

Rengasayee (Sai) Veeraraghavan

Nanocardiology Lab

Principal Investigator

Associate Professor, Department of Biomedical Engineering
Davis Heart & Lung Research Institute
The Ohio State University

Who am I? I am, in equal parts, a biomedical engineer, a cardiac physiologist, and a microscopist. My team and I are working to understand how protein nano-machines – structures 10,000 times smaller than the width of human hair – contribute to the spread of electrical signals through the heart. The goal of this research is to develop novel treatments to prevent life-threatening arrhythmias (irregular heartbeats). In pursuing this scientific mission, we are often challenged by the limits of current microscopy and image analysis methods. Therefore, the efforts of my laboratory are divided between cardiac research and the development of new imaging and image analysis techniques.

Research Interests: Cardiac electrophysiology ▪ Arrhythmia mechanisms ▪ Action potential Propagation ▪ Super-resolution microscopy ▪ Computational image analysis ▪ Gap Junctions ▪ Ion channels ▪ Indirect correlative light & electron microscopy (*iCLEM*)

CONTACT

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EDUCATION/TRAINING

2011	Ph.D. in Biomedical Engineering University of Utah, Salt Lake City, UT
2005	B.Tech in Chemical Engineering Anna University, Chennai, India. (Ranked 11 th among >6000 Chem Engg. graduates.)

EMPLOYMENT

2022 –	Associate Professor, Dept. of Biomedical Engineering, The Ohio State University, OH
2017 – 2022	Assistant Professor, Dept. of Biomedical Engineering, The Ohio State University, OH
2016 – 2017	Research Assistant Professor, The Virginia Tech Carilion Research Institute, VA
2014 – 2016	Research Associate, The Virginia Tech Carilion Research Institute, VA
2012 – 2014	Postdoctoral Research Associate, The Virginia Tech Carilion Research Institute, VA
2011 – 2012	Postdoctoral Research Fellow, Math Biology Group, University of Utah, UT
2005 – 2011	Graduate Research Assistant, Dept. of Biomedical Engineering, University of Utah, UT

AWARDS & HONORS

2022	Lumley Interdisciplinary Research Award (along with Drs. Przemysław Radwański, Sandor Györke) from the Ohio State University College of Engineering.
2021	Lumley Research Award from the Ohio State University College of Engineering.
2020	Strategic Initiative Award (\$20,000) from the Microscopy Society of America to fund microscopy-based education outreach.
2017	George Palade Award for distinguished contributions to the field of microscopy and microanalysis in the life sciences, Microscopy Society of America
2017	Young Investigator Award (Basic Science) from the Cardiac Electrophysiology Society

2015 BCVS Travel Grant, AHA Scientific Sessions 2015
 2015 Outstanding Postdoctoral Platform Presentation - Runner Up, 2015 VTCRI Annual Retreat
 2013 Award for Best Oral Presentation, International Gap Junction Conference 2013
 2013 Postdoctoral Research Fellowship for 2013-15, American Heart Association
 2013 The Clinical Research Award in Honor of Mark Josephson and Hein Wellens for 2013-14, Heart Rhythm Society (Declined)
 2013 Travel Award, Gordon Research Conference on Cardiac Arrhythmia Mechanisms 2013
 2011 Travel Award, International Gap Junction Conference 2011.

RESEARCH SUPPORT

Ongoing:

NIH R01	Veeraraghavan (PI)	07/01/20-06/30/25
Targeting Vascular Leak and Intercalated Disk Nanodomains to Prevent Atrial Fibrillation		
NIH R01	Veeraraghavan (Co-I)	03/01/19-06/30/23
Controlled and uncontrollable calcium release in heart		
NIH R01	Veeraraghavan (Co-I)	03/01/20-02/28/25
Abnormal intracellular calcium release in heart failure		
NIH R01	Veeraraghavan (Co-I)	09/01/21-08/31/26
Regulation and dysregulation of cardiac EC coupling by calmodulin		
NIH R01	Veeraraghavan (Co-I)	12/01/21-11/30/26
Defining novel mechanisms of sudden death in Dravet syndrome: Dysregulation of sodium channels in the heart		
NIH R01	Veeraraghavan (Co-I)	09/01/21-08/31/26
Regulation and dysregulation of sodium channels by calmodulin		
NIH R01HL141855-01	Veeraraghavan (Subcontract)	07/01/18-06/30/22
The Role of the Sodium Channel Beta Subunit in Cardiac Conduction		

