg SH**, and Poelzing S. (2021) “Hypernatremia and intercalated disc edema synergistically exacerbate the long QT syndrome type 3 phenotype.” *Am J Physiol. Heart Circ Physiol.* 321(6):H1042-H1055.

[55] Nowak MB[†], Veeraraghavan V, Poelzing S, and **Weinberg SH**, (2021) “Cellular size, gap junctions, and sodium channel properties govern developmental changes in cardiac conduction.” *Frontiers in Physiology*. 12:731025.

[54] Veerarghavan R, Moise N[‡], and **Weinberg SH**. (2021) “Sodium channels and the intercalated disk – it is all about location, location, location.” *J Physiology*. 599(21):4735-36. Editorial

[53] Bogdanov V, Soltisz AM, Moise N‡, Ivanova M, Andreev I, Sakuta G, **Weinberg SH**, Davis JP, Veerarghavan R, and Gyorke S. (2021) "Distributed synthesis of sarcolemmal and sarcoplasmic reticulum membrane proteins in cardiac myocytes." *Basic Research in Cardiology*. 116:63.

[52] Moise N‡, Struckman HL, Dagher C#, Veeraraghavan R, and **Weinberg SH**, (2021) "Intercalated disk nanoscale structure regulates cardiac conduction." *J Gen Physiology*. 153(8): e202112897.

[51] Gratz D, Winkle A, **Weinberg SH**, and Hund TJ. (2021) "Statistical approach to incorporating experimental variability into a mathematical model of the voltage-gated Na^+ channel and human atrial action potential." *Cells*. 10: 1516.

[50] **Weinberg SH**, Saini N† and Lemmon CA. (2021) "Effects of substrate stiffness and actin velocity on *in silico* fibronectin fibril morphometry and mechanics." *PLoS ONE.* 16(6): e0248256.

[49] Hirway S†, Hassan N, Sofroniou M, Lemmon CA, and **Weinberg SH**, (2021) "Immunofluorescence image feature analysis and phenotype scoring pipeline for distinguishing epithelial-mesenchymal transition" *Microscopy and Microanalysis.* 1-11.

[48] Nowak M†, Poelzing S, and **Weinberg SH**, (2021) "Mechanisms underlying age-associated manifestation of cardiac sodium channel gain-of-function" *J Mol Cell Cardiol.* 153: 60-71.

[47] Link PA, Heise RL, and **Weinberg SH**, (2021) "Cellular mitosis predicts vessel stability in a mechanochemical model of sprouting angiogenesis" *Biomech Modeling Mechanobio.* doi.org/10.1007/s10237-021-01442-8.

2020

[46] Phadumdeo VM† and **Weinberg SH**, (2020) "Dual regulation by subcellular calcium heterogeneity and heart rate variability on cardiac electromechanical dynamics." *Chaos.* 30: 093129.

[45] Comlekoglu T† and **Weinberg SH**, (2020) "Memory in a fractional-order cardiomyocyte model alters voltage- and calcium-mediated instabilities." *Commun Nonlinear Sci Numer Simulat.* 89: 105340.

[44] Nowak MB†, Greer-Short A, Wan X, Wu X, Deschenes I, **Weinberg SH***, and Poelzing S*, (2020) "Intercellular sodium regulates repolarization in cardiac tissue with sodium channel gain-of-function." *Biophysical J.* 118(11): 2829-2843.

[43] Scott LE†, Griggs LA, Narayanan V, Conway DE, Lemmon CA, and **Weinberg SH**, (2020) "A hybrid model of intercellular tension and cell-matrix mechanical interactions in a multicellular geometry." *Biomech Modeling Mechanobio.* 1-17.

[42] Mendez MJ†, Hoffman MJ, Cherry EM, Lemmon CA, and **Weinberg SH**, (2020) "Cell fate forecasting: a data assimilation approach to predict epithelial-mesenchymal transition." *Biophysical J.* 118(7): 1749-1768.

[41] Wood K, **Weinberg SH**, and Weinberg M, (2020) "Death certification in northern Alberta: Error occurrence rate and educational interventions." *Am J Forensic Med Path*. 41(1): 11-17.

2019

[40] Shah C, Jiwani S, Limbu B, **Weinberg SH**, and Deo M, (2019) "Delayed afterdepolarization-induced triggered activity in cardiac Purkinje cells mediated through cytosolic calcium waves." *Physiological Reports.* 7:e14296.

[39] Nowak MB†, Phadumdeo VM†, and **Weinberg SH**, (2019) "How to "boost" efficacy of a sodium channel blocker: the devil is in the details." *JACC: Basic Transl Sci.* 4(6): 752-754. Editorial.

[38] Scott LE†, **Weinberg SH**, and Lemmon CA, (2019) "Mechanochemical signaling of the extracellular matrix in epithelial-mesenchymal transition." *Frontiers Cell Dev Bio.* 7:135. Review

[37] Bui J#, Conway DE, Heise RL, and **Weinberg SH**, (2019) "Mechanochemical coupling and junctional forces in collective cell migration." *Biophysical J.* 117(1): 170-183.

[36] MacRae C, **Weinberg SH**, and Weinberg M, (2019) "Attitudes towards forensic autopsy standard B3.7 and the use of physician extenders in select autopsy cases." *Acad Forensic Path*. 9(3-4): 181-190.

2018

[35] Ly C and **Weinberg SH**, (2018) "Analysis of heterogeneous cardiac pacemaker network models and traveling wave dynamics." *J. Theoretical Biology.* 459:18-35.

[34] Phadumdeo V# and **Weinberg SH**, (2018) "Heart rate variability alters cardiac repolarization and electromechanical dynamics." *J. Theoretical Biology.* 442:31-43.

[33] **Weinberg SH** and Santamaria F, (2018) "History Dependent Neuronal Activity Modeled with Fractional Order Dynamics." In: *Computational Models of Brain and Behavior.* Ahmed Moustafa, ed., Wiley-Blackwell.

Chapter 39: 531-548. Book Chapter.

2017 [32] Lemmon CA and **Weinberg SH**, (2017) "Multiple cryptic binding sites are necessary for robust fibronectin assembly: an *in silico* study." *Scientific Reports.* 7: 18061.

[31] Deo M, **Weinberg SH**, and Boyle P, (2017) "Calcium Dynamics and Cardiac Arrhythmias." *Clinical Medicine Insights: Cardiology.* 11: 1-4. Editorial

[30] **Weinberg SH**, (2017) "Ephaptic coupling rescues conduction failure in weakly coupled cardiac tissue with voltage-gated gap junctions." *Chaos*. 27: 093908.

[29] Comlekoglu T# and **Weinberg SH**, (2017) "Memory in a fractional-order cardiomyocyte model alters properties of alternans and spontaneous activity." *Chaos*. 27: 093904.

[28] **Weinberg SH**, Mair DB#, and Lemmon CA, (2017) "Mechanotransduction dynamics at the cell-matrix interface." *Biophysical J.* 112: 1962-1974. Article featured in the journal's New and Notable; in *VCU Engineering, VCU News, Phys.org.*

[27] Greer-Short A, George S, Poelzing S*, and **Weinberg SH***, (2017) "Revealing the concealed nature of long QT type 3 syndrome." *Circulation: Arrhythm Electrophysiol.* 10(2): e004400. Article featured with Editorial Commentary.

[26] Ji H, Li Y, and **Weinberg SH**. (2017) "Calcium fluctuations alter ion channels gating in a stochastic representation of a luminal calcium release site model." *IEEE/ACM Transactions on Computational Biology and Bioinformatics.* 14(3): 611-619.

2016 [25] Limbu B, Shah K, **Weinberg SH**, and Deo M, (2016) "Role of cytosolic calcium diffusion in murine cardiac Purkinje cells." *Clinical Medicine Insights: Cardiology.* 10(S1): 17-26.

[24] **Weinberg SH**, (2016) "Impaired sarcoplasmic reticulum calcium uptake and release promote electromechanically and spatially discordant alternans: A computational study." *Clinical Medicine Insights: Cardiology*. 10(S1): 1-15.

[23] **Weinberg SH**. (2016) "Microdomain calcium concentration fluctuations alter temporal dynamics in models of calcium-dependent signaling cascades and synaptic vesicle release." *Neural Computation.* 28(3): 493-524.

[22] Wang X, Hardcastle K, **Weinberg SH**, and Smith GD. (2016) "Population density and moment-based approaches to modeling domain calcium-mediated inactivation of L-type calcium channels." *Acta Biotheoretica.* 64: 11-32.

2015 [21] **Weinberg SH**. (2015) "Spatial discordance and phase reversals during alternate pacing in discrete-time kinematic and cardiomyocyte ionic models." *Chaos.* 25: 103119.

[20] **Weinberg SH**, (2015) "Membrane capacitive memory alters spiking in neurons described by the fractional-order Hodgkin-Huxley model." *PLoS ONE*. 10(5): e0126629.

[19] Wang X, Hao Y, **Weinberg SH**, and Smith GD. (2015) "Ca^{2+} activation kinetics modulate successive puff/spark amplitude, duration, and inter-event-interval in a Langevin model of stochastic Ca^{2+} release." *Mathematical Biosciences.* 264: 101-107.

[18] Wang X, **Weinberg SH**, Hao Y, Sobie EA, and Smith GD, (2015) "Calcium homeostasis in a local/global whole cell model of permeabilized ventricular myocytes with a Langevin description of stochastic calcium release." *Am J Physiol. Heart Circ Physiol.* 308: H510-H523.

[17] **Weinberg SH**. (2015) "Personalized computational modeling for the treatment of cardiac arrhythmias," In: *The Digital Patient: Advancing Medical Research, Education, and Practice.* D Combs, J Sokolowski, C Banks, eds., John Wiley & Sons, Inc., Chapter 8: 85-99. Book Chapter.

2014 [16] **Weinberg SH**, (2014) "High frequency stimulation of cardiac myocytes: A theoretical and computational study." *Chaos.* 24: 043104.

[15] **Weinberg SH** and Smith GD, (2014) "Influence of Ca^{2+} buffers on free [Ca^{2+}] fluctuations and the effective volume of Ca^{2+} microdomains." *Biophys. J.* 106(12): 2693-2709.

2013 [14] **Weinberg SH** (2013), "High-frequency stimulation of excitable cells and networks." *PLoS ONE* 8(11): e81402.

[13] **Weinberg SH**, Chang KC, Zhu R, Tandri H, Berger RD, Trayanova NA, and Tung L, (2013) "Defibrillation success by high frequency electric

fields is related to degree and location of conduction block." *Heart Rhythm* 10(5): 740-748. Article featured on the journal cover and with an Editorial Commentary.

[12] Weinberg M, Weedn V, **Weinberg S**, and Fowler D. (2013) "Characteristics of medical examiner/coroners offices currently accredited by the National Association of Medical Examiners." *J. Forensic Sci.* 58(5): 1193-1199.

2012

[11] **Weinberg SH** and Smith GD, (2012) "Discrete-state stochastic models of calcium-regulated calcium influx are often not well-approximated by continuous mass-action descriptions of subspace dynamics." *Comput. Math. Methods Med.: Special Issue on Cardiovascular System Modeling* 2012: 897371.

[10] **Weinberg SH** and Tung L, (2012) "Oscillation in cycle length induces transient discordant and steady-state concordant alternans in the heart." *PLoS ONE* 7(7): e40477.

[9] Blazeski A, Zhu R, Hunter DW, **Weinberg SH**, Zambidis ET, and Tung L. (2012) "Cardiomyocytes derived from human induced pluripotent stem cells as models for normal and diseased electrophysiology and contractility." *Prog. Biophys. Mol. Biol.* 110(2-3): 166-77. Review.

[8] Blazeski A, Zhu R, Hunter DW, **Weinberg SH**, Boheler KR, Zambidis ET, and Tung L. (2012) "Electrophysiological and contractile function of cardiomyocytes derived from human embryonic stem cells." *Prog. Biophys. Mol. Biol.* 110(2-3): 178-95. Review.

2011

[7] Tandri H*, **Weinberg SH***, Chang KC, Zhu R, Trayanova NA, Tung L, and Berger RD, (2011) "Reversible cardiac conduction block and defibrillation with high-frequency electric field." *Science Transl. Med.* 3: 102ra96. Article featured in Science journal *Podcast*, on *NBC News,* InsideScience, Duke Medicine Health News, *The Atlantic, LiveScience.*

[6] Burridge PW, Thompson S, Millrod MA, **Weinberg S**, Yuan X, Peters A, Mahairaki V, Koliatsos V, Tung L, and Zambidis ET, (2011) "A universal system for highly efficient cardiac differentiation of human induced pluripotent stem cells that eliminates interline variability." *PLoS ONE* 6(4): e18293. Article featured in ScienceDaily.

