Steven Poelzing, Ph.D.	Associate Professor, Biomedical Engineering and Science Virginia Tech Carilion Research Institute Virginia Tech, VA

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
MetroHealth Medical Center		2004 - 2005	Postdoctoral Fellowship
Case Western Reserve University	Ph.D.	2000 - 2004	Biomedical Engineering
Case Western Reserve University	M.S.E.	1997 - 2000	Biomedical Engineering
Wright State University	B.S.	1992 - 1997	Biomedical Engineering

A. POSITIONS AND HONORS

Positions and Employment

2014-Present	Associate Professor of Health Sciences, Virginia Tech, VA
2013-Present	Associate Professor of Medicine, Virginia Tech School of Medicine, VA
2012-Present	Associate Professor of Biomedical Engineering and Science, Virginia Tech, VA
2012	Research Associate Professor of Bioengineering, University of Utah, UT
2008-Present	Adjunct Assistant Professor of Pharmacology and Toxicology, University of Utah, UT
2005-2012	Research Assistant Professor of Bioengineering, University of Utah, UT
2004-2005	Post-Doctoral Fellow. MetroHealth Medical Center, Cleveland, OH
2003-2005	Consultant to NASA Glenn Research Center, Cleveland, OH
1997-2004	Research assistant. Case Western Reserve University, Cleveland, OH
1996	National Science Foundation Research Fellow. Wright State University, Dayton, OH

Honors and Professional Memberships

Fellow of the Heart Rhythm Society (2015)
Fellow of the American Heart Association (2014)
Gordon Conference on Cardiac Arrhythmia Mechanisms, Invited Speaker (2009)
Frontiers in Cardiac Electrophysiology editorial board (2010-Present)
Computers in Cardiology 2009 Organizer
University of Utah, Top Instructors in Engineering (2008,2009,2010,2011)
Biomedical Engineering Society (since 2008)
American Physiological Society Member (since 2007)
Biophysical Society Member (since 2005)
Heart Rhythm Society Member (since 2004)
Heart Rhythm Society, Michael Bilitch Fellowship in Cardiac Pacing and Electrophysiology (2004-2005).
Rammelkamp Research Days, 1st Place Oral Presentation Presentation, MetroHealth Med. Cntr, Cleveland, OH (2004)
American Heart Association Member (since 2003)
Cardiac Electrophysiology Society Member (since 2003)
National Institutes of Health National Research Award, Case Western Reserve University, Cleveland, OH (1997-1999)

B. TEACHING EXPERIENCE

TBMH	Co-Instructor. TBMH 5984: Quantitative Imaging & Time Series Analysis Virginia Tech, Blacksburg, Virginia	2016
TBMH	Co-Director. TBMH Metabolic and Cardiovascular Track. Virginia Tech, Blacksburg, Virginia	
TBMH	Graduate Curriculum Development for the Metabolic and Cardiovascular Track Virginia Tech, Blacksburg, Virginia	2013
VTCSOM Y1	Research Domain Curriculum. Invited Speaker Virginia Tech School of Medicine, Roanoke, Virginia	2012-Present
BMES 5984	Excitable Membranes. Instructor Virginia Tech, Roanoke, Virginia	2013
BIOEN 1101	Fundamentals of Bioengineering I. Instructor	2009-Present

University of Utah, Salt Lake City, Utah
BIOEN 6460. Electrophysiology and Bioelectricity of Tissues. Co-Instructor
University of Utah. Salt Lake City, Utah 2007-2008
BIOEN 3202. Physiology for Engineers. Co-Instructor
University of Utah. Salt Lake City, Utah 2006-present
BIOEN 6464. Contemporary Topics in Cardiac Electrophysiology. Instructor
University of Utah. Salt Lake City, Utah 2006-present
EBME 105 Introduction to Biomedical Engineering, Invited Speaker
Case Western Reserve University. Cleveland, Ohio 2004
EBME 324/414 Laboratory Computing in Biomedical Engineering, Invited Lecturer
Case Western Reserve University. Cleveland, Ohio 2003-2004
EBME 313 Biomedical Engineering Laboratory I, Invited Lecturer
Case Western Reserve University, Cleveland Ohio 2003
EGR 101 Introduction to Engineering, Instructor
Wright State University. Dayton, Ohio 1995-1997

Trainees

Post-Doctoral Fellows

Anders Peter Larsen Ph.D., Postdoctoral Fellow, CVRTI, Utah 2010-2012
Carlsburg Post-Doctoral Research Fellow 2010-2012
Danish Council for Independent Research Post-Doctoral Fellow 2012-2014
MSD Pharmaceuticals. Medical Scientific Liaison 2014-Present
Vasu Gooty M.D., Research Fellow, Carilion Hospitals, Virginia 2013-Present
Gregory Hoeker, Ph.D. Postdoctoral Fellow, VT, Virginia 2014-Present