Completed

AHA Transformative Project Grant	Veeraraghavan (PI)	01/01/21-12/31/21
(Relinquished due to overlap with R01)		
Preventing Atrial Fibrillation by Preserving the Vascular Barrier and Intercalated Disk Nanodomains		
AHA Transformative Project Grant	Veeraraghavan (Co-I)	07/01/19-12/31/21
(Relinquished due to overlap with R01)		
A novel therapeutic paradigm for arrhythmogenic calmodulinopathy		
AHA Scientist Development Grant	Veeraraghavan (PI)	07/01/16-06/30/19
Modulation of cardiomyocyte ultrastructure by vascular barrier function - a novel mechanism for atrial arrhythmias		

PUBLICATIONS

Peer-reviewed Publications (h-index: 17, 912 citations)

Tarasov M*, Struckman HL*, Olgar Y*, Soltisz AM, Miller A, Bogdanov V, Györke S, **Veeraraghavan R**, Radwański PB. Nav1.6 dysregulation within myocardial T-tubules by D96V calmodulin enhances proarrhythmic sodium/calcium mishandling. J Clin Invest. 2021 [In revision] *Co-first authors.

Ortega-Pineda L, Sunycz A, Rincon-Benavides MA, Salazar- Puerta AI, Alzate-Correa D, Mezache L, Struckman HL, Duarte-Sanmiguel S, Deng B, Dodd D, Lawrence W, Moore J, **Veeraraghavan R**, Nelson MT, Gallego-Perez D, Higuera-Castro. Designer extracellular vesicles modulate pro-neuronal cell responses and improve intracranial retention. Adv Healthc Mater. 2022 Mar;11(5):e2100805.

Bogdanov V*, Soltisz AM*, Moise N, Ivanova M, Andreev I, Skuta G, Weinberg SH, Davis JP, **Veeraraghavan R**†, Györke S†. Distributed synthesis of sarcolemmal and sarcoplasmic reticulum membrane proteins in cardiac myocytes. Basic Res Cardiol. 2021 Oct 28;116(1):63. *Co-first authors. †Co-corresponding authors.

Strauss RE, Mezache L, **Veeraraghavan R**, Gourdie RG. The Cx43 Carboxyl-Terminal Mimetic Peptide alphaCT1 Protects Endothelial Barrier Function in a ZO1 Binding-Competent Manner. Biomolecules 2021, 11(8), 1192.

Moise N, Struckman HL, Dagher C, **Veeraraghavan R**, Weinberg SH. Intercalated disk nanoscale structure regulates cardiac conduction. J Gen Physiol. 2021 Aug 2;153(8):e202112897.

Mezache L, Struckman HL, Greer-Short A, Baine S, Györke S, Radwański PB, Hund TJ, **Veeraraghavan R**. Vascular Endothelial Growth Factor Promotes Atrial Arrhythmias by Inducing Acute Intercalated Disk Remodeling. Sci Rep. 2020 Nov 24. 10 (1), 1-14.

Baine S, Thomas J, Bonilla I, Ivanova M, Li J, **Veeraraghavan R**, Radwański PB, Carnes C, Györke S. Muscarinic-dependent PKG phosphorylation of the cardiac ryanodine receptor is mediated by PI3K/AKT/nNOS Signaling. J Biol Chem. 2020 Aug 14;295(33):11720-11728.

Munger MA, Olgar Y, Koleske M, Struckman HL, Mandroli J, Lou Q, Bonilla I, Kim K, Mondragon RR, Priori SG, Volpe P, Valdivia HH, Biskupiak J, Carnes CA, **Veeraraghavan R**, Györke S, Radwański PB. Tetrodotoxin-sensitive neuronal-type Na⁺ Channels: A Novel and Druggable Target for Prevention of Atrial Fibrillation. J Am Heart Assoc. 2020 Jun 2;9(11):e015119.