2010 [5] **Weinberg S**, Malhotra N, and Tung L, (2010) "Vulnerable windows define susceptibility to alternans and spatial discordance." *Am J Physiol. Heart Circ Physiol.* 298 (6): H1727-1737.

[4] **Weinberg S**, Lipke EA, and Tung L, (2010) "In vitro electrophysiological mapping of stem cells," In: *Stem Cells for Myocardial Regeneration: Methods and Protocols, Methods in Molecular Biology*. RJ Lee, ed., Humana Press, 660: 215-37. Book Chapter.

2009 [3] Anderson WS, Kudela P, **Weinberg S**, Bergey GK, and Franaszczuk PJ, (2009) "Phase-dependent stimulation effects on bursting activity in a neural network cortical simulation." *Epilepsy Res.* 84 (1): 42-55.

2008 [2] **Weinberg S**, Iravanian S, and Tung L, (2008) "Representation of collective electrical behavior of cardiac cell sheets." *Biophys. J.* 95: 1138-1150.

2006 [1] Sarunic MV, **Weinberg S**, and Izatt JA, (2006) "Full-field swept-source phase microscopy," *Optics Letters* 31: 1462-1464.

Manuscripts In Submission (3)

[1] Wu X, Swanger SA, Hoeker GS, Maisonneuve R, Carmeliet P, Gourdie RG, **Weinberg SH**, and Poelzing S, "Hypernatremia enhances transient outward potassium and late sodium currents in a mouse model of long QT syndrome type 3"

[2] Flannery K†, Miller JA‡, Poelzing S, and **Weinberg SH**, "Extracellular ionic concentration modulates arrhythmias in a simulated population of human ventricular myocytes with long QT syndrome type 3"

[3] Moise N‡ and **Weinberg SH,** "Monte Carlo modeling of the formation and organization of ion channel clustering"

PRESENTATIONS[1]

Conference Platform/Symposium Oral Presentations (77)

[1] Includes upcoming accepted conference and scheduled university presentations. Presentations accepted and scheduled, but not held due to conference cancellation, are included and noted.

Underline indicates the presenting author. #, †, and ‡ indicate undergraduate student, graduate student, and postdoctoral fellow / research scientist under my advisement, respectively.

2026 [78] **SIAM Conference on Uncertainty Quantification (UQ)**, March 22-25, 2026. Minneapolis, Minnesota. Mendez MJ‡ and **Weinberg SH**, "Reconstructing cardiac myocyte model dynamics and parameters using data-assimilation."

2025 [77] **American Heart Association Scientific Sessions**, November 8-10, 2025. New Orleans, Louisiana. **Weinberg SH**, "EP Model Parameterization at the Cell Scale: Representing Age-Related Action Potential Heterogeneity."

[76] **Fickle Heart Conference**, September 8-9, 2025. Sheffield, United Kingdom. Mendez MJ‡ and **Weinberg SH**, "Reconstructing cardiac myocyte model dynamics and parameters using data-assimilation."

[75] **FASEB Science Research Conferences: Ion Channel Regulation**, August 3-7, 2025. Southbridge, Massachusetts. Moise N‡ and **Weinberg SH,** "Ion Channel Expression, Feedback, and Homeostasis: A Long-Term Balancing Act."

[74] **FASEB Science Research Conferences: Ion Channel Regulation**, August 3-7, 2025. Southbridge, Massachusetts. Moise N‡ and **Weinberg SH,** "Intercalated Disk Ion Channel and Connexin Distribution Controls Tissue Conduction Velocity and Local Calcium Currents."

[73] **SIAM Conference on Applications of Dynamical Systems**, May 11-15, 2025. Denver, Colorado. Moise N‡ and **Weinberg SH, "**Intercalated disk ion channel and connexin distribution controls tissue conduction velocity and local calcium currents."

[72] **SIAM Conference on Applications of Dynamical Systems**, May 11-15, 2025. Denver, Colorado. Otani N and **Weinberg SH, "**The role of intercell ephaptic coupling in generating small-scale arrhythmogenic spiral wave activity."

[71] **Heart Rhythm Society Annual Meeting**, April 24-27, 2025. San Diego, California. Moise N‡ and **Weinberg SH**, "How Cardiac Rhythms Rewire the Heart Over the Long Run."

2024 [70] **SIAM Annual Meeting**, July 8-12, 2024. Spokane, Washington. Moise N‡ and **Weinberg SH**, "Atrial Fibrillation Initiation and Organization in a Mechanistic Model of Atrial Remodeling and Calcium Homeostatic Regulation."

[69] **Heart Rhythm Society Annual Meeting**, May 16-19, 2024. Boston, Massachusetts. Moise N‡ and **Weinberg SH**, "Calcium homeostatic feedback control predicts atrial fibrillation remodeling, initiation and progression."

[68] **Biophysical Society Annual Meeting,** February 10-14, 2024. Philadelphia, Pennsylvania. Miller JA†, Moise N‡ and **Weinberg SH,** "Interplay between beta-adrenergic signaling and ion channel expression elucidate remodeling and arrhythmia risk in a simulated population of human ventricular myocytes with heart failure."

2023 [67] **Society for Mathematical Biology**, July 17-21, 2023. Columbus, Ohio. Moise N‡ and **Weinberg SH**, "Emergent pacemaking and tissue heterogeneity in a calcium feedback regulatory model of the sinoatrial node."

[66] **Heart Rhythm Society Annual Meeting**, May 18-22, 2023. New Orleans, Louisiana. **Weinberg SH**, "Sodium channel subpopulations with distinct biophysical properties and subcellular localization enhance cardiac conduction: *in silico* studies."

[65] **Biophysical Society Annual Meeting**, February 18-22, 2023. San Diego, California. Moise N‡ and **Weinberg SH**, "Emergent pacemaking and tissue heterogeneity in a calcium feedback regulatory model of the sinoatrial node."

[64] **Biophysical Society Annual Meeting**, February 18-22, 2023. San Diego, California. Struckman HL, Moise N‡, King DR, Solitsz AM, Buxton A, Dunlap I, Chen Z, Radwanski P, **Weinberg SH**, and Veeraraghavan R, "A systematic investigation of the cardiac intercalated disk in health and disease."

2022 [63] **Microscopy & Microanalysis Annual Meeting**. July 31-August 4, 2022. Portland, Oregon. Struckman HL, Moise N‡, Soltisz A, Buxton A, Dunlap I, Chen Z, **Weinberg SH**, and Veeraraghavan R. "Indirect Correlative Light and Electron Microscopy (iCLEM) Coupled with

Computational Modeling Reveals the Nanoscale Basis of Functional Heterogeneities within the Heart."

[62] **Heart Rhythm Society Annual Meeting**, April 29-May 1, 2022. San Francisco, California. **Weinberg SH**, "Modeling of nanoscale structure and cell-cell coupling in cardiac tissue."

[61] **Heart Rhythm Society Annual Meeting**, April 29-May 1, 2022. San Francisco, California. Struckman HL, Moise N‡, Dagher C, Chen Z, **Weinberg SH**, and Veeraraghavan R, "Ultrastructural and Molecular Organization Determine Conduction Differences Between Atrial and Ventricular Working Myocardium."

[60] **American Mathematical Society (AMS) Spring Central Section Meeting**, March 26-27, 2022. Virtual Meeting. Moise N‡ and **Weinberg SH**, and, "Emergent Tissue Heterogeneity in a Calcium Feedback Regulatory Model of the Sinoatrial Node."

2021 [59] **Microscopy and Microanalysis Annual Meeting**, August 2-5, 2021. Virtual Meeting. Struckman HL, Moise N‡, Dagher C, **Weinberg SH**, and Veeraraghavan R, "Quantitative assessment of cardiac intercalated disk ultrastructure and molecular organization by indirect correlative light and electron microscopy."

[58] **Society for Mathematical Biology Annual Meeting**, June 13-17, 2021. Virtual Meeting. Moise N‡, Struckman HL, Dagher C, Veeraraghavan R, and **Weinberg SH**, "Intercalated disk nanoscale structure regulates cardiac conduction."

[57] **SIAM Conference on Dynamical Systems**, May 23-27, 2021. Virtual Meeting. Ly C and **Weinberg SH**, "Traveling wave dynamics in heterogeneous cardiac pacemaker tissue."

[56] **SIAM Conference on Dynamical Systems**, May 23-27, 2021. Virtual Meeting. Moise N‡, Struckman HL, Dagher C, Veeraraghavan R, and **Weinberg SH**, "Finite-element modeling of parametrically-defined cardiac intercalated disk nanodomain structure."

[55] **Biophysical Society Annual Meeting**, February 22-26, 2021. Virtual Meeting. Struckman HL, Moise N‡, Dagher C, **Weinberg SH**, and

Veeraraghavan R, “Quantitative assessment of cardiac intercalated disk ultrastructure and molecular organization by indirect correlative light and electron microscopy.”

[54] **Engineering in Healthcare: Industry and Research Symposium (EHIRS)**, February 26, 2021. Columbus, Ohio / Virtual Meeting. Hirway S†, Sofroniou M, Hassan N, Lemmon CA, and **Weinberg SH**, “Immunofluorescence image analysis pipeline for distinguishing epithelial-mesenchymal transition.”

[53] **Engineering in Healthcare: Industry and Research Symposium (EHIRS)**, February 26, 2021. Columbus, Ohio / Virtual Meeting. Nowak MB†, Poelzing S, and **Weinberg SH**, “Age-associated Ion Channel Localization and Expression Changes Regulate Cardiac Sodium Gain-of-Function.” **Won 3rd place in Graduate Platform Presentation Competition*

2020 [52] **American Heart Association Scientific Sessions**, November 13-17, 2020. Virtual Meeting. Wu X, Hoeker GS, Gourdie R, **Weinberg SH**, and Poelzing S. “Increased Extracellular Sodium and Intercellular Cleft Separation Synergistically Prolong Repolarization in the Long QT Syndrome Type 3.”

[51] **Biomedical Engineering Society (BMES) Annual Meeting**, October 14-17, 2020. Virtual Meeting. Mendez MJ†, Hoffman M, Cherry EM, Lemmon CA, and **Weinberg SH**, “A data assimilation approach for dual state-parameter estimation of epithelial-mesenchymal transition.”

[50] **Microscopy & Microanalysis Annual Meeting**, August 3-7, 2020. Virtual Meeting. Soltisz A, **Weinberg SH**, and Veeraraghavan R. “Binucleate Cell Atlasing: An Intracellular Object Localization Tool for Single-Cell Fluorescence Microscopy.”

[49] **SIAM Conference on the Life Sciences**, June 8-11,2020. Garden Grove, California. Ly C and **Weinberg SH**, “Analyzing heterogeneous cardiac pacemaker tissue models.” (conference cancelled)

[48] **SIAM Conference on the Life Sciences**, June 8-11, 2020. Garden Grove, California. Scott L, Griggs L, Narayanan V, Conway D, Lemmon CA, and **Weinberg SH**, “A predictive model of intercellular forces and cell-substrate mechanical interactions in a multicellular geometry.” Influence of

Cellular Geometry and Mechanics on Cell Signaling Mini-symposium. (conference cancelled)

[47] **SIAM Conference on the Life Sciences**, June 8-11, 2020. Garden Grove, California. Nowak M†, Poelzing S, and **Weinberg SH**, "Age-dependent regulation of cardiac sodium channel gain-of-function." Multiscale Modeling of Cardiac Dynamics Mini-symposium. (conference cancelled)

[46] **SIAM Conference on the Life Sciences**, June 8-11, 2020. Garden Grove, California. Phadumdeo V† and **Weinberg SH**, "Dual impact of subcellular calcium heterogeneity and heart rate variability on cardiac electromechanical dynamics." Multiscale Modeling of Cardiac Dynamics Mini-symposium. (conference cancelled)

[45] **Heart Rhythm Society Scientific Sessions.** May 6-9, 2020. San Diego, California. Wu X, Gourdie R, **Weinberg SH**, and Poelzing S. "Increased extracellular sodium and intercalated disc separation exacerbates the cardiac long-QT type 3 phenotype." (conference cancelled)

[44] **SIAM Conference on Mathematics of Data Science**, May 5-8, 2020. Cincinnati, Ohio. Hirway SU†, Hassan N, Lemmon CA, and **Weinberg SH**, "Immunofluorescence image feature analysis pipeline for distinguishing epithelial-mesenchymal transition." (conference cancelled)

[43] **SIAM Conference on Mathematics of Data Science**, May 5-8, 2020. Cincinnati, Ohio. Mendez MJ† and **Weinberg SH**, "Cell fate forecasting: a data assimilation approach to predict epithelial-mesenchymal transition." Merging Experimental Measurements with Numerical Simulations: Applications of Data Assimilation Mini-symposium. (conference cancelled)

[42] **Biophysical Society Annual Meeting**, February 15-19, 2020. San Diego, California. Mendez MJ†, Hoffman M, Cherry EM, Lemmon CA, and **Weinberg SH**, "Cell fate forecasting: a data assimilation approach to predict epithelial-mesenchymal transition."