Graduate Fellows-Research Advisor

Rengasayee Veeraraghavan. Bioengineering Ph.D. student. 2005-2011
Post-Doctoral Fellow at Virginia Tech with Rob Gourdie 2012-2014
Przemyslaw Radwanski Pharm.D, Pharmacology and Toxicology Ph.D. 2007-2011
University of Utah College of Pharmacy, Wolf Prize 2011
Post-Doctoral Fellow at the Ohio State University with Sandor Györke 2011-2014
Research Assistant Professor. The Ohio State University 2014-Present
Anders Peter Larsen. Visiting Ph.D. student 2007-2009
John Ryan Rigby. Bioengineering M.S. 2007-2012
Myriad Genetics Project Manager 2012-Present
Amara Greer-Short. Biomedical Engineering Ph.D. Student 2011-Present
Ellen E. Wade Fellowship 2015-2016
Sharon George Biomedical Engineering Ph.D. Student 2011-Present
VTCRI Medical Research Scholar 2014-2015
American Heart Association Pre-doctoral Fellowship 2015-2016
David W. Francis Lillian Francis Scholarship Fund, VT 2015-2016
Michael Entz. Biomedical Engineering Ph.D. Student 2013-Present
Virginia Tech. Walts Scholar 2013-2014
Anand Abraham. Medical Student, Virginia Tech 2013-Present
Matthew Yanoff. Medical Student. Virginia Tech 2014-Present
VTCSOM, Research Letter of Distinction July 2015
Christa Funch Jensen. Visiting PhD Trainee. University of Copenhagen 2014
Tristan Raisch. Rotating TBMH Graduate Student. Virginia Tech 2014
Soheil Sadri. Rotating TBMH Graduate Student. Virginia Tech 2014

Graduate Fellows-Committee Member

Jason G. Little. Pharmacology and Toxicology. Ph.D
University of Utah 2007-2012
Katherine Degen, Biomedical Engineering and Sciences. PhD. Student
Virginia Tech 2013-Present

Undergraduate Students

Carl Richards. Bioengineering Senior Project 2006-2007. Medical School
Adam Smoot. Bioengineering Senior Project 2007-2008.- UROP Scholarship.
Winner-Undergraduate Research Symposium, University of Utah 2008. Law School

Corey Sharp. Bioengineering Senior Project	2008-2009
Zach Collins. Bioengineering Senior Project	2008-2009. UROP Scholarship
Branden Hunsaker, Bioengineering Senior Project	2009-2010
Amir Ghaffarian, Bioengineering Senior Project	2009-2011. UROP Scholarship
Harjit Kaur, Bioengineering Senior Project	2010-2013
Katherine Sciuto, Bioengineering Senior Project	2010-2012 UROP Scholarship
NASA. National Space Grant Fellowship 2012	
NSF Graduate Research Fellow 2012-2015	
Lance Lindsay, Bioengineering Senior Project	2012-2013
Michael Entz, Bioengineering Senior Project	2012-2013
Kayla Wilburn Kilpatrick, Bioengineering Senior Project	2012-2013
Tristan Raisch, Biomedical Engineering Student, Virginia	2013-2014
Spencer Lovegrove, Biomedical Engineering Student. Virginia	2013-2014 SURF Fellowship
Toria Knox, Molecular Biology Student. Virginia	2014-Present

C. PUBLICATIONS AND LECTURES

Peer-Reviewed Publications Total 44 H-index 14 i10-index-18

1. Entz M, George SA, Zeitz M, Raisch T, Smyth J, **Poelzing S.** Heart Rate and Extracellular Sodium and Potassium Modulation of Gap Junction Mediated Conduction in Guinea Pigs. Front Physiol. 2016. *IN PRESS*
2. Greer-Short A, **Poelzing S.** Temporal response of ectopic activity in guinea pig ventricular myocardium in response to isoproterenol and acetylcholine. Front Physiol. 2015 Oct 20;6:278
3. Abdullah O, Gomez AD, Merchant S, Stedham O, Heidinger M, **Poelzing S**, Hsu E, Orientation Dependence of Microcirculation-Induced Diffusion Signal in Anisotropic Tissues. Magn Reson Med. 2015. Oct 29
4. Cameron Varano A, Rahimi A, Dukes MJ, **Poelzing S**, M McDonald S, Kelly DF. Visualizing virus particle mobility in liquid at the nanoscale. Chem Commun (Camb). 2015 Oct 29;51(90):16176-9
5. George SA, Sciuto KJ, Lin J, Salama ME, Keener JP, Gourdie RG, **Poelzing S,** Extracellular sodium and potassium levels modulate cardiac conduction in mice heterozygous null for the Connexin43 gene. Pflugers Arch. 2015 Mar 14.
6. Greer-Short A, **Poelzing S.** Distinguishing between overdrive excited and suppressed ventricular beats in guinea pig ventricular myocardium. Front Physiol. 2015 Feb 18;6:14
7. 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. Pflugers Arch. 2015 Jan 13.
8. Radwański PB, Brunello L, Veeraraghavan R, Ho HT, 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
9. Hoeker GS, Hood AR, Katra RP, **Poelzing S**, Pogwizd SM. Sex Differences in β-Adrenergic Responsiveness of Action Potentials and Intracellular Calcium Handling in Isolated Rabbit Hearts. PLoS One. 2014 Oct 23;9(10): e111411
10. Janson CM, **Poelzing S,** Shah MJ, Combined Inhibition of Na+ and Ca2+ Channels: A Novel Paradigm for Treatment of Incessant Ventricular Arrhythmias in Anderson-Tawil Syndrome. Heart Rhythm Journal. 2013 Nov 7. pii: S1547-5271(13)01291-5
11. Radwanski PB, Greer-Short A, **Poelzing S** Inhibition of Na(+) Channels Amerliorates Arrhythmias in a Drug Induced Model of Andersen-Tawil Syndrome. *Heart Rhythm Journal.* 2013 Feb; 10(20): 255-63
12. 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*. 2013 Feb;207(2):280-9
13. Larsen AP, Sciuto KJ, Moreno AP, **Poelzing S**. The voltage sensitive dye di-4-ANEPPS slows conduction velocity in isolated guinea pig hearts. *Heart Rhythm Journal.* 2012 Sep;9(9):1493-500
14. Rigby JR, **Poelzing S.** A Novel Frequency Analysis Method for Assessing K(ir)2.1 and Na (v)1.5 Currents. *Ann Biomed Eng***.** 2012 Apr;40(4):946-54
15. Veeraraghavan R, Salama ME, **Poelzing S**, Interstitial Volume Modulates the Conduction Velocity- Gap Junction Relationship. Am J Physiolo Heart Circ Physiol. 2012 Jan 1;302(1):H278-86