Struckman HL, Baine S, Thomas J, Mezache L, Mykytyn K, Györke S, Radwański PB, **Veeraraghavan R**. Super-resolution Imaging Using Novel High Fidelity Antibody Reveals Close Association of Neuronal Sodium Channel Nav1.6 with Ryanodine Receptors in Cardiac Muscle. Microsc Microanal. 2020 Jan 14:1-9.

Bonilla IM, Belevych AE, Baine S, Stepanov A, Mezache L, Bodnar T, Liu B, Volpe P, Priori S, Weisleder N, Sakuta G, Carnes CA, Radwański PB, **Veeraraghavan R***, Györke S. Enhancement of Cardiac Store Operated Calcium Entry (SOCE) within Novel Intercalated Disk Microdomains in Arrhythmic Disease. Sci Rep. 2019 Jul 15;9(1):10179. *Co-corresponding author

Veeraraghavan R*, Hoeker GS, Alvarez-Laviada A, Hoagland D, Wan X, King DR, Sanchez-Alonso J, Chen C, Jourdan J, Isom LL, Deschenes I, Smyth J, Gorelik J, Poelzing S, Gourdie RG. The adhesion function of the sodium channel beta subunit (β1) contributes to cardiac action potential propagation. Elife. 2018 Aug 14;7:e37610. *Co-corresponding author

Koleske M, Bonilla I, Thomas J, Zaman N, Baine S, Knollmann B, **Veeraraghavan R**, Györke S, Radwański PB, TTX-sensitive Nav Contribute to Early and Delayed Afterdepolarizations in Long QT Arrhythmia Models, J Gen Physiol. 2018 Jul 2;150(7):991-1002.

Raisch TB, Yanoff MS, Larsen TR, Farooqui MA, King DA, **Veeraraghavan R**, Gourdie RG, Baker JW, Arnold WS, AlMahameed ST, Poelzing S. Intercalated Disc Extracellular Nanodomain Expansion in Patients with Atrial Fibrillation. Front Physiol. 2018 May 4;9:398.

Veeraraghavan R*, Lin J, Keener JP, Gourdie RG, Poelzing S. Potassium Channels in the Cx43 Gap Junction Perinexus Modulate Ephaptic Coupling: An Experimental and Modeling Study, Pflugers Arch. 2016 Oct;468(10):1651-61. *Co-corresponding author

Veeraraghavan R*, Gourdie RG. Stochastic Optical Reconstruction Microscopy-based Relative Localization Analysis (STORM-RLA) for Quantitative Nanoscale Assessment of Spatial Protein Organization. Mol Biol Cell. 2016 Nov 7;27(22):3583-3590. *Co-corresponding author

Radwański PB, Ho HT, **Veeraraghavan R**, Brunello L, Liu B, Belevych AE, Unudurthi SD, Makara MA, Priori SG, Volpe P, Armondas AA, Dillmann WH, Knollmann BC, Mohler PJ, Hund TJ, Györke S. Neuronal Na⁺ Channels Are Integral Components of Pro-Arrhythmic Na⁺/Ca²⁺ Signaling Nanodomain That Promotes Cardiac Arrhythmias During β -Adrenergic Stimulation. *JACC Basic Transl Sci*. 2016 Jun;1(4):251-266.

Veeraraghavan R, Lin J, Hoeker GS, Keener JP, Gourdie RG, Poelzing S. Sodium Channels in the Cx43 Gap Junction Perinexus May Constitute a Cardiac Ephapse: An Experimental and Modeling Study, *Pflügers Arch*. 2015 Oct;467(10):2093-105.

Radwański PB, Brunello L, **Veeraraghavan R**, Ho H, Lou Q, Makara MA, Belevych AE, Anghelescu M, Priori SG, Volpe P, Hund TJ, Janssen PM, Mohler PJ, Bridge JH, Poelzing S, Györke S. Neuronal Na⁺ Channel Blockade Suppresses Arrhythmogenic Diastolic Ca²⁺ Release. *Cardiovasc Res*. 2015 Apr 1;106(1):143-52.