2019 [41] **Biomedical Engineering Society (BMES) Annual Meeting**, October 16-19, 2019. Philadelphia, Pennsylvania. Nowak MB†, King R, Poelzing S, and **Weinberg SH**, "Age-dependent regulation of cardiac sodium gain of function."

[40] **Virginia Academy of Science Annual Meeting**, May 22-24, 2019. Norfolk, Virginia. Hirway S† and **Weinberg SH**. "Immunofluorescence image feature analysis and clustering pipeline for distinguishing epithelial-mesenchymal transition."

[39] **Virginia Academy of Science Annual Meeting**, May 22-24, Norfolk, Virginia. Phadumdeo V† and **Weinberg SH**. "Coupled influence of heart rate variability and subcellular calcium heterogeneity on cardiac electromechanical dynamics."

[38] **Biology and Medicine through Mathematics Conferences**, May 15-17, 2019. Richmond, Virginia. Ly C and **Weinberg SH**. "Analysis of heterogeneous cardiac pacemaker tissue models and traveling wave dynamics."

[37] **Biology and Medicine through Mathematics Conferences**, May 15-17, 2019. Richmond, Virginia. Mendez MJ†, Hoffman MJ, Cherry EM, Lemmon CA, and **Weinberg SH**. "Predicting TGF-β-induced epithelial-mesenchymal transition using data assimilation.

[36] **SIAM Conference on Applications of Dynamical Systems**, May 19-23, 2019. Snowbird, Utah. **Weinberg SH**, "Gap junctional and ephaptic coupling modulate repolarization in cardiac tissue." Mapping and Modeling Cardiac Electrical Dynamics and Arrhythmias Mini-symposium.

[35] **Ephaptic Coupling Conference**, May 5-7, 2019. Roanoke, Virginia. **Weinberg SH**, "Ephaptic coupling in pathophysiology: Sodium nanodomains and channel gain-of-function mutations."

[34] **Biophysical Society Annual Meeting**, March 2-6, 2019. Baltimore, Maryland. Mair DB, Perrone M, Zhu J, Elmasli C, **Weinberg SH**, and Li R "Cell migration on compliant substrates requires actin polymerization by the Arp2/3 complex." Cell Mechanics, Mechanosensing, and Motility Platform.

2018 [33] **Biomedical Engineering Society (BMES) Annual Meeting**, October 17-20, 2018. Atlanta, Georgia. Nowak MB†, Poelzing S, and **Weinberg SH**, "Intercellular sodium nanodomain signaling regulates repolarization in cardiac tissue."

[32] **Biology and Medicine through Mathematics Conferences**, May 30-June 1, 2018. Richmond, Virginia. Phadumdeo V[#] and **Weinberg SH**, "Effect of heart rate variability on electromechanical dynamics in cardiac tissue."

[31] **Biology and Medicine through Mathematics Conferences**, May 30-June 1, 2018. Richmond, Virginia. Scott LE[†], Griggs L, Narayanan V, Conway D, **Weinberg SH**, and Lemmon CA. "Regulation of cellular patterning through the extracellular matrix."

[30] **Biology and Medicine through Mathematics Conferences**, May 30-June 1, 2018. Richmond, Virginia. Comlekoglu T[#] and **Weinberg SH**, "Memory affects alternans under voltage- and calcium-mediated conditions in a fractional-order cardiomyocyte model."

[29] **Virginia Academy of Science Annual Meeting**, May 23-25, 2018. Longwood, Virginia. Phadumdeo V[#] and **Weinberg SH**, "Influence of heart rate variability on cardiac electromechanical dynamics." Biomedical and General Engineering track.

[28] **Virginia Academy of Science Annual Meeting**, May 23-25, 2018. Longwood, Virginia. Comlekoglu T[#] and **Weinberg SH**, "Memory influences instabilities in electrical rhythms in a fractional-order cardiomyocyte model." Biomedical and General Engineering track.

[27] **Virginia Academy of Science Annual Meeting**, May 23-25, 2018. Longwood, Virginia. Nowak M[†] and **Weinberg SH**, "Sodium nanodomains signaling regulates repolarization in cardiac tissue." Biomedical and General Engineering track.

[26] **SIAM Southeastern Atlantic Sectional Conference**, March 9-11, 2018. Chapel Hill, North Carolina. **Weinberg SH** and Lemmon CA, "Mesoscale modeling of the extracellular matrix." Innovations in Biomechanical Modeling of Cardiovascular and Pulmonary Physiology Mini-Symposium.

[25] **Biophysical Society Annual Meeting**, February 17-21, 2018. San Francisco, California. Mair DB, Zhu J, **Weinberg SH**, and Li R, "The

ARP2/3 complex is necessary for migration of glioblastoma cells on compliant substrates due to a lamellipodia-provided mechanical advantage."

2017 [24] **National Association of Medical Examiners Annual Meeting**, October 13-17, 2017. Scottsdale, Arizona. Wood K, **Weinberg SH**, and Weinberg M, "Death certification in northern Alberta: error occurrence rate and educational intervention." Hot Topics in Public Health Session.

[23] **National Association of Medical Examiners Annual Meeting**, October 13-17, 2017. Scottsdale, Arizona. Weinberg M, **Weinberg SH**, and Andrews J, "Medical Assistance in Dying – Early Experiences in Alberta, Canada." Hot Topics in Public Health Session.

[22] **Annual Scientific Meeting of the Canadian Association of Pathologists**, June 10-13, 2017. Charlottetown, Prince Edward Island. Wood K, **Weinberg SH**, and Weinberg M, "Death certification in northern Alberta: educational intervention."

[21] **SIAM Conference on Applications of Dynamical Systems**, May 21-25, 2017. Snowbird, Utah. Comlekoglu T# and **Weinberg SH**, "Fractional-order voltage dynamics suppresses alternans and promotes spontaneous activity in a minimal cardiomyocyte model." Initiation and Suppression of Excitation Waves Mini-symposium. Abstract

[20] **Biology and Medicine through Mathematics Conferences**, May 18-20, 2017. Richmond, Virginia. Comlekoglu T# and **Weinberg SH**, "Capacitive memory suppresses alternans and promotes spontaneous activity in a minimal cardiomyocyte model." Abstract

[19] **Discovery, Research, Innovation, and Education (DRIvE) Days Meeting**, University of Alberta, April 21-22, 2017. Edmonton, Alberta. Andrews J, **Weinberg SH**, and Weinberg M, "Alberta Physician Assistance in Dying: Review of Deaths During the First Year."

2016 [18] **IEEE International Conference on Big Data and Cloud Computing (BDCloud)**, October 8-10, 2016. Atlanta, George. Hao J, **Weinberg SH**, Li M, Wang J, and Li Y, "An Apache Spark implementation of the block power method for computing dominant eigenvalues and eigenvectors of large-scale matrices." Workshop on Applications of Big Data Science

(ABDS). Conference Proceedings

[17] **Biomedical Engineering Society (BMES) Annual Meeting**, October 5-8, 2016. Minneapolis, Minnesota. **Weinberg SH**, Bjergaard S, and Bursac N, "Intercalated disk localization of the inward rectifier current (IK1) modulates cardiac conduction." Cardiac Electrophysiology session.

[16] **SIAM Conference on the Life Sciences**, July 11-14, 2016. Boston, Massachusetts. **Weinberg SH**, "Spatial discordance and phase reversals in a discrete-time map model." Complex Cardiac Electrical Dynamics Mini-symposium.

[15] **Biology and Medicine through Mathematics Conferences**, May 20-22, 2016. Richmond, Virginia. Poelzing S, Greer-Short, **Weinberg SH**, "Using mathematical modeling to unmask the concealed nature of long QT-3 syndrome."

[14] **Virginia Academy of Science Annual Meeting**, May 17-20, 2016. Fredericksburg, Virginia. Mair DB[#], Petet T[†], Scott LE[†], **Weinberg SH**, and Lemmon CA. "A computational model of cell-generated traction forces and fibronectin assembly." Biomedical and General Engineering track.

2015 [13] **Biomedical Engineering Society (BMES) Annual Meeting**, October 7-10, 2015. Tampa, Florida. Mair DB[#], Petet T[†], **Weinberg SH**, and Lemmon CA. "A computational model of cell-generated traction forces and fibronectin assembly." Bioinformatics, Computational and Systems Biology track.

[12] **Society for Mathematical Biology Annual Meeting,** June 30-July 3, 2015. Atlanta, Georgia. **Weinberg SH** and Smith GD. "Calcium buffers do not suppress and may enhance calcium fluctuations in the cardiac dyadic subspace." Modeling Calcium Signaling in Cardiomyocytes Mini-Symposium.

[11] **International Symposium on Bioinformatics Research and Applications (ISBRA)**, June 7-10, 2015. Norfolk, Virginia. Ji H, Li Y, and **Weinberg SH**. "Calcium ion fluctuations alter channel gating in a stochastic luminal calcium release site model." Conference Proceedings published in the Lecture Notes in Computer Science series: *Bioinformatics Research and Applications.* eds. Harrison R, Li Y, and Mandoiu I.

Springer International Publishing.

[10] **Production and Operations Management Society (POMS) Annual Meeting**, May 8-11, 2015. Washington, DC. Diaz R, Behr J, **Weinberg SH**, and Palacio K. "Analyzing emergency department frequency utilizations for non-emergent demands." Program

[9] **Biophysical Society Annual Meeting,** February 7-11, 2015. Baltimore, Maryland. **Weinberg SH**. "Fluctuations in calcium concentration alter the temporal dynamics of calcium-dependent signaling cascades." Calcium Signaling Platform. Abstract

[8] **Biophysical Society Annual Meeting,** February 7-11, 2015. Baltimore, Maryland. Poelzing S, Entz M, and **Weinberg SH**. "Acute modulation of sodium channel biophysical properties using high-frequency stimulation." Large Scale Molecular Simulations Platform. Abstract

2014 [7] **Decision Sciences Institute Annual Meeting**, November 22-25, 2014. Tampa, Florida. Diaz R, Behr JG, and **Weinberg SH**. "Modeling chronic disease patient flows within a medical group." Challenges in Managing Capacity in Healthcare Session.

[6] **Frontiers in Applied and Computational Mathematics Annual Meeting**, May 22-23, 2014. Newark, New Jersey. **Weinberg SH** and Smith GD. "The influence of Ca^{2+} buffers on free [Ca^{2+}] fluctuations the effective volume of microdomains."

[5] **VMASC Modeling, Simulation, and Visualization Student Capstone Conference, Old Dominion University**, April 17, 2014. Suffolk, Virginia. Wang X, **Weinberg SH**, Hao Y, Sobie EA, and Smith GD. "Calcium homeostasis in a local/global whole cell model with a Langevin description of stochastic calcium release."

2013 [4] **Society for Mathematical Biology Annual Meeting**, June 10-13, 2013. Tempe, Arizona. **Weinberg SH** and Smith GD. "Influence of calcium concentration fluctuations on the dynamics of calcium-regulated calcium channels." Modeling Ionic Flows in Biological Cells Mini-symposium.

[3] **Biophysical Society Annual Meeting**, February 2-6, 2013. Philadelphia, Pennsylvania. **Weinberg SH** and Smith GD. "Calcium concentration fluctuations and subspace volume influence calcium-regulated calcium channel gating and subspace dynamics." Calcium-activated Channels Platform. Abstract

2012 [2] **Heart Rhythm Society Scientific Sessions.** May 11, 2012. Boston, Massachusetts. **Weinberg SH**. "Conduction block and defibrillation with high frequency electric field." Novel Mechanisms for Defibrillation Platform. Abstract

[1] **American Academy of Forensic Sciences Annual Scientific Meeting**, February 20-25, 2012. Atlanta, Georgia. Weinberg M, Weedn V, **Weinberg SH**, and Fowler D. "Characteristics of medical examiner/coroners offices currently accredited by the National Association of Medical Examiners."

Conference Poster Presentations (95)

* indicates authors contributed equally. Underline indicates the presenting author. #, †, and ‡ indicate undergraduate student, graduate student, and postdoctoral fellow under my advisement, respectively.

2025 [95] **Biophysical Society Annual Meeting,** February 15-19, 2025. Los Angeles, California. Moise N‡, Struckman H, Veeraraghavan R, and **Weinberg SH,** "Intercalated Disk Ion Channel and Gap Junction Distribution Regulate Tissue Conduction and Nanodomain Calcium Currents"

[94] **Biophysical Society Annual Meeting,** February 15-19, 2025. Los Angeles, California. Mendez MJ‡ and **Weinberg SH,** "Predicting cardiac myocyte electrophysiological response to hERG blockade using data assimilation."