16. Shinlapawittayatorn K, Dudash LA, Du XX, Heller L, **Poelzing S,** Ficker E, Deschenes I, A Novel Strategy Using Cardiac Sodium Channel Polymorphic Fragments to Rescue Trafficking Deficient SCN5A Mutations. Circ Genetics. 2011 Oct;4(5):500-9
17. Radwanski P, **Poelzing S**. NCX Is an Important Determinant for Premature Ventricular Activity in a Drug Induced Model of Andersen-Tawil Syndrome. Cardiovasc Res. 2011 Oct 1;92(1):57-66
18. Rigby JR, **Poelzing S.** Recapitulation of an Ion Channel Current IV Curve Using Frequency Components. J Vis Exp. 2011 Feb 8;(48)
19. Radwanski P, Veeraraghavan R, **Poelzing S**. Cytosolic Calcium Accumulation Underlies Ventricular Arrhythmias in Guinea Pig Model of Andersen-Tawil Syndrome. Heart Rhythm. 2010 Apr 7.
20. Larsen AP, Grunnet M, Olesen SP, **Poelzing S**. Pharmacological Activation of IKr Impairs Conduction in Guinea Pig Hearts. J Cardiovasc Electrophysiol. 2010 Feb 16
21. Strom M, Wan X, **Poelzing S,** Ficker E, Rosenbaum DS, Gap junction heterogeneity as mechanism for electrophysiologically distinct properties across the ventricular wall. Am J Physiol Heart Circ Physiol. 2009 Dec 24
22. Metcalf CS, **Poelzing** S, Little JG, Bealer SL. Status Epilepticus Induces Cardiac Myofilament Damage and Increased Susceptibility to Arrhythmias in Rat. Am J Physiol Heart Circ Physiol. 2009 Dec;297(6):H2120-7
23. **Poelzing S**, Smoot AF, Veeraraghavan R, Novel X-ray attenuation mechanism: Role of Inter-Atomic Distance. *Medical Physics*, 2008 Oct 35(10);4386-4395
24. Sandhu RK, Costantini O, Cummings JE, **Poelzing S,** Rosenbaum DS, Quan KJ. Intracardiac alternans compared to surface T-wave alternans as a predictor of ventricular arrhythmias in humans. Heart Rhythm. 2008 Jul;5(7):1003-8
25. Veeraraghavan R, **Poelzing S.** Mechanisms Underlying Increased Right Ventricular Conduction Sensitivity to Flecainide Challenge. *Cardiovasc Res.* 2008 Mar 1;77(4):749-56
26. Stinstra JG, **Poelzing S**, MacLeod RS, Henriquez CS, A Model for Estimating the Anisotropy of the Conduction Velocity in Cardiac Tissue Based on the Tissue Morphology. Computers in Cardiology, Durham 2007
27. **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
28. **Poelzing S,** Forleo C, Samodell M, Dudash L, Sorrentino S, Anaclerio M, Troccoli R, Iacoviello M, Romito R, Guida P, Chahine M, Pitzalis M, Deschenes , SCN5A polymorphism restores trafficking of a Brugada syndrome mutation on a separate gene. Circulation 2006 Aug 1;114(5):368-76
29. Pajouh M, Wilson L, **Poelzing S**, Johnson N, Rosenbaum DS. IKs Blockade Reduces Dispersion of Repolarization in Heart Failure. *Heart Rhythm Journal*. 2005 Jul;2(7):731-8
30. **Poelzing S,** Rosenbaum DS. Optical measurements reveal nature of intercellular coupling across ventricular wall. *Am J Physiol Heart Circ Physiol.* 2005 Oct;289(4):H1428-35.
31. **Poelzing S**, Dikshteyn M, Rosenbaum DS. Transmural conduction is not a two way street. *J Cardiovasc Electrophysiol*, 2005 April;16(4);455
32. **Poelzing S,** Rosenbaum DS. Altered Connexin43 Expression in Failing Myocardium Produces Electrophysiologic Heterogeneities Across the Ventricular Wall. *Am J Physiol Heart Circ Physiol.* 2004 Oct;287(4):H1762-70
33. **Poelzing S,** Akar F, Baron, E, Rosenbaum DS. Heterogeneous Connexin43 Expression Produces Electrophysiologic Heterogeneities Across the Ventricular Wall. *Am J Physiol Heart Circ Physiol.* 2004. May;286(5):H2001-9

