

# Natalia Trayanova, PhD

## Curriculum Vitae

### ***Professional Experience***

- 9/12-present Department of Medicine,  
Johns Hopkins School of Medicine, Baltimore, MD  
**Professor, Joint Appointment.**
- 4/12 -present Department of Biomedical Engineering  
Johns Hopkins University, Baltimore, MD.  
**Professor, Murray B. Sachs Endowed Chair**
- 8/06 -present Department of Biomedical Engineering and Institute for Computational  
Science, Johns Hopkins University, Baltimore, MD.  
**Professor.**
- 5/02 -7/06 Department of Biomedical Engineering, Tulane University, New Orleans.  
**Professor.**
- 1/02 -5/02 Laboratory of Physiology, University of Oxford, Oxford, United Kingdom.  
**Distinguished Fulbright Visiting Professor.**
- 1/95 -5/02 Department of Biomedical Engineering, Tulane University, New Orleans.  
**Associate Professor. Elected to Graduate Faculty, 4/97.**
- 1/90 -12/94 Department of Biomedical Engineering, Duke University, Durham, NC  
**Assistant Research Professor.**
- 6/88 -12/89 Bulgarian Academy of Sciences, Sofia, Bulgaria  
**Assistant Professor.**
- 12/86 -5/88 Department of Biomedical Engineering, Duke University, Durham, NC  
**Visiting Research Fellow.**
- 1/86 -12/86 Bulgarian Academy of Sciences, Sofia, Bulgaria  
**Assistant Professor**

### ***Education***

- 1982–6 Ph.D. in Biophysics from the Central Laboratory of Biophysics (Section Bioengineering), Bulgarian Academy of Sciences, Sofia, Bulgaria
- 1980–2 M.S. in Physics from the Department of Physics, Sofia University, Bulgaria

### ***Honors and Awards***

- 2015 **Discovery Innovation Award**, Johns Hopkins School of Medicine
- 2013 **NIH Director's Pioneer Award**
- 2012 **Murray B Sachs Endowed Chair**, Johns Hopkins University
- 2010 **Fellow** of the Biomedical Engineering Society
- 2010 **Fellow** of the American Heart Association
- 2009 **William R. Brody Faculty Scholar** (Named Chair), Johns Hopkins University
- 2009 **Chair**, Gordon Research Conference on Cardiac Arrhythmia Mechanisms
- 2008 **Fellow** of the Heart Rhythm Society
- 2007 **Vice Chair**, Gordon Research Conference on Cardiac Arrhythmia Mechanisms
- 2005 **Award for Excellence in Research and Scholarship**, Tulane University
- 2004 **Astor Visiting Lectureship**, Oxford University, UK
- 2003 **Fellow**, American Institute for Medical and Biological Engineering
- 2002 **Outstanding Researcher Award**, Tulane School of Engineering
- 2002-2006 **Established Investigator Award**, American Heart Association
- 2001-2002 **Fulbright Distinguished Scholars Research Award**
- 2000 **Lee H. Johnson Award for Teaching Excellence**, Tulane University
- 2000 **AETMB Teaching Award**, Department of Biomedical Engineering, Tulane University
- 1999 **AETMB Teaching Award**, Department of Biomedical Engineering, Tulane University