2024 [93] **Cardiac Physiome Workshop**, September 12-14, 2024. Freiburg, Germany. Ivanovic-Sandt E, Moise N‡, Veeraraghavan R, **Weinberg SH**, Kucera J "Sodium depletion in intercalated disc cleft nanodomains and intercellular exchange of sodium ions between cardiomyocytes during ephaptic coupling: a model study."

[92] **Annual Meeting of the ESC Working Group on Cardiac Cellular Electrophysiology (EWGCCE),** July 1-3, 2024. Graz, Austria. Kucera J, Moise N‡, Veeraraghavan R, **Weinberg SH**, Ivanovic-Sandt E, "Sodium depletion in intercalated disc cleft nanodomains and intercellular exchange of sodium ions between cardiomyocytes during ephaptic coupling: a model study."

[91] **Biophysical Society Annual Meeting,** February 10-14, 2024. Philadelphia, Pennsylvania. Moise N‡ and **Weinberg SH,** "Atrial fibrillation initiation and organization in a mechanistic model of atrial remodeling and calcium homeostatic regulation."

[90] **Biophysical Society Annual Meeting,** February 10-14, 2024. Philadelphia, Pennsylvania. Miller J†, Moise N‡ and **Weinberg SH,** "Interplay between beta-adrenergic signaling and ion channel expression elucidate remodeling and arrhythmia risk in a simulated population of human ventricular myocytes with heart failure."

[89] **Biophysical Society Annual Meeting,** February 10-14, 2024. Philadelphia, Pennsylvania. Miller J†, Guerrelli D, Salameh S, Moise N‡, Posnack N, and **Weinberg SH,** "Changes in cardiac maturation from birth through adolescence: effects on cardiac electrophysiology."

2023 [88] **Gordon Research Conference: Cardiac Arrhythmia Mechanisms**, February 26 – March 3, 2023. Galveston, Texas. Salameh S, Guerrelli D, Miller J†, **Weinberg SH**, and Posnack N. "Changes in Cardiac Maturation from Birth Through Adolescence: Effects on Cardiac Electrophysiology".

[87] **Biophysical Society Annual Meeting**, February 18-22, 2023. San Diego, California. Mendez MJ†, Hoffman MJ, Cherry E, and **Weinberg SH**, "Reconstructing action potential and ionic current dynamics of a mammalian ventricular cell using data assimilation."

[86] **Biophysical Society Annual Meeting**, February 18-22, 2023. San Diego, California. Miller JA†, Moise N‡, and **Weinberg SH**, "Modeling incomplete penetrance in long QT syndrome type 3 (LQT3) through ion channel heterogeneity: an *in silico* study."

[85] **Biophysical Society Annual Meeting**, February 18-22, 2023. San Diego, California. Phadumdeo VM†, Mallare BL#, Hund TJ, and **Weinberg**

SH, “Data-drive, patient-specific simulations of long-term heart rate variability and cardiac alternans formation.”

2022 [84] **Basic Cardiovascular Sciences (BCVS) Scientific Sessions.** Chicago, Illinois, July 25-28, 2022. Wu X, King D, Hoeker G, Johnstone SR, Gourdie RG, **Weinberg SH**, and Poelzing S. “Age-dependent remodeling of the perinexus modulates the phenotype and arrhythmic risk of long QT syndrome type 3.”

[83] **Basic Cardiovascular Sciences (BCVS) Scientific Sessions.** Chicago, Illinois, July 25-28, 2022. Wu X, Hoeker G, Gourdie RG, **Weinberg SH**, and Poelzing S. “Long QT syndrome type 3 phenotype dependences on extracellular sodium and the perinexus in a genetic mouse model.”

[82] **Rising BME Scholars Regional Conference**. St. Louis, Missouri. June 22-24, 2022. Struckman HL, Moise N‡, Tarasov M, Soltisz AM, Buxton A, Dunlap I, Chen Z, Radwański PB, **Weinberg SH**, and Veeraraghavan R. “Reconstructing intercalated disk nanostructure and molecular organization to unravel conduction differences between atria and ventricles – A combined microscopy and modeling study.”

[81] **International Society for Heart Research (ISHR) World Congress**. June 12-15, 2022. Berlin, Germany. Struckman HL**,** Moise N, Tarasov M, Soltisz AM, Buxton A, Dunlap I, Chen Z, Radwański PB, **Weinberg SH**, and Veeraraghavan R. “Reconstructing intercalated disk nanostructure and molecular organization to unravel conduction differences between atria and ventricles – A combined microscopy and modeling study.”

[80] **Biophysical Society Annual Meeting**, February 19-23, 2022. San Francisco, California. Moise N‡, Struckman HL, Veeraraghavan R, and **Weinberg SH**, “Intercalated disk nanoscale structure and ion channel localization regulate cardiac conduction.”

[79] **Biophysical Society Annual Meeting**, February 19-23, 2022. San Francisco, California. Mendez MJ†, Hoffman MJ, Cherry E, Lemmon CA, and **Weinberg SH**, “A data assimilation approach to predict cell population epithelial-mesenchymal transition dynamics.”

[78] **Biophysical Society Annual Meeting**, February 19-23, 2022. San

Francisco, California. Hirway SU†, Lemmon CA, and **Weinberg SH**, "Multicellular mechanochemical hybrid Cellular Potts model of tissue formation during epithelial-mesenchymal transition."

[77] **Biophysical Society Annual Meeting**, February 19-23, 2022. San Francisco, California. Struckman HL, Moise N‡, Dunlap I, Chen Z, **Weinberg SH**, and Veeraraghavan R, "Conduction differences between atrial and ventricular working myocardium elucidated through previously unrecognized nanoscale structural organization."

[76] **Biophysical Society Annual Meeting**, February 19-23, 2022. San Francisco, California. Struckman HL, Moise N‡, Dunlap I, Chen Z, **Weinberg SH**, and Veeraraghavan R, "Coupling indirect correlative light and electron microscopy (iCLEM) with computational modeling to expand the physiologist's reach into the nanoscale."

2021 [75] **The EMT International Association (TEMTIA) 9.5 Meeting**, December 14-17, 2021. Virtual Meeting. Mendez MJ†, Hoffman M, Cherry EM, Lemmon CA, and **Weinberg SH**, "A data assimilation approach to predict cell population ephithelial-mesenchymal transition dynamics."

[74] **The EMT International Association (TEMTIA) 9.5 Meeting**, December 14-17, 2021. Virtual Meeting. Hirway S†, Hassan N, Sofroniou M, Lemmon CA, and **Weinberg SH**, "Immunofluorescence image analysis pipeline for distinguishing epithelial-mesenchymal transition."

[73] **American Heart Association Scientific Sessions**, November 13-15, 2021. Virtual Meeting. Moise N‡, Struckman HL, Veeraraghavan R, and **Weinberg SH.** "Intercalated disk nanoscale structure and ion channel distribution regulate cardiac conduction."

[72] **American Heart Association Scientific Sessions**, November 13-15, 2021. Virtual Meeting. Struckman HL, Moise N‡, Dunlap I, Chen Z, **Weinberg SH**, and Veeraraghavan R "Intercalated disk nanoscale structure and molecular organization underlies conduction differences between atria and ventricles."

[71] **Biophysical Society Annual Meeting**, February 22-26, 2021. Virtual Meeting. Wu X, Gourdie RG, Hoeker GS, **Weinberg SH**, and Poelzing S, "Age-dependent intercalated disc perinexal narrowing conceals long-QT

syndrome 3 phenotype."

[70] **Biophysical Society Annual Meeting**, February 22-26, 2021. Virtual Meeting. Hirway S†, Sofroniou M, Hassan N, Lemmon CA, and **Weinberg SH**, "Immunofluorescence image analysis pipeline for distinguishing epithelial-mesenchymal transition."

[69] **Biophysical Society Annual Meeting**, February 22-26, 2021. Virtual Meeting. Moise N‡, Struckman HL, Dagher C, Veeraraghavan R, and **Weinberg SH**, "Finite-Element Modeling of Parametrically-Defined Cardiac Intercalated Disk Nanodomain Structure."

[68] **Biophysical Society Annual Meeting**, February 22-26, 2021. Virtual Meeting. Mendez MJ†, Hoffman M, Cherry EM, Lemmon CA, and **Weinberg SH**, "Predicting epithelial-mesenchymal transition dynamics under specific perturbations using data assimilation."

[67] **Biophysical Society Annual Meeting**, February 22-26, 2021. Virtual Meeting. Nowak MB†, Poelzing S, and **Weinberg SH**, "Age-associated Ion Channel Localization and Expression Changes Regulate Cardiac Sodium Gain-of-Function."

[66] **Biophysical Society Annual Meeting**, February 22-26, 2021. Virtual Meeting. Phadumdeo VM† and **Weinberg SH**, "Dual impact of heart rate variability and subcellular calcium heterogeneity on cardiac alternans."

[65] **Engineering in Healthcare: Industry and Research Symposium (EHIRS)**, February 26, 2021. Columbus, Ohio / Virtual Meeting. Dagher C#, Struckman HL, Moise N‡, **Weinberg SH**, and Veeraraghavan R, "Analysis of transmission electron micrographs to quantify intercalated disk structure for computational modeling."

2020 [64] **Biomedical Engineering Society (BMES) Annual Meeting**, October 14-17, 2020. Virtual Meeting. Moise N‡, Veeraraghavan R, and **Weinberg SH**, "Finite-Element Modeling of Parametrically-Defined Cardiac Intercalated Disk Nanodomain Structure."

[63] **Microscopy & Microanalysis Annual Meeting**, August 3-7, 2020. Virtual Meeting. Dagher C, Struckman H, Moise N‡, **Weinberg SH**, and Veeraraghavan R. "Analysis of transmission electron micrographs to

quantify intercalated disk structure for computational modeling." (conference held virtually). *Won Best Poster Award.*

[62] **Biophysical Society Annual Meeting**, February 15-19, 2020. San Diego, California. Hirway SU†, Scott LE, Lemmon CA, and **Weinberg SH**, "A predictive model of multicellular mechanics and intracellular signaling during epithelial-mesenchymal transition."

[61] **Biophysical Society Annual Meeting**, February 15-19, 2020. San Diego, California. Phadumdeo VM† and **Weinberg SH**, "Dual effects of subcellular calcium heterogeneity and heart rate variability on cardiac electromechanical dynamics."

2019 [60] **OSU Center for Clinical and Translational Science (CCTS) Annual Scientific Meeting**, December 3, 2019. Columbus, Ohio. Hirway S†, Hassan N, Lemmon CA, and **Weinberg SH**, "Immunofluorescence image feature analysis and clustering pipeline for distinguishing epithelial-mesenchymal transition."

[59] **Biomedical Engineering Society (BMES) Annual Meeting**, October 16-19, 2019. Philadelphia, Pennsylvania. Mendez MJ†, Hoffman M, Cherry EM, Lemmon CA, and **Weinberg SH**, "Predicting TGF-beta-induced epithelial-mesenchymal transition dynamics."

[58] **Biomedical Engineering Society (BMES) Annual Meeting**, October 16-19, 2019. Philadelphia, Pennsylvania. Hirway S†, Hassan N, Lemmon CA, and **Weinberg SH**, "Immunofluorescence image feature analysis and clustering pipeline for distinguishing epithelial-mesenchymal transition."

[57] **Biomedical Engineering Society (BMES) Annual Meeting**, October 16-19, 2019. Philadelphia, Pennsylvania. Phadumdeo VM† and **Weinberg SH**, "Coupled influence of heart rate variability and subcellular calcium heterogeneity on cardiac electromechanical dynamics."

[56] **Biology and Medicine through Mathematics Conferences**, May 15-17, 2019. Richmond, Virginia. Nowak M†, King DR, Poelzing S, and **Weinberg SH**. "Age-dependent regulation of cardiac sodium channel gain of function."

[55] **Biology and Medicine through Mathematics Conferences**, May 15-

17, 2019. Richmond, Virginia. Hirway S†, Hassan N, Lemmon CA, and **Weinberg SH**. "Immunofluorescence image feature analysis and clustering pipeline for distinguishing epithelial-mesenchymal transition."

[54] **Biology and Medicine through Mathematics Conferences**, May 15-17, 2019. Richmond, Virginia. Phadumdeo VM† and **Weinberg SH**. "Coupled influence of heart rate variability and subcellular calcium heterogeneity on cardiac electromechanical dynamics."

[53] **Gordon Research Conference: Cardiac Arrhythmia Mechanisms**, March 31-April 5, 2019. Lucca, Italy. Nowak MB†, King DR, Poelzing S, and **Weinberg SH**, "Age-dependent regulation of cardiac sodium channel gain-of-function."