Reviews

1. George SG, **Poelzing S**, Cardiac conduction in isolated hearts of genetically modified mice - Connexin43 and salts. Prog Biophys Mol Biol. 2015 Nov 25.
2. Hoeker GS, **Poelzing S**, Moving beyond the reductionist approach-Time to put the pieces back together in a broken (infarcted) heart. Heart Rhythm. 2015 Jan;12(1):179-80
3. 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
4. Veeraraghavan R, **Poelzing S**, Gourdie RG. Intercellular Electrical Communication in the Heart: A New, Active Role for the Intercalated Disk. Cell Commun Adhes. 2014 Jun;21(3):161-7

5. Veeraraghavan R, **Poelzing S**, Gourdie RG. Old cogs, new tricks: A scaffolding role for connexin43 and a junctional role for sodium channels? FEBS Lett. 2014 Apr 17;588(8):1244-1248.
6. Veeraraghavan R, Gourdie RG, **Poelzing S**, Mechanisms of Cardiac Conduction: A History of Revisions. Am J. Physiol Heart Circ Phys. 2014 Mar 1;306(5):H619-27.
7. Rhett JM, Veeraraghavan R, **Poelzing S**, Gouride RG. The perinexus: Sign-post on the path to a new model of cardiac conduction? Trends in Cardiovasc Med. 2013 Mar;11.
8. **Poelzing S**. Are electrophysiologically distinct M-Cells a characteristic of the wedge preparation? Heart Rhythm, 2009,6(7):1035-7
9. **Poelzing S**, Rosenbaum DS. The modulated dispersion hypothesis confirmed in humans. *Circulation, Arrhythmia and Electrophysiology*. 2009,2:100-101.
10. **Poelzing S,** Rosenbaum DS. Cellular mechanisms of Torsade de Points. In: The hERG cardiac potassium channel: structure, function, and long QT syndrome. John Wiley & Sons and the Novartis Foundation, Chichester, UK, 2005, pp. 204-224
11. **Poelzing S**, Rosenbaum DS. Nature, Significance and Mechanisms of Electrical Heterogeneities in Ventricle. *The Anatomical Record.* 2004 Oct;280A(2):1010-7

Book Chapters

Bealer SL, Metcalf CS, **Poelzing S**, Little JG, Brewster A, Anderson A. Cardiac Myocyte Damage, Electrocardiographic Dysfunction, and Ion Channel Remodeling in Rodent Models of Seizure Disorders. Sudden Unexplained Death in Epilepsy. *In Press*

Invited Lectures

A New Light on an Old Mechanism of Cell-to-cell Electrical Communication. Invited speaker. SUNY Upstate Medical University, January 14, 2016

A New Light on an Old Mechanism of Cell-to-cell Electrical Communication. Invited speaker. University of Copenhagen, Nov 27, 2015

New Solutions. TEDx. Virginia Tech, Nov 16,2015

A New Light on an Old Mechanism of Cell-to-cell Electrical Communication. Invited speaker. Johns Hopkins University, Feb 6, 2015

Cardiac action potential conduction studied by voltage-sensitive dyes in isolated hearts.Copenhagen Meeting on Cardiac Arrhythmia. Copenhagen, Denmark 2014

The Space In Between: Bridging the Gap Junction by an Ephapse. David S. Rosenbaum Symposium. Cleveland, Ohio. 2013

Propagation of the impulse-Connexins and Fibrosis.Danish Cardiovascular Research Academy. Sandbjerg. Denmark 2011

Targeting Gap Junctions to Restore Intercellular Coupling. Heart Rhythm Society. Denver 2010,

Sodium Channel Mutations and Arrhythmogenesis. Gordon Research Conference: Cardiac Arrhythmia Mechanisms, Barga Italy 2009

Connexins in Heart Failure, American Heart Association. New Orleans 2008

What is Different About the Outflow Tract. Heart Rhythm Society, San Francisco 2008

Regulation and Function of Gap Junctions in the Heart. Heart Rhythm Society, Denver 2007

Mechanisms of preferential cardiac disease manifestation in right-precordial leads. A Tale of Two Ventricles, Panum Institute, Denmark 2007.