Veeraraghavan R, Larsen AP, Torres NS, Grunnet M, Poelzing S. Potassium channel activators differentially modulate the effect of sodium channel blockade on cardiac conduction. *Acta Physiol (Oxf)*. 2013 Feb;207(2):280-9.

Veeraraghavan R, Salama M, Poelzing S. Interstitial Volume Modulates the Conduction Velocity- Gap Junction Relationship. *Am J Physiol Heart Circ Physiol*. 2012 Jan 1;302(1):H278-86.

Radwański P, **Veeraraghavan R**, Poelzing S. Cytosolic Calcium Accumulation and Delayed Repolarization Associated with Ventricular Arrhythmias in Guinea Pig Model of Andersen-Tawil Syndrome, *Heart Rhythm*. 2010 Oct;7(10):1428-1435. Epub 2010 Apr 7.

Poelzing S, Smoot A, **Veeraraghavan R**, Novel X-Ray Attenuation Mechanism: Role of Inter-Atomic Distance, *Med Phys*. 2008 Oct; 35(10):4386-4395.

Veeraraghavan R, Poelzing S. Mechanisms Underlying Increased Right Ventricular Conduction Sensitivity to Flecainide Challenge. *Cardiovasc. Res*. 2008 Mar 1;77(4):749-56. Epub 2007 Dec 4

Poelzing S, **Veeraraghavan R**. Heterogeneous Ventricular Chamber Response to Hypokalemia and Inward Rectifier Potassium Channel Blockade underlies Bifurcated T-wave in Guinea Pig, *Am J Physiol Heart Circ Physiol*, 2007 Jun;292(6):H3043-51. Epub 2007 Feb 16.

Book Chapters

Veeraraghavan R, Hund, T.J. 2020. Oxidant-Induced Models of Vascular Leak. Pages 95-108, In: *Measuring Oxidants and Oxidative Stress in Biological Systems*. Editors: Berliner LJ and Parinandi NL. Springer Publishers, New York, New York.

Kodali, S.T., Kotha, S.R., Kufmann, P.A., Yenigalla, A., **Veeraraghavan R**, Pannu, S., Hund, T.J., Satoskar, A.R., McDaniel, J., Parinandi, N.L. 2020. Oxidative Lipidomics - Analysis of Oxidized Lipids and Lipid Peroxidation in Biological Systems with Relevance to Health & Disease. Pages 61-94, In: *Measuring Oxidants and Oxidative Stress in Biological Systems*. Editors: Berliner LJ and Parinandi NL. Springer Publishers, New York, New York.

Editorials & Reviews

Veeraraghavan R, Moise N, Weinberg SH. Sodium channels and the intercalated disk - it is all about location, location, location. *J Physiol*. 2021 Nov;599(21):4735-4736.

Radwański PB, Johnson CN, Györke S, **Veeraraghavan R**. Cardiac Arrhythmias as Manifestations of Nanopathies: An Emerging View. *Front Physiol*. 2018 Sep 4;9:1228.

Veeraraghavan R*, Radwański P. Sodium channel clusters: harmonizing the cardiac conduction orchestra, *J Physiol*. 2018 Feb 15;596(4):549-550. *Corresponding author

Veeraraghavan R, Györke S, Radwański P. Neuronal Sodium Channels: Emerging Components of the Nano-machinery of Cardiac Calcium Cycling, *J Physiol*. 2017 Jun 15;595(12):3823-3834. Epub 2017 Mar 26.

Veeraraghavan R, Poelzing S, Gourdie RG. Novel ligands for zipping and unzipping the intercalated disk: today's experimental tools, tomorrow's therapies? *Cardiovasc Res*. 2014 Nov 1;104(2):229-30. Epub 2014 Oct 03.

Veeraraghavan R, Poelzing S, Gourdie RG. Intercellular electrical communication in the heart: a new, active role for the intercalated disk. *Cell Commun Adhes*. Epub 2014 Apr 15.

Veeraraghavan R, Poelzing S, Gourdie RG. Old Cogs, New Tricks: A Scaffolding Role For Connexin43 And A Junctional Role For Sodium Channels? *FEBS Lett*. Epub 2014 Jan 28.