[52] **Biophysical Society Annual Meeting**, March 2-6, Baltimore, Maryland. Phadumdeo VM† and **Weinberg SH**, "Coupled influence of heart rate variability and subcellular calcium heterogeneity on cardiac electromechanical dynamics."

[51] **Biophysical Society Annual Meeting**, March 2-6, 2019. Baltimore, Maryland. Hirway S†, Hassan NT, Lemmon CA, and **Weinberg SH**, "Immunofluorescence image feature analysis and clustering pipeline for distinguishing epithelial-mesenchymal transition."

[50] **Biophysical Society Annual Meeting**, March 2-6, 2019. Baltimore, Maryland. Scott LE†, Lemmon CA, and **Weinberg SH**, "Junctional forces maintain isometric tension of the epithelial monolayer."

[49] **Biophysical Society Annual Meeting**, March 2-6, 2019. Baltimore, Maryland. Petet T†, Deal H, DeCastro A, Tang C, **Weinberg SH**, and Lemmon CA, "Substrate viscosity dictates cellular response."

[48] **Biophysical Society Annual Meeting**, March 2-6, 2019. Baltimore, Maryland. Nowak MB†, King DR, Poelzing S, and **Weinberg SH**, "Age-dependent regulation of cardiac sodium channel gain-of-function."

[47] **Biophysical Society Annual Meeting**, March 2-6, 2019. Baltimore, Maryland. Mendez MJ†, Hoffman M, Cherry E, Lemmon CA, and **Weinberg SH**, "Predicting TGF-beta-induced epithelial-mesenchymal

transition using data assimilation."

[46] **Cellular and Molecular Bioengineering Conference**, January 2-6, 2019. San Diego, California. Petet T†, Deal H, DeCastro A, Tang C, **Weinberg SH**, and Lemmon CA, "Substrate viscosity dictates cellular response."

2018 [45] **American Institute of Chemical Engineers (AIChE) Annual Meeting**, October 17-20, 2018. Atlanta, Georgia. Elmasli C, Mair DB, Perrone M, Zhu J, **Weinberg SH**, and Li R, "Cell migration on compliant substrates requires actin polymerization by the Arp2/3 complex."

[44] **Biomedical Engineering Society (BMES) Annual Meeting**, October 17-20, 2018. Atlanta, Georgia. Bui J and **Weinberg SH**, "Modeling the cell mechanochemical signaling in collective cell migration."

[43] **Biomedical Engineering Society (BMES) Annual Meeting**, October 17-20, 2018. Atlanta, Georgia. Petet T, Deal H, DeCastro A, Tang C, **Weinberg SH**, and Lemmon CA, "Substrate viscosity dictates cellular response."

[42] **Biomedical Engineering Society (BMES) Annual Meeting**, October 17-20, 2018. Atlanta, Georgia. Mendez MJ†, Lemmon CA, and **Weinberg SH**, "Modeling TGFβ-induced epithelial-mesenchymal transition dynamics."

[41] **Biomedical Engineering Society (BMES) Annual Meeting**, October 17-20, 2018. Atlanta, Georgia. Mair D, Perrone M, Zhu J, Elmasli C, **Weinberg SH**, and Li R, "The Arp2/3 complex is necessary for migration of glioblastoma cells in 2D on compliant substrates due to lamellipodia-provided mechanical advantages."

[40] **Biology and Medicine through Mathematics Conferences**, May 30-June 1, 2018. Richmond, Virginia. Mendez M† and **Weinberg SH**, "Critical parameters in a computational model of TGF-beta-induced epithelial-mesenchymal transition."

[39] **Biology and Medicine through Mathematics Conferences**, May 30-June 1, 2018. Richmond, Virginia. Nowak M† and **Weinberg SH**, "Intercellular sodium nanodomains signaling regulates repolarization in

cardiac tissue."

[38] **Virginia Academy of Science Annual Meeting**, May 23-25, 2018. Longwood, Virginia. Mendez M† and **Weinberg SH**, "Critical parameters in a computational model of TGF-beta-induced epithelial-mesenchymal transition."

[37] **Biophysical Society Annual Meeting**, February 17-21, 2018. San Francisco, California. Scott LE†, Lemmon CA, and **Weinberg SH**, "Cellular adhesions predict mobility propensities of EMT."

[36] **Biophysical Society Annual Meeting**, February 17-21, 2018. San Francisco, California. Comlekoglu T# and **Weinberg SH**, "Memory alters formation of voltage- and calcium-mediated alternans in a fractional-order cardiomyocyte model."

[35] **Biophysical Society Annual Meeting**, February 17-21, 2018. San Francisco, California. Phadumdeo V# and **Weinberg SH**, "Heart rate variability alters cardiac alternans and electromechanical dynamics."

[34] **Biophysical Society Annual Meeting**, February 17-21, 2018. San Francisco, California. Lemmon CA and **Weinberg SH**, "Multiple cryptic binding sites are necessary for robust fibronectin assembly."

2017 [33] **Society for Neuroscience Annual Meeting**, November 11-15, 2017. Washington, DC. Tremmel C, Sobreira F, **Weinberg SH**, and Krusienski DJ, "Development of a visual pathway model to optimize sensory stimuli for brain-computer interface."

[32] **VCU School of Engineering Undergraduate Research Symposium**, November 2, 2017. Richmond, Virginia. Gonzalez A# and **Weinberg SH**, "Modeling the dynamics of cell pair migration."

[31] **Biomedical Engineering Society (BMES) Annual Meeting**, October 11-14, 2017. Phoenix, Arizona. Comlekoglu T# and **Weinberg SH**, "Capacitive memory suppresses alternans, promotes spontaneous activity, and alters conduction in a fractional-order minimal cardiomyocyte model."

[30] **Biomedical Engineering Society (BMES) Annual Meeting**, October

11-14, 2017. Phoenix, Arizona. Phadumdeo V[#] and **Weinberg SH**, "Heart rate variability alters cardiac repolarization and electromechanical dynamics."

[29] **Biology and Medicine through Mathematics Conferences**, May 18-20, 2017. Richmond, Virginia. Phadumdeo V[#] and **Weinberg SH**, "Heart rate variability alters cardiac repolarization and electromechanical dynamics."

[28] **Discovery, Research, Innovation, and Education (DRIvE) Days Meeting**, University of Alberta, April 21-22, 2017. Edmonton, Alberta. Wood K, **Weinberg SH**, Weinberg M, "Death certification in northern Alberta: error categorization and occurrence rate based on physician specialty."

[27] **Discovery, Research, Innovation, and Education (DRIvE) Days Meeting**, University of Alberta, April 21-22, 2017. Edmonton, Alberta. Wood K, **Weinberg SH**, Weinberg M, "Death certification in northern Alberta: educational intervention."

[26] **Biophysical Society Annual Meeting**, February 11-15, 2017. New Orleans, Louisiana. Comlekoglu T[#] and **Weinberg SH**, "Capacitive memory suppresses alternans and promotes spontaneous activity in a fractional-order minimal cardiomyocyte model." *Won Undergraduate Poster Award.*

[25] **Gordon Research Conference: Cardiac Arrhythmia Mechanisms**, February 5-10, 2017. Ventura, California. Greer-Short A, Raisch T, Barrett S, **Weinberg SH**, and Poelzing S, "LQT3-associated arrhythmias are revealed and APD prolonged in edematous hearts."

2016 [24] **Biomedical Engineering Society (BMES) Annual Meeting**, October 5-8, 2016. Minneapolis, Minnesota. Mair D[#], Petet T[†], Scott LE[†], **Weinberg SH**, and Lemmon CA, "In vitro validation of a computational model of fibronectin assembly."

[23] **Biophysical Society Annual Meeting**, February 27-March 2, 2016. Los Angeles, California. Mair DB[#], Petet T[†], Scott LE[†], **Weinberg SH**, and Lemmon CA. "A computational model of cell-generated traction forces and fibronectin assembly."

[22] **Biophysical Society Annual Meeting**, February 27-March 2, 2016. Los Angeles, California. Poelzing S, Greer-Short A, Jessup D, and **Weinberg SH**. "Ephaptic self-attenuation conceals early afterdepolarizations associated with long QT-3 syndrome."

2015

[21] **Society for Mathematical Biology Annual Meeting**, June 30-July 3, 2015. Atlanta, Georgia. **Weinberg SH**, Scott LE†, Mair DB#, and Lemmon CA. "An elastic-stochastic model of cell-generated traction forces and extracellular matrix assembly." Abstract

[20] **Biophysical Society Annual Meeting**, February 7-11, 2015. Baltimore, Maryland. **Weinberg SH**, Scott LE†, Mair DB#, and Lemmon CA. "A computational model of cell-generated traction forces and fibronectin assembly." Abstract

2014

[19] **Society for Neuroscience Annual Meeting**, November 15-19, 2014. Washington, DC. **Weinberg SH** and Smith GD. "Calcium buffers do not suppress (but may enhance) intrinsic free calcium concentration fluctuations in calcium microdomains." Abstract

[18] **Society for Neuroscience Annual Meeting**, November 15-19, 2014. Washington, DC. Wang X, Hardcastle K, **Weinberg SH**, and Smith GD. "A population density and moment-based approach to modeling domain calcium-mediated inactivation of L-type calcium channels." Abstract

[17] **Nonlinear Dynamics and Stochastic Methods: From Neuroscience to Other Biological Applications Conference**, March 10-12, 2014. Pittsburg, Pennsylvania. **Weinberg SH** and Smith GD. "The influence of calcium buffers on free [Ca^{2+}] fluctuations and the effective volume of Ca^{2+} microdomains." Abstract

[16] **Biophysical Society Annual Meeting**, February 15-19, 2014. San Francisco, California. **Weinberg SH** and Smith GD. "Buffer- and diffusion-mediated calcium concentration fluctuations accelerate the stochastic dynamics of calcium-triggered events." Abstract

[15] **Biophysical Society Annual Meeting**, February 15-19, 2014. San Francisco, California. Wang X, Hardcastle K, **Weinberg SH**, and Smith

GD. "A population density and moment-based approach to modeling domain calcium-mediated inactivation of L-type calcium channels." Abstract

2013 [14] **Cardiac Physiome Workshop**, October 17-19, 2013. Bar Harbor, Maine. Wang X, Hao Y, **Weinberg SH**, Sobie EA, and Smith GD. "Calcium homeostasis in a local/global whole cell model with a Langevin description of stochastic calcium release."

[13] **Biomedical Engineering Society (BMES) Annual Meeting**, September 25-28, 2013. Seattle, Washington. **Weinberg SH** and Smith GD. "Fluctuations in calcium concentration influence calcium spark dynamics in cardiac myocytes." Program

[12] **Cold Spring Harbor Meeting on Computational Cell Biology**, March 19-22, 2013. Cold Spring Harbor, New York. **Weinberg SH** and Smith GD. "Influence of calcium buffers on concentration fluctuations and stochastic dynamics of calcium-triggered events."

[11] **Biophysical Society Annual Meeting**, February 2-6, 2013. Philadelphia, Pennsylvania. Hardcastle K, **Weinberg SH**, and Smith GD. "A population density domain model for calcium-inactivation of L-type calcium channels." Abstract

[10] **Biophysical Society Annual Meeting**, February 2-6, Philadelphia, Pennsylvania. Wang X, Hao Y, **Weinberg SH**, Sobie EA, and Smith GD. "Analysis of spark versus non-spark mediated SR calcium leak using a Langevin description of stochastic calcium release." Abstract

2012 [9] **Heart Rhythm Society Scientific Sessions.** May 11, 2012. Boston, Massachusetts. Chang KC*, **Weinberg SH***, Zhu R, Tandri H, Berger RD, Tung L, and Trayanova NA. "Degree of induced refractoriness predicts success of defibrillation by high frequency electric field." Abstract

2011 [8] **Gordon Research Conference: Cardiac Arrhythmia Mechanisms**, February 13 – 28, 2011. Galveston, Texas. **Weinberg S**, Chang KC, Zhu R, Tandri H, Trayanova NA, Berger RD, and Tung L, "Mechanisms of cardiac conduction block and arrhythmia termination by sinusoidal alternating current fields."

[7] **Gordon Research Conference: Cardiac Arrhythmia Mechanisms**, February 13 – 28, 2011. Galveston, Texas. Chang KC, **Weinberg S**, Zhu R, Tandri H, Berger RD, Tung L, and Trayanova NA, "Conduction block and arrhythmia termination in the whole heart by alternating current field stimulation."

2010 [6] **Maryland Stem Cell Research Symposium**, September 22, 2010. Gaithersburg, Maryland. Thompson S, Burridge P, **Weinberg S**, Zambidis E, and Tung L, "Human embryonic stem cell derived cardiomyocytes display functional calcium cycling and electrophysiological uniformity."