Gap Junction Remodelling as a Mechanism for Promoting Electrophysiological Heterogeneity: Substrate Remodelling, Hearth Rhythm Society, Denver 2007

Altered Conduction and Arrhythmias in Heart Failure. American Heart Association, Chicago 2006

Presentations

Veeraraghavan R, Lin J, Keener JP, **Poelzing S,** Gourdie RG. Super Resolution Studies of Sodium Channels Within Intercalated Disk Microdomains Suggest Novel Arrhythmia Mechanism. American Heart Association. Orlando, 2015 *Oral*

Abdullah O, Gomez AD, Merchant S, Stedham O, Heidinger M, **Poelzing S,** Hsu E. Myocardial Microcirculation Induces Anisotropic Diffusion-Like Magnetic Resonance Contrast. American Heart Association. Orlando, 2015. *Poster*

Abdullah O, Gomez AD, Merchant S, Stedham O, Heidinger M, **Poelzing S,** Hsu E. Intravoxel Incoherent Motion and Arterial Spin Labeling MRI of Isolated Perfused Hearts. Proceedings of ISMRM, 2015.

Greer-Short A, **Poelzing S**, Sleep to Waking versus Waking to Exercise: Resting State Impact on Risk of Sudden Cardiac Death. Biomedical Engineering Society. Tampa Bay 2015. *Poster*

Entz MW, Zeitz M, Smyth J, **Poelzing S**, Gap Junctional Coupling Modulates the Ephaptic Coupling-Conduction Velocity Relationship. Gordon Conference-Cardiac Arrhythmias. Italy 2015. *Poster*

George SA, **Poelzing S**, Ephaptic Self-Attenuation in Mice Hearts: Experimental Evidence of Conduction Slowing Secondary to Reduced Perinexal Width and Sodium Driving Force. Gordon Conference-Cardiac Arrhythmias. Italy 2015. *Poster*

Greer-Short A, **Poelzing S**, Parasympathetic to Sympathetic Stimulation: Higher Arrhythmia Risk than Sympathetic Stimulation Alone. Gordon Conference-Cardiac Arrhythmias. Italy 2015. *Poster*

Veeraraghavan R, Ongstad EL, **Poelzing S**, Gourdie RG. Superresolution Microscopic Localization of Scn5a and Scn1b Subunits of the Sodium Channel Complex Within Intercalated Disk Microdomains: Implications for Ephaptic Coupling. Gordon Conference-Cardiac Arrhythmias. Italy 2015. *Poster*

Veeraraghavan R, Lin J, Keener JP, **Poelzing S**, Gourdie RG. Superresolution Mircoscopy Reveals Sodium Channel Localization within Intercalated Disk Microdomains: Implications for Ephaptic Coupling. Biophysical Society. Baltimore 2015. *Poster*

S Poelzing, M Entz, SH Weinberg. Acute Modulation of Sodium Channel Biophysical Properties using High-Frequency Stimulation. Biophysical Society, Baltimore 2015. *Oral*

Veeraraghavan R, Lin J, Keener JP, **Poelzing S**, Gourdie RG. Anisotropic Conduction Slowing During Sodium Channel Blockade: A Role For Ephaptic Coupling? Cardiac EP Society. Chicago 2014

Veeraraghavan R, Lin J, Keener J, Gourdie RG, **Poelzing S.** A Novel Role for Inward-rectifier Potassium Channels in Ephaptic Coupling. Heart Rhythm Society. San Francisco, California 2014. *Featured Poster*

George S, Sciuto K, Salama M, Gourdie RG, **Poelzing S.** Ephaptic Coupling and Gap Junctional Coupling - Two Aspects of Electrical Coupling between Cardiac Myocytes. Heart Rhythm Society. San Francisco, California 2014. *Poster*

Veeraraghavan, R, Lin J, Keener J, **Poelzing S**, Gourdie RG. Sodium Channels in the Cx43 Gap Junction Perinexus May Constitute a Cardiac Ephapse: An Experimental and Modeling Study. Heart Rhythm Society. San Francisco, California 2014. *Poster*

Radwanski PR, Brunello L, Veeraraghavan R, Ho HT, Belevych A, Priori SG, Volpe P, Janssen P, Bridge J, **Poelzing S**, Gyorke S. Neuronal Na+ Channels Contribute to the Arrhythmogenic Diastolic Ca2+ Release Through the Microdomain Na+/Ca2+ Signaling. Heart Rhythm Society. San Francisco, California 2014. *Young Investigator Competition*

Greer-Short A, Heidinger M, **Poelzing S**. The Latency-Spontaneous Beat Relationship: Two Mechanisms at Play? Biomedical Engineering Society. Seattle, Washington 2013. *Poster.*

George S, Greer-Short A, Sciuto KJ, Salama ME, **Poelzing S**. Modulation of Ephaptic Coupling in Cardiac Conduction during reduced Gap Junctional Coupling. International Gap Junction Conference. Charleston, South Carolina 2013. *Oral Presentation.*

Veeraraghavan R, Rhett M, **Poelzing S**, Gourdie RG. Experimental Evidence that the Cx43 Gap Junction Perinexus Functions as a Cardiac Ephapse. International Gap Junction Conference. Charleston, South Carolina 2013. *Oral Presentation.*

Veeraraghavan R, Lin J, Keener JP, Gourdie RG, **Poelzing S.** Sodium Channel Blockade Reveals Anisotropic Conduction Dependence on Ephaptic Coupling. Heart Rhythm Society. Denver 2013, *Poster*

Larsen AP, Pedersen R, **Poelzing S.** Effect of Acute Hyperglycemia on Cardiac Conduction. Biophysical Society. Philadelphia 2013, *Poster*

Abdullah O, Gomez AD, Merchant S, Stedham O, Heidinger M, Poelzing S, Hsu E, Effects of Perfusion on Cardiac MR Diffusion Measurements, ISMRM, 2012.