## ***Awards to Members of Trayanova Laboratory and Trainee Co-authors***

- 2016 Melanie Zile, PhD student, winner, Student Poster Competition, Cardiac Mechanoelectric Coupling and Arrhythmias, Freiburg, Germany
- 2016 Alexandra Bardeceanu, PhD student, David C. Gakenheimer Fellowship award
- 2015 Melanie Zile, PhD student, David C. Gakenheimer Fellowship award
- 2015 Hermenegild Arevalo, postdoctoral fellow, **winner**, Young Investigator Award Competition, *clinical category*, Heart Rhythm Society Scientific Sessions
- 2015 Sohail Zahid, PhD student, awardee, NSF Graduate Fellowship
- 2015 Eran Ukwatta, postdoctoral fellow, **winner**, Imaging Network Symposium, Ontario, Canada
- 2015 Sohail Zahid, PhD student, awardee, ARCS Foundation Scholarship award
- 2014 Eran Ukwatta, postdoctoral fellow, BME Centennial Fellowship award
- 2014 Lukas Rantner, PhD student, first-author paper selected as best of 2013 in the journal Heart Rhythm
- 2014 Kelly Chang, PhD student, ARCS Foundation Scholarship award
- 2013 Hermenegild Arevalo, PhD student, *finalist*, Young Investigator Award Competition, Electrophysiology Society
- 2013 Thomas OHara, postdoctoral fellow, awardee, NIH post-doctoral fellowship
- 2013 Lukas Rantner, PhD student, **winner**, Stefan-Schuy Prize for best paper, Austrian BME Society
- 2013 Kathleen McDowell, PhD student, **winner**, Best poster presentation, Gordon Research Conference on Cardiac Arrhythmia Mechanisms
- 2013 Fijoy Vadakkumpadan, awardee, Smith Charitable Foundation Award
- 2013 Takashi Ashihara, former member and co-author with Dr. Trayanova, **winner**, Suzuken Memorial Foundation Award of the Japanese Society of Electrophysiology for publication in the journal Circulation Research with Dr. Trayanova
- 2012 Fijoy Vadakkumpadan, awardee, AHA Scientist Development Award
- 2012 Patrick Boyle, postdoctoral fellow, **winner**, poster competition, Physiome meeting
- 2012 Jason Constantino, PhD student, awardee, Siebel Scholarship
- 2012 Kathleen McDowell, PhD student, awardee, AHA pre-doctoral fellowship
- 2012 Patrick Boyle, postdoctoral fellow, *finalist*, Rosa Delgani Young Investigator Award, CinC meeting
- 2012 Kathleen McDowell, PhD student, **winner**, Jos Willems Young Investigator Award, ISCE meeting
- 2011 Brent Millare, PhD student, awardee, NIH pre-doctoral fellowship
- 2011 Hiroshi Ashikaga, *finalist*, Young Investigator Award Competition, AHA Scientific Sessions
- 2011 David Krummen, *finalist*, Young Investigator Award Competition, AHA Scientific Sessions
- 2011 Hiroshi Ashikaga, **winner**, Young Investigator Award Competition, 4th Asia Pacific Heart Rhythm Society Scientific Session
- 2011 Jason Constantino, PhD student, and Seth Weinberg, co-author, third places in the trainee poster competition, Gordon Research Conference on Cardiac Arrhythmia Mechanisms
- 2010 Jason Constantino, PhD student, awardee, NIH pre-doctoral fellowship
- 2010 Jason Bayer, PhD student, awardee, AHA pre-doctoral fellowship
- 2010 Jason Bayer, PhD student, *finalist*, Young Investigator Award Competition, ISE meeting
- 2009 Hermenegild Arevalo, PhD student, awardee, NIH pre-doctoral fellowship
- 2009 Kathleen McDowell, PhD student, awardee, NSF pre-doctoral fellowship
- 2009 Carolyn Park, undergraduate student, PURA award, Johns Hopkins University
- 2009 Grace Tan, undergraduate student, **winner**, trainee poster competition, Tissue-level Arrhythmia Mechanisms, Gordon Conference on Cardiac Arrhythmia Mechanisms
- 2009 Dr. Takashi Ashihara, **winner**, 2009 Young Investigator Award, Japanese Society of Electrophysiology, Kyoto, Japan
- 2009 Lukas Rantner, PhD student, awardee, Doctoral Fellowship, Austrian Academy of Sciences
- 2008 Grace Tan, undergraduate student, PURA award, Johns Hopkins University
- 2008 Dr. Gernot Plank, **winner**, Stefan Schuy Award of the Austrian Society of Biomedical Engineering
- 2007 Martin Bishop, **winner**, student poster competition, Organ-level Arrhythmia Mechanisms, Gordon

- Research Conference on Cardiac Arrhythmia Mechanisms
- 2006 Molly Maleckar, PhD student, **winner**, Outstanding Graduate Student Award, Tulane School of Engineering
- 2006 Brock Tice, PhD student, **winner**, Outstanding Research Graduate Student Award, Department of Biomedical Engineering, Tulane University
- 2005 Martin Bishop, **winner**, student paper competition, IEEE EMBC annual meeting
- 2005 Brock Tice, PhD student, AHA pre-doctoral fellowship
- 2005 Molly Maleckar, PhD student, **winner**, Best Poster Presentation, Organ/Tissue Category, Gordon Conference on Cardiac Arrhythmia Mechanisms, St. Ivez, CA
- 2005 Weihui Li, PhD student, **winner**, Outstanding Graduate Student Award, Tulane Engineering School
- 2004 Dr. Blanca Rodriguez, postdoctoral fellow, **winner**, Young Investigator Award, Heart Rhythm Society Scientific Sessions
- 1999 Ezana Azene, MS student, **winner**, Rosana Delgani Young Investigator Award, Computers in Cardiology
- 1999 James Wall, undergraduate student, *finalist*, EMBS/BMES Student Competition
- 1997 Kirill Skouibine, PhD student, *finalist*, EMBS Student Competition

### ***Scientific Review Activities***

- *Book Editor:*

Cardiac Defibrillation: Mechanisms, Challenges and Implications, InTech Publishing, 2011