Veeraraghavan R, Gourdie RG, Poelzing S. Mechanisms of Cardiac Conduction: A History of Revisions. *Am J Physiol Heart Circ*

Physiol. 2014 Mar;306(5):H619-27. Epub 2014 Jan 10.

Rhett JM*, **Veeraraghavan R***, Poelzing S, Gourdie RG. The Perinexus: Sign-Post on the Path to a New Model of Cardiac Conduction? Trends Cardiovasc. Med 2013. Epub 2013 Mar 11.

Patents

Mezache L, **Veeraraghavan R**, Compositions and Methods for Treating Atrial Fibrillation. Pending; filed May 2021.

Poelzing S, **Veeraraghavan R**, Smoot A, X-ray attenuating compositions and methods. U.S. Patent 8808668; filed April 2009.

Poelzing S, **Veeraraghavan R**, Raisch R. Automatic Centerline Isolation and Continuous Width Measurements Between Two Edges. U.S. Patent Application No: 62/405,554 filed 10/7/2016.

Gourdie RG, **Veeraraghavan R**, Poelzing S. Pharmacologic Targeting of Cell Adhesion to Modulate Conduction. U.S. Patent Application No: 62/299,817 filed 02/25/2016.

Veeraraghavan R, Gourdie RG. Two Novel Methods for the Assessment of Relative Protein Localization from Three Dimensional Single Molecule Localization Data. U.S. Patent Application No: 62/295,672 filed 02/16/2016.

PROFESSIONAL MEMBERSHIPS

Heart Rhythm Society (since 2006) ▪ American Heart Association (since 2006) ▪ Cardiac Electrophysiology Society (since 2006) ▪ Biophysical Society (since 2010) ▪ Microscopy Society of America (since 2016; Education-Outreach Committee Chair 2018-2020, Education-Outreach Committee Member 2017-present)

PRESENTATIONS

Invited Presentations

Veeraraghavan R. Leveraging correlative multi-modal multi-scale microscopy to understand the heart in health and disease, Gordon Research Conference on Liquid Phase Electron Microscopy, 2022. [To be presented]

Veeraraghavan R. Variability in Channel Isoform Expression Determines Pathology and Drug Response. Heart Rhythm 2022.

Veeraraghavan R. Inflammation-induced vascular leak and progression of AF. American Heart Association Annual Scientific Sessions, 2021.

Veeraraghavan R, Struckman HL. Linking Cardiac Nanostructure and Molecular Organization to Function, Webinar organized by Bruker Fluorescence Microscopy Inc, 2021.

Veeraraghavan R. Confocal Imaging to Characterize Structural Underpinnings of Local Calcium Entry Events, Heart Rhythm 2021.

Veeraraghavan R. Targeting Vascular Leak and Intercalated Disk Nanodomains to Prevent Atrial Fibrillation, American Heart Association Annual Scientific Sessions, 2020.

Veeraraghavan R. Confocal Imaging to Characterize Local Calcium Entry Events, Heart Rhythm 2020.

Veeraraghavan R. Structural Changes in Sodium Channel-Rich Nanodomains Contribute to the Progression of Atrial Fibrillation, Microscopy & Microanalysis 2018.

Greert-Short A, Hund TJ, **Veeraraghavan R**. Structural Changes in Sodium Channel-Rich Nanodomains Contribute to the Progression of Atrial Fibrillation, Microscopy & Microanalysis 2018.

Veeraraghavan R, Hoeker GS, Alvarez-Laviada A, Wan X, Deschenes I, Smyth J, Gorelik J, Poelzing S, Gourdie RG. STORM and TEM Identify the Cardiac Ephapse: An Intercalated Disk Nanodomain with Previously Unanticipated Functions in Cardiac Conduction, Microscopy & Microanalysis 2017.

Veeraraghavan R. Integrating Imaging Tools From Single Molecule to Whole Organ Scales to Investigate the Heart's Structure and Function, Microscopy & Microanalysis 2017: Pre-Meeting Congress for Students and Early-Career Professionals.

Veeraraghavan R, Gourdie RG. STORM-based Quantitative Assessment of Sodium Channel Localization Relative to Junctional Proteins within the Cardiac Intercalated Disk, Microscopy & Microanalysis 2016.