Veeraraghavan R, Lin J, Keener JP, **Poelzing S**. A Novel Role For Ephaptic Coupling in Cardiac Conduction: An Experimental and Modeling Study. Biophysical Society.San Diego 2012. *Oral Presentation*

Veeraraghavan R, **Poelzing S**. Interstitial Volume Modulates the Cardiac Conduction Velocity- Gap Junction Relationship. International Gap Junction Conference. Ghent, Belgium. 2011, *Poster*

Sciuto KJ, Larsen AP, Moreno AP, **Poelzing S**. Di-4-ANEPPS Slows Cardiac Conduction Velocity. Biophysical Society, Baltimore 2011, *Poster*

Veeraraghavan R, Larsen AP, **Poelzing S**. Pharmacological IKs Activation Slows Cardiac Conductions and Exacerbates the Effect of INa Blockade. Biophysical Society, Baltimore 2011, *Poster*

Rigby JR, **Poelzing S**. Recreating the Ion Channel IV Curves Using Specific Frequency Components. Biophysical Society, Baltimore 2011, *Poster*

Radwanski PB, **Poelzing S,** SERCA2a Inhibition Paradoxically Increases Triggered Activity During Calcium Overload, Gordon Conference, 2010: Cardiac Regulatory Mechanisms, *Poster*

Veeraraghavan R, **Poelzing S.** Myocardial Edema Sensitizes Conduction to Gap Junction Uncoupling. Heart Rhythm Society, Denver 2010, *Poster*

Ribgy JR, **Poelzing S.** Characteristic Frequency Analysis of Inward Rectifier Kir2.1. Biophysical Journal, vol. 98, issue 3, pg. 332a. 2010 *Poster*

Veeraraghavan R, **Poelzing S.** Edema: A Missing Link in the Conduction Velocity-Gap Junction Relationship. Biophysical Journal, vol. 98, issue 3, pg. 95a. 2010 *Poster*

Radwanski PB, Veeraraghavan R, **Poelzing S,** SERCA2a/NCX Ratio Determines Regional Propensity for Triggered Activity During Calcium Overload, American Heart Association, Orlando 2009, *Oral Presentations*

Radwanski PB, Veeraraghavan R, **Poelzing S,** Heterogeneous Ca2+ Cycling Underlies Bidirectional Ventricular Arrhythmias During Conditions of Ca2+ Overload, Heart Rhythm Society, Orlando 2009, *Poster*

Radwanski PB, Veeraraghavan R, **Poelzing S,** Heterogeneous Calcium Handling Modulates Spatio-Temporal Presentation Initiation of Premature Beats During Conditions of Calcium Overload, American Heart Association, New Orleans 2009, *Poster*

Veeraraghavan R, Stinstra J, **Poelzing S**, Edema Increases Conduction Anisotropy Heterogeneously Between the Left and Right Ventricles. Heart Rhythm Society, San Francisco 2008, *Poster*

Radwanski P, Veeraraghavan R, Munger M, **Poelzing S**. Pininacidil Reduces Interventricular Heterogeneities and Arrhythmia Susceptibility During Loss of Inward Rectifier Potassium Channel Function. American College of Clinical Pharmacology, Philedelphia 2008, *Poster*

Stinstra JG, **Poelzing S,** MacLeod RS, Henriquez CS, A Model for Estimating the Anisotropy of the Conduction Velocity in Cardiac Tissue Based on the Tissue Morphology. Computers in Cardiology, Durham 2007

Poelzing S, Veeraraghavan R, Heterogeneous Ventricular Chamber Response to Gap Junction Blockade. Gap Junction Conference, Denmark 2007, *Poster*

Veeraraghavan R, **Poelzing S**, Interventricular Nav1.5 Heterogeneities Underlie Conduction Heterogeneities in the Brugada Syndrome. Heart Rhythm Society, Denver 2007, *Poster*

Dudash L, **Poelzing S**, Deschenes I. Gene Therapy using Fragments of SCN58 H558R Polymorphism Restores Function of a Brugada Syndrome Mutation. American Heart Association, Chicago 2006, *Oral Presentation*

Poelzing S, Veeraraghavan R. Interventricular Heterogeneities Underlie Electrophysiologic Manifestations in Andersen-Tawil Syndrome (LQT7). American Heart Association, Chicago 2006, *Oral Presentation*

Poelzing S, Samodell M, Deschenes I. The H558R Polymorphism Rescues the R282H Brugada Syndrome Mutation Through Alpha Subunit Interactions. American Heart Association, Dallas, 2005, *Oral Presentation*

Dikshteyn M, **Poelzing S**, Rosenbaum, DS. Heterogeneous Connexin43 Expression Underlies Electrophysiologic Heterogeneities in the Heart. Gap Junction Conference, Whistler, British Columbia, 2005, *Oral Presentation*