[5] **International Society for Stem Cell Research Annual Meeting**, June 16-19, 2010. San Francisco, California. Burridge P, Thompson S, Millrod M, Zhang H, Zou B, Yan W, **Weinberg S**, Li M, Tung L, and Zambidis E. "Efficient cardiac differentiation of human pluripotent stem cells for high throughput cardiotoxicity screening."

[4] **Heart Rhythm Society Scientific Sessions**, May 12-15, 2010. Denver, Colorado. **Weinberg SH**, Tandri H, Chang KC, Trayanova NA, Berger RD, and Tung L. "High frequency field stimulation terminates reentry and blocks cardiac conduction." Abstract

2009 [3] **Gordon Research Conference: Cardiac Arrhythmia Mechanisms**, February 15-20, 2009. Lucca, Italy. **Weinberg SH**, Malhotra N, and Tung L, "Hypothermia augments calcium and action potential alternans in cardiomyocyte monolayers."

2008 [2] **American Heart Association Scientific Sessions**, November 8-12, 2008. New Orleans, Louisiana. Edmonds S, Sekar R, Molitoris J, **Weinberg SH**, Limpitikul W, Malhotra N, Eaton B, and Tung L, "Overexpression of connexin43 reverses loss of conduction velocity in an in vitro, anisotropic model of interstitial cardiac fibrosis." Abstract

2006 [1] **Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine X, SPIE Photonics West**, January 23-25, 2006. San Jose, California. Sarunic MV, **Weinberg S**, Applegate BE, Ellerbee AK, and Izatt JA, "Full-field swept-source phase microscopy."

Invited University, Department, and Institute Seminars (32)

2025 [32] **School of Biomedical Sciences Seminar, University of Leeds**, September 10, 2025. Leeds, United Kingdom. “Ion Channel Expression, Feedback, and Homeostasis: A Long-Term Balancing Act.”

2023 [31] **Johann Radon Institute for Computational and Applied Mathematics (RICAM)**, October 26, 2023. Linz, Austria. “Quantifying uncertainty in cardiac conduction: experiments and models”. Seminar in the “Uncertainty Quantification in Biomedical Applications” Training School Program.

[30] **Center for Computational and Applied Mathematics Seminar, Purdue University**, October 2, 2023. West Lafayette, Indiana. “Modeling of nanoscale structure and cell-cell coupling in cardiac tissue”

2022 [29] **Mathematical Biology Seminar, University of British Columbia**, April 20, 2022. Vancouver, British Columbia. “Multiscale modeling of tissue formation during epithelial-mesenchymal transition”

[28] **University of California Davis Cardiovascular Symposium**, March 25-26, 2022. Davis, California. “Subcellular structural remodeling in cardiovascular disease: Modeling studies”

2021 [27] **Mathematical Biology Seminar, New Jersey Institute of Technology**, November 17, 2021. Newark, New Jersey. “Modeling of nanoscale structure and cell-cell coupling in cardiac tissue”

[26] **Children’s National Heart Institute Seminar, Children’s National Hospital**, September 21, 2021. Washington, D.C. “Mechanisms underlying age-associated manifestation of cardiac sodium channel gain-of-function”

[25] **Biomedical Engineering Department Seminar, Rutgers University**, March 22, 2021. New Brunswick, New Jersey. “Cell fate forecasting: a data assimilation approach to predict epithelial-mesenchymal transition”

[24] **Davis Heart and Lung Research Institute (DHLRI), The Ohio State Wexner Medical Center**, January 15, 2021. Columbus, Ohio. “Heart rate variability: what is it good for?”

2020 [23] **International Society for Heart Research (ISHR) Cardiovascular Webinar Series**, May 26, 2020. Virtual Seminar. “Revealing the concealed nature of sodium channelopathies.”

[22] **Biophysics Graduate Program Seminar, The Ohio State University**, April 17, 2020. Columbus, Ohio. “Cell fate forecasting: a data assimilation approach to predict epithelial-mesenchymal transition.”

2019 [21] **Biomathematics Initiative Seminar, The College of William & Mary**, February 8, 2019. Williamsburg, Virginia. “Regulation of sodium nanodomain signaling in cardiac tissue.”

2018 [20] **Kavli Institute of Theoretical Physics (KITP) Program on Integrative Cardiac Dynamics, University of California, Santa Barbara**, July 3, 2018. Santa Barbara, California. “Sodium signaling at the intercalated disk.”

[19] **Mathematics Department Seminar, Rochester Institute of Technology**, April 17, 2018. Rochester, New York. “Biophysical modeling of intercellular nanodomain signaling.”

[18] **Biomedical Engineering Department Seminar, The Ohio State University**, March 8, 2018. Columbus, Ohio. “Between two cells: intercellular nanodomain signaling in cardiac tissue.”

[17] **Cell Biology Department Seminar, The Johns Hopkins University**, February 8, 2018. Baltimore, Maryland. “Mesoscale modeling of extracellular matrix assembly and mechanotransduction.”

[16] **Pharmacological Sciences Department Seminar, Icahn School of Medicine at Mount Sinai**, January 11, 2018. New York, New York. “Between two cells: the critical role of intercellular nanodomain signaling in cardiac tissue.”

2017 [15] **Engineering Graduate Student Association (EGSA) Seminar, Virginia Commonwealth University**, December 1, 2017. Richmond, Virginia. “Between two cells: the critical role of intercellular signaling in cardiac tissue.”

[14] **NSF-REU Program in Extremal Graph Theory and Dynamical**

Systems, Rochester Institute of Technology, July 17-18, 2017. Rochester, New York. "Modeling cellular and multicellular cardiac signaling." *Invited faculty scholar-in-residence.*

[13] **Biomedical Engineering Department Seminar, University of Texas at San Antonio**, April 21, 2017. San Antonio, Texas. "Revealing the concealed nature of long QT syndrome."

[12] **Physiology and Biophysics Department Seminar, Virginia Commonwealth University**, February 9, 2017. Richmond, Virginia. "Revealing the concealed nature of long QT syndrome: cardiac tissue microstructure regulation of a sodium channelopathy phenotype."

2016

[11] **Mathematics Department Seminar, Virginia Commonwealth University**, September 30, 2016. Richmond, Virginia. "Fractional-order differential equation models of the Hodgkin-Huxley neuron."

2015

[10] **Virginia Tech Carilion Research Institute Seminar, Virginia Polytechnic Institute and State University**, October 16, 2015. Roanoke, Virginia. "Multiscale and stochastic computational modeling."

[9] **Computer Science Department Seminar, Old Dominion University**, September 11, 2015. Norfolk, Virginia. "Solving a large (and sparse) matrix eigenvector problem for the analysis of calcium microdomain signaling." Abstract

[8] **Electrical & Computer Engineering Department Seminar, Old Dominion University**, September 4, 2015. Norfolk, Virginia. "Development of an elastic-stochastic computational model of extracellular matrix assembly and fibrosis." Abstract

2014

[7] **Mathematics Department Workshop on Mathematical and Statistical Modeling with Applications in Epidemiology, Social and Health Sciences, Norfolk State University**, April 25, 2014. Norfolk, Virginia. "Markov chains and fluctuations in calcium signaling." Program

[6] **Computational Cardiology Seminar, The Johns Hopkins University**, April 15, 2014. Baltimore, Maryland. "Modeling calcium fluctuations in calcium microdomains."

2013 [5] **Mathematics Department Seminar, Virginia Commonwealth University**, September 13, 2013. Richmond, Virginia. "Modeling stochastic dynamics of calcium signaling."

[4] **Biomedical Engineering Department Seminar, Virginia Commonwealth University,** April 17, 2013. Richmond, Virginia. "Modeling of the stochastic dynamics of intracellular calcium in cardiac myocytes."

2012 [3] **Biomathematics Initiative Seminar, The College of William & Mary**, September 21, 2012. Williamsburg, Virginia. "Discrete-state stochastic models of calcium-regulated calcium influx and subspace dynamics."

[2] **Applied Science Department Seminar, The College of William & Mary**, March 28, 2012. Williamsburg, Virginia. "A novel paradigm for cardiac defibrillation using high frequency electric fields."

2010 [1] **Biomedical Engineering Department Student Seminar, The Johns Hopkins University,** November 19, 2010. Baltimore, Maryland. "Cardiac conduction block and arrhythmia termination using alternating current field stimulation."

Invited Symposium, Center, and University Presentations (8)

2025 [8] **Center for Ethics and Human Values (CEHV) CARE Panel, The Ohio State University,** December 1, 2025. Columbus, Ohio. "The End of Animal Models for Preclinical Research?"

[7] **Smart Vehicles Center (SVC) IUCRC Advisory Meeting, The Ohio State University,** May 8, 2025. Columbus, Ohio. "Update on the College of Engineering, Research, Industry Partnerships, and the Strategic Importance of Mobility Innovation."

[6] **Center for Automative Research (CAR) External Advisory Board, The Ohio State University,** April 4, 2025. Columbus, Ohio. "Welcome and Update from the College of Engineering."

[5] **Center for Industrial Metal Forming (CIMF) IUCRC Advisory Meeting, The Ohio State University,** March 11, 2025. Columbus, Ohio. "Update on the College of Engineering, Research, and Industry

Partnerships."

[4] **Manufacturing & Materials Joining Innovation Center (Ma2JIC) IUCRC Advisory Meeting, The Ohio State University,** February 11, 2025. Columbus, Ohio. "Update on the College of Engineering, Research, Industry Partnerships, and the Impact of Materials and Manufacturing Innovation."

2024 [3] **Sustainable Aviation Forum, The Ohio State University,** October 16, 2024. Columbus, Ohio. "Welcome and Introduction."

[2] **Center for Automative Research (CAR) External Advisory Board, The Ohio State University,** October 4, 2024. Columbus, Ohio. "Update from the College of Engineering."

[1] **Center for Automative Research (CAR) External Advisory Board, The Ohio State University,** April 12, 2024. Columbus, Ohio. "Update from the College of Engineering."

Patents, Issued (3) and Pending (0)

2023 [3] "Method and Device for Treating Cardiac Arrhythmias," Tandri H, Berger RD, **Weinberg SH**, Tung L, Halperin H, Hunter D. Application US 17/342,405. US Patent 11,717,694 B2. Filed June 8, 2021. Published on September 23, 2021. Issued on August 8, 2023.

2021 [2] "Method and Device for Treating Cardiac Arrhythmias," Tandri H, Berger RD, **Weinberg SH**, Tung L, Halperin H, Hunter D. Application US 15/826,498. US Patent 11,052,261 B2. Filed November 29, 2017. Published on March 29, 2018. Issued on July 6, 2021.

2020 [1] "Method and Device for Treating Cardiac Arrhythmias," Tandri H, Berger RD, **Weinberg SH**, Tung L, Halperin H, Hunter D. Application US 14/604,457. US Patent 10,532,216 B2. Filed January 23, 2015. Published on September 17, 2015. Issued on January 14, 2020.