Veeraraghavan R, Gourdie RG. Spatial Organization of Proteins: Above and Below Abbe's Diffraction Limit, Heart Rhythm 2016.

Abstracts

Mezache L, **Veeraraghavan R**, Targeting the Vascular Endothelial Barrier to Prevent Inflammation-induced Atrial Fibrillation, Gordon Research Conference on Cardiac Arrhythmia Mechanisms 2022 [Poster; To be presented].

Struckman HL, Moise N, Chen Z, Weinberg SH, **Veeraraghavan R**. Uncovering the role of intercalated disk nanostructure and molecular organization in determining conduction differences between atria and ventricles, Gordon Research Conference on Cardiac Arrhythmia Mechanisms 2022 [Poster; To be presented].

Tarasov M, Olgar Y, Struckman HL, Miller A, Davis JP, Györke S, **Veeraraghavan R**, Radwanski PB. Nav1.6 Dysregulation by D96V Mutant Calmodulin Enhances Pro-arrhythmic Late Sodium Current, Gordon Research Conference on Cardiac Arrhythmia Mechanisms 2022 [Poster; To be presented].

Soltisz AM, Struckman HL, Radwanski PB, Veeraraghavan R. Nearest Neighbor-Based Spatial Analysis of Fluorescence Microscopy Data Reveals Increased Association of Nav1.6 with Cardiac Dyads in Mouse Model of Type-2 Diabetes. Microscopy & Microanalysis 2022 [Oral Presentation; To be presented]

Struckman HL, Moise N, Soltisz A, Buxton A, Dunlap I, Chen Z, Weinberg S, Veeraraghavan R. Indirect Correlative Light and Electron Microscopy (iCLEM) Coupled with Computational Modeling Reveals the Nanoscale Basis of Functional Heterogeneities within the Heart. Microscopy & Microanalysis 2022 [Oral Presentation; To be presented]

Mezache L, Soltisz AM, Johnstone SR, Isakson B, Veeraraghavan R. Quantitative Morphological Analysis of Super-resolution Images Provides Validation of Novel Therapies to Prevent Atrial Fibrillation. Microscopy & Microanalysis 2022 [Oral Presentation; To be presented]

Mezache L, Soltisz AM, Johnstone SR, Isakson B, Veeraraghavan R. Vascular Barrier Protection Prevents Atrial Fibrillation by Preserving Cardiac Nanostructure. AHA Vascular Discovery 2022. [Oral Presentation]

Soltisz AM, Bogdanov V, Davis JP, Györke S, Veeraraghavan R. Bidirectional nearest neighbor colocalization identifies cardiomyocyte microtranslatomes producing calmodulin and its effector targets. Heart Rhythm 2022 [Poster]

Struckman HL, MS, Moise N, PhD, Dunlap I, Chen Z, PhD, Weinberg S, PhD, Veeraraghavan R. Ultrastructural and Molecular Organization Determine Conduction Differences Between in Atrial and Ventricular Working Myocardium. Heart Rhythm 2022 [Oral Presentation]

Struckman HL, Tarasov M, Olgar Y, Miller A, Davis JP, Györke S, Veeraraghavan R, Radwanski PB. Sodium channel Nav1.6 and Na-Ca Exchanger Remodeling Contributes to Arrhythmogenic Late Sodium Current and Ca²⁺ sparks in the Presence of D96V Mutant Calmodulin. Heart Rhythm 2022 [Poster]

Bogdanov V, Soltisz AM, Sakuta G, **Veeraraghavan R**, Davis JP, Györke S. Adrenergic signaling regulates spatially distinct calmodulin mRNA pools within cardiac myocytes, Biophysical Society 66th Annual Meeting 2022. [Poster]

Mezache L, Soltisz AM, Johnstone S, Isakson B, **Veeraraghavan R**. Vascular Endothelial Barrier Protection Prevents Nanoscale Cardiac Remodeling: A Novel Strategy to Prevent Atrial Fibrillation, Biophysical Society 66th Annual Meeting 2022. [Poster; Travel Award Winner]