Poelzing S, Rosenbaum, DS. Heterogeneous Connexin43 Expression Produces Electrophysiologic Heterogeneities Across the Ventricular Wall. Heart Rhythm Society, New Orleans, 2005, *Oral Presentation*

Dikshteyn M, **Poelzing S**, Rosenbaum, DS. Heterogeneous Connexin43 Expression Underlies Regional Dispersion of Repolarization and Increased Susceptibility to Arrhythmias. Heart Rhythm Society, New Orleans, 2005, *Oral Presentation*

Jeyaraj DD, Wilson LD, **Poelzing S**, Wan X, Rosenbaum DS. Segmental versus transmural remodeling as electrophysiological basis for T-wave memory. Heart Rhythm Society, New Orleans, 2005, *Oral Presentation*

Sandhu R, Costantini O, Cummings J, Dettmer M, **Poelzing S**, Rosenbaum DS, Quan KJ. Regional Intracardiac Alternans Underlies T Wave Alternans in Humans. Heart Rhythm Society, New Orleans, 2005, *Oral Presentation*

Poelzing S, Samodell M, Deschenes I. SCN5A Polymorphism Rescues Brugada Syndrome Mutation. Biophysical Society, Long Beach, 2005, *Poster*

Poelzing S, Forleo C, Sorrentino S, Anaclerio M, Troccoli R, Iacoviello M, Romita R, Guida P, Samodell M, Deschenes I, PitzalisM . SCN5A Polymorphism Rescues Brugada Syndrome Mutation. American Heart Association, New Orleans, 2004, *Oral Presentation*

Deschenes I, Armoundas A, Jones SP, **Poelzing S**, Tomaselli G, Functional link between Na channels and Ito revealed by Posttranscriptional Gene Silencing of NavB1 in Cardiac Myocytes, American Heart Association, New Orleans, 2004, *Oral Presentation*

Poelzing S, Rosenbaum DS. Heterogeneous Connexin43 Expression Produces Electrophysiologic Heterogeneities Across the Ventricular Wall. North American Society for Pacing and Electrophysiology, Washington D.C., 2003, *Oral Presentation*

Pajouh M, Wilson LD, **Poelzing S**, Johnson NJ, Rosenbaum DS. IKs Blockade Reduces Dispersion of Repolarization in Heart Failure. North American Society for Pacing and Electrophysiology, Washington D.C., 2003, *Oral Presentation*

Poelzing S, Baron E, Rosenbaum DS. New Evidence for Heterogeneous Connexin43 Expression in Ventricular Myocardium. North American Society for Pacing and Electrophysiology, San Diego, 2002, *Oral Presentation*
Poelzing S, Roth BJ, Rosenbaum DS. Novel Use of Optical Mapping to Measure Cell-to-Cell Coupling Across the Transmural Wall. North American Society for Pacing and Electrophysiology, San Diego, 2002, *Poster*
Akar F, **Poelzing S**, Rosenbaum D, Direct Measurement of Cell-to-Cell Coupling in the Intact Heart: A Novel Approach of High Resolution Optical Mapping. American Heart Association, Atlanta, 1999. *Poster*

D. RESEARCH SUPPORT

Current:

1R01HL102298-01A1 Poelzing (PI) **01/01/2011-01/31/2015**
National Institutes of Health
"Extracellular Space as Modulator of Gap Junction-Conduction Velocity Relationship"
The cardiac gap junction-conduction velocity relationship is described as a linear relationship. Pharmacological intervention for targeting gap junctions can reproduce this relationship fairly consistently. However, transgenic and disease remodeled gap junctions do not affect conduction velocity in such a predictable manner, suggesting that another parameter modulates the gap junction-conduction velocity relationship. We preliminarily demonstrate that the extracellular volume modulates the gap junction-conduction velocity relationship, and the purpose of the grant is to demonstrate the mechanism underlying this modulation.

1DP7OD018428-01 Van Wart, Friedlander (PI) **09/20/13-08/31/18**
National Institutes of Health
"Mentorship and Development Program for Biomedical Trainees"
Role: Key Personnel-Other

Carilion Clinic Poelzing(Co-I) **06/01/14-05/31/15**
Research Acceleration Program _ No Cost Extension
"Role of Cell-to-Cell Coupling in Atrial Fibrillation Management: A Pilot Study"
This pilot study seeks to correlate post-operative atrial fibrillation occurrence with indices of ephaptic coupling.

Pending:

2 RO1 HL56728-10A2 Gourdie (PI) **1/01/15-12/31/20**
National Institutes of Health
"Patterning of gap junctions in the arrhythmic heart"
Role: Collaborator

1 RO1 HL126963-01 Poelzing (PI) **7/01/15-06/30/20**
National Institutes of Health
"Electrical Coupling as a Modulator of Calcium Mediated Arrhythmias"
Role: PI

Completed:

"Molecular Mechanisms of Regional Ventricular Delayed Afterdepolarization Propensity in ATS1"
Principal Investigator: Steven Poelzing, Ph.D.
Agency: Treadwell Foundation
Type: N/A
Period: July 2009 – June 2013
This work focuses on investigating cellular mechanisms which lead to heterogeneous delayed after depolarization propensity in a pharmacological model of ATS1.