HONORS AND AWARDS

2024 Elected as Fellow, American Heart Association (FAHA)

2022 Elected as Fellow, Heart Rhythm Society (FHRS)

2011 Young Investigators Poster Competition 3rd prize, Gordon Research Conference: Cardiac Arrhythmia Mechanisms

2006 Howard G. Clark Award, for distinguished undergraduate research

2005 Center for Emerging Cardiac Technologies (CECT) fellowship for undergraduate research

Tau Beta Pi, Engineering National Honor Society

TEACHING

F and *S* denote the **F**all and **S**pring semester, respectively, and two-digit years are shown for brevity.
* denotes a new course that I developed or an existing course with significantly updated curriculum
# denotes a co-taught course

Instructor

Biomedical Engineering Department, The Ohio State University

BME 2700 Numerical Simulations in Biomedical Engineering* – F20#, F21#, S22#, F22#, S23#, F23
BME 5001 Cardiovascular Engineering – F21#
BME 5194.05 Advanced Numerical Methods and Modeling in BME* – S21, F22
BME 8811-4 Biomedical Engineering Seminar – F20, S21, F21, S22, F22, S23, F23

Biomedical Engineering Department, Virginia Commonwealth University

EGRB 601 Numerical Methods and Modeling in Biomedical Engineering* - F18
EGRB 215 Computational Methods in Biomedical Engineering I - F16, F17, S19

Applied Science Department, The College of William & Mary

APSC 490/690 MATLAB for Biologists and Neuroscientists* – F13

Independent Study Advisor

Biomedical Engineering Department, The Ohio State University

BME 4999H BME Undergraduate Honors Thesis Research (Ross Aiello) – S24
BME 4998 Undergraduate Research in BME (Grace Yan) – S24
BME 4998 Undergraduate Research in BME (Rhea Supekar) – S23, F23, S24
BME 4998 Undergraduate Research in BME (Jacob Miller) – F20
BME 4998 Undergraduate Research in BME (Brianna Mallare) – F21

Biomedical Engineering Department, Virginia Commonwealth University

ENGR 492 Independent Study in Engineering (Tien Comlekoglu) – S17

Guest Lecturer

Biomedical Engineering Department, The Ohio State University

BME 2200 Quantitative Principles of Cellular and Molecular Systems – F23, S24, F24, S25, S26

Biomedical Engineering Department, The Ohio State University

BME 5001 Cardiovascular Engineering – F19, S21, F23, F24, S26

Biomedical Engineering Department, The Ohio State University

BME 5560 Biomedical Engineering Applications in Cancer Biology – F21, S23, S24

Biomedical Engineering Department, Virginia Commonwealth University

EGRB 303 Biotransport Processes – S18, S19

Biomedical Engineering Department, *Old Dominion University*

BME 401/501 Biomedical Engineering I: Principles – F15

Modeling, Simulation & Visualization Engineering Department, *Old Dominion University*

MSIM 602 Simulation Fundamentals – F15

Applied Science Department, *The College of William & Mary*

APSC 351/651 Cellular Biophysics and Modeling – S13

MENTORING

Post-doctoral Research Associates Advised

2024 Vrishti Phadumdeo – Biomedical Engineering, OSU

2023-2025 Mario Mendez – Biomedical Engineering, OSU

2020-2024 Nicolae Moise – Biomedical Engineering, OSU

- American Heart Association (AHA) Post-Doctoral Fellowship (2022-2023): "Regulation of Cardiac Conduction by Intercalated Disk Nanoscale Structure"
- Mini-symposium organizer at 2022 SIAM Life Sciences meeting
- Travel Award for 2023 Biophysical Society Annual Meeting
- Finalist for DHLRI Postdoc of the Year (2023)

PhD Students Advised

2024-present Richard Sui – Biophysics, OSU

2024-present Gabriella Ellks – Biomedical Engineering, OSU

- Recipient of OSU College Graduate Fellowship (2024-2025)

2018-2023 Vrishti Phadumdeo – Biomedical Engineering, OSU

- Thesis: “Fluctuations in Heart Rate Influence Cardiac Arrhythmic Propensity: A Translational Investigation”
- DHLRI Graduate Student of the Year Winner (2023)

2018-2022 Shreyas Hirway – Biomedical Engineering, OSU

- Thesis: “Multiscale Modeling and Image Analysis of Epithelial Tissues and Cancer Dynamics”

2017-2023 Mario Mendez – Biomedical Engineering, OSU

- Thesis: “A Data-Assimilation Approach to Predict Cellular Dynamics”

2017-2021 Madison Nowak – Biomedical Engineering, OSU

- Thesis: “Novel *In Silico* Models to Predict Pro-Arrhythmic Triggers in Ventricular Tissue with a Sodium Channel Gain-of-Function”

2016-2019 Lewis Scott - Biomedical Engineering, VCU (Christopher Lemmon, co-advisor)

- Thesis: “Mechanochemical Regulation of Epithelial Tissue Remodeling: A Multiscale Computational Model of the Epithelial-Mesenchymal Transition Program”

Thesis MS Students Advised

2024- Katherine Flannery – Biomedical Engineering, OSU

- Recipient of the Rittgers Scholarship in Biomedical Engineering

2022-2023 Madeline Dulaney – Biophysics, OSU (Rengasayee Veeraraghavan, co-advisor)

- Thesis: “Voltage gated sodium channel beta-subunits”

2021-2022 Jacob Miller – Biomedical Engineering, OSU

- Thesis: “Modeling incomplete penetrance in long QT syndrome type 3 (LQT3) through ion channel heterogeneity”

2018-2019 Navpreet Saini – Biomedical Engineering, VCU

- Thesis: “Cell type and substrate dependence of fibronectin properties and mechanotransduction”

Non-Thesis MS Students Advised

2022-2023 Noah Steele – Biomedical Engineering, OSU

Undergraduate Students Advised

2026-present Camryn Bir – Biomedical Engineering, OSU

2025-present Keirstin Trehan – Biomedical Engineering, OSU

2025-present Eric Boykin – Biomedical Engineering, OSU

2023-2025 Grace Yan – Computer Science, OSU

2023-2024 Ross Aiello – Biomedical Engineering, OSU

- Undergraduate Honors Thesis: “Computational Modeling of Ion Channel Clustering in Cardiac Cellular Membrane”

2023 Alsidiq Shammet – Mechanical Engineering, University of Texas at Dallas

- 2023 BUCKEYE REU participant

2023 AJ Liss – Biomedical Engineering, Northwestern University

2022-2025 Rhea Supekar – Computer Science, OSU

- Undergraduate Honors Thesis: “Using Data-Assimilation to Predict Drug Perturbations”

2022-2024 Richard Sui – Physics, OSU

2022-present Andrea Castelblanco Agostini, Mechanical Engineering, University of Puerto Rico Mayagüez

- 2022 BUCKEYE REU participant

2020-2021 Celine Dagher – Biomedical Engineering, OSU

2020-2021 Jacob Miller – Biomedical Engineering, OSU

- Second-Year Transformational Experience Program (STEP) Undergraduate Research participant

2020-2023 Brianna Mallare – Biomedical Engineering, OSU

2018-2019 Michelle Nguyen – Biomedical Engineering, VCU

- 2018 VCU Honors Summer Undergraduate Research Program (HSURP) participant
- Currently PhD student in Biomedical Engineering at Johns Hopkins

2018-2019 Christine Sirota – Biomedical Engineering, VCU

2018 Justin Bui – Chemical Engineering and Computer Science, UC Berkeley

- 2018 VCU Undergraduate Summer Research Program on Mechanobiology of Disease and Nanomedicine participant

2017-2018 Ana Gonzalez – Biomedical Engineering, VCU

2017-2018 Julia Smith – Biomedical Engineering, VCU

2017 Jarrod Cartwright - Biomedical Engineering, VCU

2016-2018 Tien Comlekoglu - Biomedical Engineering, VCU

- Received VCU Honors College Travel Awards ($500 each) for the 2017 and 2018 *Biophysical Society Annual Meetings*, and the 2017 *Biomedical Engineering Society Annual Meeting*
- Won the Undergraduate Poster Award at the 2017 *Biophysical Society Annual Meeting* ($100 prize)
- 2017 VCU Honors Summer Undergraduate Research Program

(HSURP) participant ($2000 stipend)
- Invited to participate in 2018 *RIT Undergraduate Workshop on Dynamics of Excitable Systems* ($300 stipend, travel expenses)
- Won an Honorable Mention for the Best Student Presentation at the 2018 *Virginia Academy of Sciences Annual Meeting – Biomedical & General Engineering Session*
- Currently MD/PhD student at University of Virginia

2016-2018 Vrishti Phadumdeo - Biomedical Engineering, VCU
- Received VCU Honors College Travel Award ($500 each) for the 2017 *Biomedical Engineering Society Annual Meeting* and the 2018 *Biophysical Society Annual Meeting*
- Invited to participate in 2018 *RIT Undergraduate Workshop on Dynamics of Excitable Systems* ($300 stipend, travel expenses)

2016-2017 Anderson Scott - Biomedical Engineering, VCU

Research Scientist / Associate Supervised

2025-present Mario Mendez – Biomedical Engineering, OSU

2024-present Nicolae Moise – Biomedical Engineering, OSU
- American Heart Association (AHA) Career Development Award (2025-2028): "Mechanistic modeling of atrial tissue remodeling and atrial fibrillation progression"

2023 Salvatore Sidoti – Biomedical Engineering, OSU (Thomas Hund, co-supervisor)

2022-2024 Jacob Miller – Biomedical Engineering, OSU

Career / Professional Mentorship

2021-2023 Davis Heart & Lung Research Institute (DHLRI) Post-Doctoral Career Advisory Program Mentor (*Caymen Novak, mentee*)

Mentoring Training

2021 Drake Institute for Teaching and Learning Endorsement for Research Mentoring Training, OSU

2021 "Better Mentoring = Better Science" Mentoring Workshop, OSU College of Engineering

PhD Candidacy Committees

2025 Alexander Winkle, Biomedical Engineering, OSU (*Thomas Hund, advisor*)

2024 Madison Ammon, Biophysics Graduate Program, OSU (*Rengasayee Veeraraghavan, advisor*)

2023 Sydney Anderson, Biomedical Engineering, OSU (*Aleks Skardal, advisor)*
2023 Jon Fritz, Biophysics Graduate Program, OSU (*Samir Ghadiali, advisor)*
2023 Seulhee Kim, Biomedical Engineering, OSU (*Lufang Zhang, advisor)*
2022 Alexandra Janowski, Biomedical Engineering, OSU (*Rebecca Vanderpool, advisor)*
2022 Andrew Soltisz, Biomedical Engineering, OSU (*Rengasayee Veeraraghavan, advisor)*
2022 Louisa Mezache, Biomedical Engineering, OSU (*Rengasayee Veeraraghavan, advisor)*
2022 Dorma Flemister, Biomedical Engineering, OSU (*Samir Ghadiali, advisor)*
2022 Rebecca Shaheen, Biomedical Engineering, OSU (*Thomas Hund, advisor)*

PhD Dissertation Committees

2024 Alexandra Janowski, Biomedical Engineering, OSU (*Rebecca Vanderpool, advisor*
2024 Seulhee Kim, Biomedical Engineering, OSU (*Lufang Zhang, advisor)*
2023 DeAnalisa Jones, Pharmacology and Therapeutics Discovery, Icahn School of Medicine at Mount Sinai (*Eric Sobie, advisor)*
2023 Julie Han, Biomedical Engineering, George Washington University (*Emilia Entcheva, advisor)*
2023 Heather Struckman, Biomedical Engineering, OSU (*Rengasayee Veeraraghavan, advisor)*
2023 Andrew Soltisz, Biomedical Engineering, OSU (*Rengasayee Veeraraghavan, advisor)*
2023 Louisa Mezache, Biomedical Engineering, OSU (*Rengasayee Veeraraghavan, advisor)*
2022 Thomas Petet, Biomedical Engineering, VCU (*Christopher Lemmon, advisor)*
2021 Ben Scandling, Biomedical Engineering, OSU (*Keith Gooch, advisor)*
2020 Thien-Khoi Phung, Biomedical Engineering, University of Virginia (*Jeffrey Holmes, advisor)*
2019 Patrick Link, Biomedical Engineering, VCU (*Rebecca Heise, advisor)*
2018 Lauren Griggs, Biomedical Engineering, VCU (*Christopher Lemmon, advisor)*
2018 Fernando Sobreira, Biomedical Engineering, Old Dominion University (*Dean Krusienski, advisor*)
2016 Hao Ji, Computer Science, Old Dominion University (*Yaohang Li, advisor*)

MS Dissertation Committees

2021 Ketan Fernandes, Biomedical Engineering, OSU (*Keith Gooch, advisor*)
2021 Alexander Winkle, Biomedical Engineering, OSU (*Thomas Hund, advisor*)

Undergraduate Honors Committees

2025 Logan Schneider, Biomedical Engineering, OSU (*Aleks Skardal, advisor)*
2023 Aneesh Zutshi, Biomedical Engineering, OSU (*Aleks Skardal, advisor)*
2021 Jane Yu, Biomedical Engineering, OSU (*Thomas Hund, advisor*)
2014 Wendy Herbst, Biology, The College of William & Mary (*Margaret Saha, advisor*)
2013 Kiah Hardcastle, Neuroscience, The College of William & Mary (*Gregory Smith, advisor*)

SERVICE

PROFESSIONAL SERVICE

Reviewer for Scientific Journals

Acta Biotheoretica
Advances in Experimental Biology and Medicine
American Journal of Physiology: Heart and Circulatory Physiology
Annals of Biomedical Engineering
Arrhythmia and Electrophysiology Review
Biocybernetics and Biomedical Engineering
Bioelectrochemistry
Biomechanics and Modeling in Mechanobiology
Biophysical Journal
BMC Bioinformatics
Chaos
Communications in Nonlinear Science and Numerical Simulation
Computational and Mathematical Methods in Medicine
Computer Methods in Biomechanics and Biomedical Engineering
Computers in Biology and Medicine
Current Protocols
Differential Equations and Dynamical Systems
eLife
Europace
European Biophysics Journal
Frontiers in Pharmacology
Frontiers in Computational Neuroscience