Soltisz AM, Struckman HL, Radwanski PB, **Veeraraghavan R**. Pathologically Increased RyR2-Nav1.6 Colocalization In The db/db Mouse Model Of Diabetic Cardiomyopathy, Biophysical Society 66th Annual Meeting 2022. [Poster; Travel Award Winner]

Struckman HL, Moise N, Dunlap I, Chen Z, Weinberg SH, **Veeraraghavan R**. Coupling Indirect Correlative Light and Electron Microscopy (iCLEM) With Computational Modeling to Expand the Physiologist's Reach Into the Nanoscale, Biophysical Society 66th Annual Meeting 2022. [Poster]

Struckman HL, Moise N, Dunlap I, Chen Z, Weinberg SH, **Veeraraghavan R**. Conduction Differences Between Atrial and Ventricular Working Myocardium Elucidated Through Previously Unrecognized Nanoscale Structural Organization, Biophysical Society 66th Annual Meeting 2022. [Poster]

Struckman HL, Tarasov M, Olgar Y, Miller A, Davis JP, Györke S, **Veeraraghavan R**, Radwanski PB. Arrhythmogenic Calmodulin Mutant D96V Induces Unexpected Remodeling of Cardiac Nanostructure, Biophysical Society 66th Annual Meeting 2022. [Poster]

Struckman HL, Moise N, Dunlap I, Chen Z, Weinberg SH, **Veeraraghavan R**. Intercalated disk nanostructure and molecular organization underlie conduction differences between atria and ventricles, American Heart Association Annual Scientific Sessions 2021 [Oral Presentation].

Struckman HL, Tarasov M, Olgar Y, Miller A, Davis JP, Györke S, **Veeraraghavan R**, Radwanski PB. Structural Remodeling of Nav1.6 Channel Clusters Contributes to Arrhythmogenic Late Sodium Current in the Presence of D96V Mutant Calmodulin, American Heart Association Annual Scientific Sessions 2021 [Oral Presentation].

Tarasov M, Olgar Y, Struckman HL, Miller A, Davis JP, Györke S, **Veeraraghavan R**, Radwanski PB. Nav1.6 Dysregulation by Mutant Calmodulin Enhances Late Sodium Current in human iPSC Cardiomyocytes and Promotes Arrhythmias in D96V transgenic mice, American Heart Association Annual Scientific Sessions 2021 [Poster].

Mezache L, Nuovo G, **Veeraraghavan R**, Vascular Endothelial Barrier Protection May Prevent Arrhythmias In Atrial Fibrillation And Myocardial Infarction, American Heart Association Annual Scientific Sessions 2021 [Poster].

Mezache L, Nuovo G, **Veeraraghavan R**, The Vascular Barrier: A Common Anti-Arrhythmic Target in Atrial Fibrillation and Myocardial Infarction, American Heart Association Basic Cardiovascular Science Conference 2021 [Poster].

Soltisz AM, Bogdanov V, Györke S, **Veeraraghavan R**, Morphological Object Localization: A Novel Image Analysis Pipeline for Quantitative Spatial Localization of Biomolecule Signal from Fluorescence Microscopy Data, Microscopy & Microanalysis 2021 [Oral Presentation, Student Scholar Award Winner].

Mezache L, Nuovo G, **Veeraraghavan R**, A Multipronged Microscopy Approach Identifies Common Anti-Arrhythmic Strategy for Atrial Fibrillation and Myocardial Infarction, Microscopy & Microanalysis 2021 [Poster].

Struckman HL, Moise N, Dagher C, Weinberg S, **Veeraraghavan R**, Quantitative Assessment of Cardiac Intercalated Disk Ultrastructure and Molecular Organization by Indirect Correlative Light and Electron Microscopy, Microscopy & Microanalysis 2021 [Oral Presentation].

Mezache L, Nuovo G, **Veeraraghavan R**, Vascular Barrier Protection: A Common Anti-Arrhythmic Strategy for Atrial Fibrillation and Myocardial Infarction, Heart Rhythm 2021 [Poster]

Moise N, Struckman HL, Dagher C, **Veeraraghavan R**, Weinberg S, Finite-Element Modeling of Parametrically-Defined Cardiac Intercalated Disk Nanodomain Structure. SIAM Conference on Applications of Dynamical Systems, Virtual, 2021, Oral Presentation.