"Ion Channel Characterization using Current Voltage Resonance Spectroscopy"
Principal Investigator: Steven Poelzing, Ph.D.
Agency: National Institutes of Health R21
Type: R21-HL094828-01
Period: September 2009 – August 2011

The purpose of this project is to determine whether unique resonant frequencies exist within ion channels. Once identified, the unique resonant ion channel frequencies will be used to simultaneous quantify the cardiac sodium channel and inward rectifier potassium currents.
"Molecular Mechanisms of Brugada Syndrome as a Right Ventricular Disease"
Principal Investigator: Steven Poelzing, Ph.D.
Agency: Treadwell Foundation
Type: N/A
Period: July 2005 – June 2008
This work focuses on investigating cellular mechanisms which predispose the right ventricle to increased arrhythmogenesis compared to the left ventricle.

"Novel Therapeutics Diastolic Heart Failure"
Principal Investigator: Steven Poelzing, Ph.D.
Agency: Medtronic
Type: N/A
Period: July 2006 – June 2007
The goals of this work are to develop a proof of concept for a novel therapeutic device in order to treat diastolic heart failure.

"Mechanisms of Arrhythmogenesis in Heart Failure: Role of Connexin43 Remodeling."
Principal Investigator: Steven Poelzing, Ph.D.
Agency: Heart Rhythm Society
Type: Post-Doctoral Presentation Fellowship
Period: July 2003 – June 2005
This work focused on the functional consequences of heterogeneous gap junction distribution across the ventricular wall in a canine model of pacing induced heart failure.

"Role of Gap Junction Remodeling on the Mechanism of Ventricular Arrhythmias in the Failing Heart"
Principal Investigator: Steven Poelzing
Agency: American Heart Association, Ohio Valley Affiliate
Type: Pre-Doctoral Presentation Fellowship
Period: July 2002 – June 2004
This work focused on elucidating the distribution and functional consequences of gap junction distribution across the ventricular wall in normal and failing myocardium.

E. PATENTS

US Patent 8808668 August 19, 2014
X-ray attenuating compositions and methods

F. COMMUNITY CONTRIBUTIONS

Virginia Junior Academy of Science. Judge. Virginia Tech. May 2013.
High School Outreach. Invited to speak to Math and Science Clubs at Hillcrest High School. Midvale UT, Jan 2012
Consultant with the Utah Museum of Natural History, Salt Lake City UT, 2010-Present
Speaker for the Utah Society of Environmental Educators, Salt Lake City UT. 2009
Salt Lake Valley Science and Engineering Fair Judge, Salt Lake City, UT, 2008-Present
Science Pub Invited Speaker, American Chemical Society, Salt Lake City, UT 2008
Consultant and grant Collaborator with The Leonardo, Salt Lake City, UT 2007-2010
Pre-Science Fair Invited Speaker, Oakdale Elementary School, Sandy UT 2006
Science Fair Judge, Madeleine Choir School's Science Fair, Salt Lake City, UT 2007

G. UNIVERSITY CONTRIBUTIONS

Bioengineering Student Leader Club Co-creator and advisor. 2010-Present
Invent and TechTitans University of Utah. Invited Judge
Invited Lecturer- PHTX 7500. 4/20/11
Cardiovascular, Hypertension and Diabetes Symposium. Conceived and organized. 3/17/2011-3/18/2011
Students of Biomedical Engineering faculty advisor. 2008-Present
Invited Lecturer- BIOL 3960. "Molecular Pathways of Environmental Pesticides", University of Utah. 04/24/2007
Invited Lecturer- Biomedical Engineering Society lunch with a professor. University of Utah 08
Comparative Medicine Outreach Program, University of Utah, 2007-Present

College of Engineering Teaching Workshop. 11/15/2007

H. STUDY SECTION MEMBER

National Institutes of Health, ESTA Permanent Member. 2014-Present
National Institutes of Health, ESTA (2011, 2012, Ad hoc)
National Institutes of Health, SEP (2013, 2014)
National Institutes of Health, CVRS-K Special Emphasis Panel (2013)
American Heart Association (2009-Present)
Canadian Institutes of Health Research (2007)

I. EXTERNAL SERVICE

International Gap Junction Conference Organizer. 2013 Meeting
American Journal of Physiology: Heart Circulatory Physiology: Editor. 2012-Present
Biophysical Journal, Reviewer
Circulation. Reviewer
Circulation Research. Reviewer
Frontiers in Cardiac Electrophysiology. Editorial Board Member 2010-Present
Heart Rhythm Journal, Reviewer
Journal of Molecular Medicine, Reviewer

J. COLLABORATORS

Søren-Peter Olesen, University of Copenhagen. 2007-Present
Morten Grunnet, Neurosearch, University of Copenhagen, 2007-Present
Steven Bealer, University of Utah, 2007-Present
Matthew Movsesian, University of Utah, 2011-Present
James Keener, University of Utah, 2009-Present
Morten Schak Nielsen, University of Copenhagen. 2013-Present
Thomas Jespersen, University of Copenhagen. 2014-Present