Frontiers in Genetics
Frontiers in Molecular Biosciences
Frontiers in Physiology
Heart Rhythm O2
iScience
Journal of the American College of Cardiology (JACC): Basic to Translational Science
Journal of Clinical Medicine
Journal of Computational Science
Journal of Membrane Biology
Journal of Molecular and Cellular Cardiology
Journal of Physiology
Journal of Theoretical Biology
Journal of the Royal Society of Medicine Cardiovascular Disease
Mathematical Biosciences
Mathematical Biosciences and Engineering
Matrix Biology
Microscopy and Microanalysis
Multiscale Modeling and Simulation
Neural Computation
Pflugers Archiv – European Journal of Physiology
PLOS Computational Biology
Proceedings of the National Academy of Sciences (PNAS)
Physical Biology
Physical Review E
Physical Review Letters (PRL)
Physical Review Research (PRR)
Physiological Measurement
Science Advances
Scientific Reports
IEEE Transactions on Biomedical Engineering
IEEE/ACM Transactions on Computational Biology and Bioinformatics
IEEE Transactions on NanoBioscience

Reviewer for Grant Proposals

2025 National Institutes of Health (NIH), Special Emphasis Panel (UM1), *ad-hoc reviewer*

Wellcome Fund, Discovery Award Program, *reviewer*

2024 American Heart Association (AHA); Bioengineering, Career Development

Award (CDA), *reviewer*

National Science Foundation (NSF); SBIR, *ad-hoc reviewer*

2023 Israel Science Foundation (ISF), Israel; *ad-hoc reviewer* for the Personal Research Grants Program

2022 Marsden Fund, New Zealand; Cellular, Molecular and Physiological Biology Panel, *ad-hoc reviewer*

National Science Foundation (NSF); CCF, *ad-hoc reviewer*

National Institutes of Health (NIH); Intercellular Interactions (ICI) Study Section, *ad-hoc reviewer*

2021 National Science Foundation (NSF); CMMI, *ad-hoc reviewer*

National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP), *reviewer*

2020 American Heart Association (AHA); Basic Sciences 1, Career Development Award (CDA), *reviewer*

2019 Medical Research Council (MRC), United Kingdom, *ad-hoc reviewer*

2017 National Science Foundation (NSF); CBET, *ad-hoc reviewer*

The Jeffress Trust Awards Program in Interdisciplinary Research

2016 United States-Israel Binational Science Foundation (BSF)

Editorial Board Member

2024-present *American Journal of Physiology: Heart and Circulatory Physiology*
2022-present *Frontiers in Physiology: Cardiac Electrophysiology*
2021-present *Frontiers in Network Physiology: Networks in the Cardiovascular System*
2014-present *Frontiers in Physiology: Computational Physiology and Medicine*

Guest Editor

2017 *Clinical Medicine Insights: Cardiology,* Special issue on "Calcium Dynamics and Cardiac Arrhythmias"
2023 *PLoS Computational Biology*

Professional Societies

2017-2019 Virginia Academy of Science, *Member*
Biomedical & General Engineering Section Chair (2017-2019)
2015-present Society for Industrial and Applied Mathematics, *Member*

2012-present Biomedical Engineering Society, *Member*
Society for Mathematical Biology, *Member*
2011-present Biophysical Society, *Member*
Public Affairs Committee, Member (2015-2021)
Education Committee, Member (2016-2022)
Membership Committee, Member (2022-2028)
Bioengineering Subgroup, *Chair-Elect (2023-2024), Chair (2024-2025)*
2010-present Heart Rhythm Society, *Member*
Elected as *Fellow* (2022)
2009-present American Heart Association, *Member*
Elected as *Fellow* (2024)

Professional Service Roles for Scientific Meetings

2026 **Netflux and Network Biology Conference**. January 7, Virtual. Program Committee member.

2025 **FASEB Science Research Conferences: Ion Channel Regulation**, August 3-7, Southbridge, Massachusetts. Session chair, Panelist.

Biophysical Society Annual Meeting, February 15-19, Los Angeles, California. Travel Award reviewer, Session chair.

UC Davis Cardiovascular Symposium, February 14-15, Davis, California. Panelist.

2024 **Biophysical Society Annual Meeting**, February 10-14, Philadelphia, Pennsylvania. Travel Award reviewer.

2023 **Society for Mathematical Biology Annual Meeting,** July 16-July 21, Columbus, Ohio. Mini-symposium organizer, Session chair.

Biophysical Society Annual Meeting, February 18-22, San Diego, California. Travel Award reviewer.

2022 **International Symposium on Bioinformatics Research and Applications (ISBRA)**, November 14-17, Haifa, Israel. Program committee member, Abstract reviewer.

Biophysical Society Annual Meeting, February 19-23, San Francisco, California. Travel Award reviewer.

2021 **Annual Biomedical Research Conference for Minority Students (ABRCMS),** November 10-13, Virtual Meeting. Abstract reviewer.

Biomedical Engineering Society (BMES) Annual Meeting, Oct 6-9, Orlando, Florida. Abstract reviewer.

Society for Mathematical Biology Annual Meeting, June 13-17, Riverside, California / Virtual Meeting. Mini-symposium organizer, Session chair.

Engineering in Healthcare: Industry and Research Symposium (EHIRS), February 26, Columbus, Ohio / Virtual Meeting. Graduate poster judge.

Biophysical Society Annual Meeting, February 21-26, Virtual Meeting. Travel Award reviewer.

2020 **International Symposium on Bioinformatics Research and Applications (ISBRA)**, December 1-4, Moscow, Russia. Program committee member, Abstract reviewer.

Annual Biomedical Research Conference for Minority Students (ABRCMS), November 9-13, Virtual Meeting. Abstract reviewer.

Biomedical Engineering Society (BMES) Annual Meeting, Oct 14-17, Virtual Meeting. Abstract reviewer.

SIAM Conference on the Life Sciences, June 8-11, Garden Grove, California. Mini-symposium organizer, Session chair (conference cancelled)

UC Davis Cardiovascular Symposium, February 19-21, Davis, California. Panelist.

Biophysical Society Annual Meeting, February 15-19, San Diego, California. Travel Award reviewer, Session chair.

2019 **Biomedical Engineering Society (BMES) Annual Meeting**, Oct 16-19, Philadelphia, Pennsylvania. Abstract reviewer, Session chair.

International Symposium on Bioinformatics Research and Applications (ISBRA), June 3-6, Barcelona, Spain. Program committee member, Abstract reviewer.

SIAM Conference on Applications of Dynamical Systems, May 19-23, Snowbird, Utah. Mini-symposium organizer, Session chair.

Ephaptic Coupling Conference, May 5-7, Roanoke, Virginia. Conference co-organizer, Session chair.

Gordon Research Conference: Cardiac Arrhythmia Mechanisms, March 31-April 5, Lucca, Italy. Poster award judge.

Biophysical Society Annual Meeting, March 2-6, Baltimore, Maryland. Education Travel Award reviewer, Session chair, Poster award judge.

2018 **Biomedical Engineering Society (BMES) Annual Meeting**, Oct 17-20, Atlanta, Georgia. Abstract reviewer, Session chair.

International Symposium on Bioinformatics Research and Applications (ISBRA), June 8 - 11, Beijing, China. Program committee member, Abstract reviewer.

Biophysical Society Annual Meeting, February 17-21, San Francisco, California. Education Travel Award reviewer, Session chair.

2017 **Biomedical Engineering Society (BMES) Annual Meeting**, Oct 11-14, Phoenix, Arizona. Abstract reviewer, Session chair, Poster award judge.

International Symposium on Bioinformatics Research and Applications (ISBRA), May 29-June 1, Honolulu, Hawaii. Program committee member, Abstract reviewer.

SIAM Conference on Applications of Dynamical Systems, May 21-25, Snowbird, Utah. Mini-symposium organizer, Session chair.

Biophysical Society Annual Meeting, Feb 11-15, New Orleans, Louisiana. Education Travel Award reviewer.

2016 **American Heart Association (AHA) Scientific Sessions**, November 12-

16, New Orleans, Louisiana. Abstract reviewer.

Biomedical Engineering Society (BMES) Annual Meeting, October 5-8, Minneapolis, Minnesota. Rapid Resume workshop reviewer.

International Symposium on Bioinformatics Research and Applications (ISBRA), June 5-8, Minsk, Belarus. Program committee member, Abstract Reviewer.

Virginia Modeling, Analysis and Simulation Center (VMASC) Student Capstone Conference, April 14, Suffolk, Virginia. Abstract reviewer.

2015 **Society for Mathematical Biology Annual Meeting,** June 30-July 3, Atlanta, Georgia. Mini-symposium organizer, Session chair.

International Symposium on Bioinformatics Research and Applications (ISBRA), June 7-10, Norfolk, Virginia. Program committee member, Abstract Reviewer, Session chair.

Virginia Modeling, Analysis and Simulation Center (VMASC) Student Capstone Conference, April 16, Suffolk, Virginia. Abstract reviewer.

Professional Mentorship

Society for Mathematical Biology. *Mentorship Program for Junior Scientists*.
Mentor to:

2023 Chris Heggerud, postdoctoral fellow at University of California, Davis
2021 Ashley Schwartz, graduate student at San Diego State University
2015 Erik Palmer, graduate student at the University of South Carolina
2013 Maryam Khan, undergraduate at Northeastern Illinois University

Miscellaneous Professional Service

2017 Scholar-in-residence, *Research Experiences for Undergraduates (REU) for Mathematics, Rochester Institute of Technology*
2015 Virginia representative at the *Rally for Medical Research Capitol Hill Day*, September 16-17, Washington, D.C. Meetings with Congressional offices to promote funding for biomedical research. Biophysical Society Blog Post

UNIVERSITY SERVICE

Service to The Ohio State University (OSU):
Biomedical Engineering Department Service

2021-2024 Graduate Studies Committee, *Associate Chair*
2020-2023 Faculty Search Committee, *member*
2020-2021 Cancer Engineering Faculty Recruitment and Screening Committee, *member*
2020-2024 Executive Committee, *member*
2019-2020 Clinical Faculty Search Committee, *member*
2019-2024 Appointments, Promotions, and Tenure (AP&T) Committee, *member*
2019-2024 Biomedical Engineering Research Committee (BERC), *member; Chair (2020-2024)*

Davis Heart & Lung Research Institute (DHLRI) Service

2021 Judge for the *DHLRI Research Day*
2020-present Education Committee*, member; Chair (2023-2025)*
2019 Judge for the *DHLRI Research Day*

College of Engineering & Graduate School Service

2025 Assistant Dean for Faculty Lifecycle (ADFL) Search Committee, *Chair*
2024-present Center for Industrial Metal Forming (CIMF) IUCRC Academic Policy Committee, *member*
2024-present AIM for Composites EFRC Advisory Board, *member*
2024-present Ohio Water Resources Center Advisory Board, *member*
2024-present College of Engineering Research Committee, *Chair*
2022 Undergraduate Research Forum, abstract judge
2022 Hayes Graduate Research Forum, presentation judge
2021-2022 Undergraduate Honors Committee, *member*
2021-2023 Recruitment and Retention Committee, *member*
2021 Graduate Faculty Representative (GFR) for the Ph.D. candidacy exam for *J. Butchacas.* Plant Physiology. February 17.
2019 Graduate Faculty Representative (GFR) for the Ph.D. defense for *J. Maroli.* Electrical and Computer Engineering. November 19.

University Service

2025-present Harnessing Advanced Manufacturing & Innovation Collaboration (HamiCo) Board of Directors, *member*
2025-present Clinical and Translational Data Science T32 Executive Committee, *member*
2025 Director of Research Development Search, Research Development Office, ERIK, *interview panel member*
2025-present OSU-Honda Partnership Leadership Review Team, *member*

2024-present OSU Comprehensive Cancer Center (CCC) Internal Advisory Board, *member*
2024-present Research Security Governance Board, *member*
2024-2025 Working Group on Public Access to Sponsored Research Data*, member*
2024 Center for Clinical and Translational Science (CCTS) Strategic Planning Steering Committee, *member*
2024-present Translational Data Analytics Institute (TDAI) Internal Advisory Board, *member*
2021 University Fellowship Review Committee, *member*

Leadership Training

2023 Academic Leadership Series (OSU Office of Academic Affairs)

Service to Virginia Commonwealth University (VCU):
Biomedical Engineering Department Service

2017-2018 Faculty Search committee, *member*
2017-2018 Graduate Admission committee, *member*
2017-2019 Affiliate Faculty committee, *committee chair*
2017-2019 Seminar Selection committee, *member*
2016-2019 Organizer of monthly Grant Proposal reviews

College of Engineering Service

2017 Grade Appeal Review Committee, *member and rotating chair*
2017 Judge for the *Undergraduate Research Symposium*
2017 Judge for the *Annual Graduate Student Symposium and Exhibit*

University Service

2017-2020 CCTR Endowment Fund Research Advisory Committee, *member*
2017 Reviewer for *VCU Presidential Research Quest (PeRQ) Fund*