Moise N, Struckman HL, Dagher C, **Veeraraghavan R**, Weinberg S, Intercalated Disk Nanoscale Structure Regulates Cardiac Conduction. Society of Mathematical Biology Annual Meeting, Virtual, 2021, Oral Presentation.

Tarasov M, Olgar Y, Miller A, Struckman HL, Davis JP, Györke S, **Veeraraghavan R**, Radwanski PB. Arrhythmogenic calmodulin mutant D96V dysregulates Na⁺-Ca²⁺ nanodomains in cardiomyocyte transverse tubules, Biophysical Society 65th Annual Meeting 2021, Poster.

Moise N, Struckman HL, Dagher C, **Veeraraghavan R**, Weinberg SH. Finite-element modeling of parametrically-defined cardiac intercalated disk nanodomain structure, Biophysical Society 65th Annual Meeting 2021, Poster.

Bogdanov V, Soltisz AM, Ivanova M, Andreev I, **Veeraraghavan R**, Davis JP, Györke S. A novel method for single molecule visualization of active protein synthesis in cardiac myocytes reveals Serca2a mRNA translation is sarcoplasmic reticulum Ca²⁺ load dependent, Biophysical Society 65th Annual Meeting 2021, Poster.

Bogdanov V, Soltisz AM, Ivanova M, Andreev I, Sakuta G, Davis JP, **Veeraraghavan R**, Györke S. Local synthesis of sarcolemma and sarcoplasmic reticulum membrane proteins in cardiac myocytes, Biophysical Society 65th Annual Meeting 2021, Poster.

Struckman HL, Moise N, Dagher C, Weinberg S, **Veeraraghavan R**. Quantitative Assessment of Cardiac Intercalated Disk Ultrastructure and Molecular Organization by Indirect Correlative Light and Electron Microscopy, Biophysical Society 65th Annual Meeting 2021, Oral Presentation.

Mezache L, Greer-Short A, Radwański PB, Hund TJ, **Veeraraghavan R**. Targeting the Vascular Endothelial Barrier to Prevent Nanoscale Cardiac Remodeling: A Novel Strategy to Prevent Atrial Fibrillation, Biophysical Society 65th Annual Meeting 2021, Poster.

Soltisz AM, **Veeraraghavan R**. Quantitative Spatial Localization of Biomolecules From Fluorescence Microscopy Data, Biophysical Society 65th Annual Meeting 2021, Poster.

Mezache L, Phillips A, Baine S, Györke S, Radwański PB, Hund TJ, **Veeraraghavan R**. The Vascular Endothelial Barrier: A Novel Therapeutic Target for Preventing Atrial Fibrillation, American Heart Association Annual Scientific Sessions 2020, Poster.

Bernas T, **Veeraraghavan R**, Wilson ZT, Soltisz A, Jiang M, Tseng G. Junctophilin-2 (JPH2) Interactome in Ventricular Myocytes

is Subcellular Compartment-dependent and Subject to Remodeling During Hypertrophy Leading to Heart Failure, American Heart Association Annual Scientific Sessions 2020, Poster.

Soltisz A, Weinberg S, **Veeraraghavan R**. Binucleate Cell Atlasing: An Intracellular Object Localization Tool for Single-Cell Fluorescence Microscopy, Microscopy & Microanalysis 2020, Oral Presentation.

Struckman HL, Mezache L, Baine S, Greer-Short A, Györke S, Radwański PB, Hund TJ, **Veeraraghavan R**. The Nanoscale Basis of Atrial Fibrillation: Functional Impact of Disrupting Nav1.5-rich Intercalated Disk Nanodomains, Microscopy & Microanalysis 2020, Oral Presentation.

Mezache L, Struckman HL, Phillips A, Baine S, Greer-Short A, Györke S, Radwański PB, Hund TJ, **Veeraraghavan R**. Indirect CLEM – from Structural Insights to Novel Therapy for Atrial Fibrillation, Microscopy & Microanalysis 2020, Oral Presentation.

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