- *Journal Associate Editor:*

Heart Rhythm, January 2014 – present

Frontiers in Computational Physiology and Medicine, 2010 – present

IEEE Transactions on Biomedical Engineering, 1997-2006

- *Journal Editorial Board Member:*

Heart Rhythm Journal, 2005 – present

American Journal of Physiology, Heart and Circulatory Physiology, 2011 – present

In Silico Pharmacology, 2012 – present

- *Area Editor:*

IEEE Reviews in Biomedical Engineering, 2008 – 2015

- *NIH Review Service:*

NIH Directors New Innovator Award, 2014 -present NIH

MABS Study Section, member 2011-2012

ESTA Study Section, member 2005 – 2009

ESTA Study Section, ad hoc member 2004 – 2005 NIH,

Chair, BRP Special Study Section (ZRG) 2004 – 2005

AHA, Electrophysiology Study Section, 2003 – 2004

CVA Study Section, ad hoc member 2000 – 2003

NSF, Bioengineering Directorate, 1999 Israeli National Science Foundation,

2014 Swedish Academy of Sciences, 2013-2014

Hong Kong Research Council, 2008

Swiss National Academy of Sciences, 1999

Cornell Theory Center, 1999

- *NIH NHLBI Strategic Planning Committee, 2006:*

Group on Bioinformatics and Computational Biology

- *Abstract Reviewer:*

International Society for Computerized Electrocardiology, Heart Rhythm Society, American Heart Association Scientific Sessions

- *Reviewer, Young Investigator Competitions:*

North American Society of Pacing and Electrophysiology

• *Reviewer, Journals (selected):*

Science Translational Medicine, Nature Communications, Circulation Research, Circulation, Circulation Electrophysiology and Arrhythmias, Biophysical Journal, Journal of the American College of Cardiology, Cardiovascular Research, Heart Rhythm, Journal of the American College of Cardiology, Journal of Cardiovascular Electrophysiology, American Journal of Physiology, Progress in Biophysics and Molecular Biology, IEEE Transactions on Biomedical Engineering, Annals of Biomedical Engineering, Drug Metabolism and Pharmacokinetics, Chaos, Journal of Electrocardiography, Journal of Mathematical Biology, Mathematical Biosciences, Journal of Theoretical Biology, Medical and Biological Engineering and Computing, CRC Critical Reviews in Biomedical Engineering, Mathematical Biosciences, Philosophical Transactions of the Royal Society London, Physical Review, Journal of Physiology, Experimental Physiology, PLoS One, PLoS Computational Biology, Progress in Biophysics and Molecular Biology, Drug Discovery Today: Disease Models

***Other Professional Service***

2016 Session Chair, Japanese Heart Rhythm Society, Sapporo, Japan  
2016 Session Chair, ISC2016, Tokyo, Japan  
2016 Session Chair, Cardiostim meeting, Nice, France  
2016 Session Chair, Western Atrial Fibrillation Symposium, Park City, Utah  
2015 Session Chair, TRM Forum, Lugano, Switzerland  
2015 Char of multiple sessions, Heart Rhythm Society Scientific Sessions  
2013-present CIPA Steering Team, FDA  
2013-present American Heart Association, Mid-Atlantic Affiliate Research Committee  
2013-present AIMBE membership committee  
2013 Session Chair, TRM Forum, Lugano, Switzerland  
2013 Session Chair, Cardiac Electrophysiology Society meeting  
2013 Session Chair, 2013 IEEE EMBC meeting  
2012-present Heart Rhythm Society Publications Committee  
2012 – 2013 Track Chair, 2013 IEEE EMBC meeting  
2012 Cardiac Electromechanics Minisymposium Organizer, 8th European Solid Mechanics Conference  
2011 Session Chair, American Heart Association Scientific Sessions  
2011 Minisymposium Organizer, ICNAAM meeting  
2011 Theme Chair, IEEE EMBC meeting  
2011 Trainee Competition Judge, Gordon Research Conference on Cardiac Arrhythmia Mechanisms  
2010 Session Chair, Cardiac Electrophysiology Society meeting  
2010 Session Chair, Computing in Cardiology meeting  
2010 Session Chair, ISCE meeting  
2009 Session Chair, BMES Annual meeting  
2007 – 2009 Chair, Gordon Conference on Cardiac Arrhythmia Mechanisms  
2007 – 2016 Cardiostim meeting, Program Committee  
2006 – 2010 Heart Rhythm Society Scientific Sessions Program Committee  
2008 Session Chair, American Heart Association Scientific Sessions  
2008 Session Chair, BMES Annual meeting  
2008 Session Chair, Heart Rhythm Society Scientific Sessions  
2008 Breakout Session Chair, Workshop on Computer Methods for Cardiovascular Devices  
2007 Vice Chair, Gordon Conference on Cardiac Arrhythmia Mechanisms  
2007 Debate Chair, Heart Rhythm Society Scientific Sessions  
2007 Session Organizer and Chair, ISCE meeting  
2007 Program Committee Member, Cardiac Mechano-electric Feedback Meeting  
2006 Session Chair, Heart Rhythm Society Scientific Sessions  
2005 – 2006 Theme and Track Chair, EMBS Annual meeting  
2005 Session Chair, Heart Rhythm Society Scientific Sessions  
2004 – 2005 Program Committee Member, IASTED meetings  
2004 Session Chair, Meeting of the Physiological Society, Oxford

- 2004 Session Chair, IASTED meeting
- 2004 Session Chair, Fourth International Workshop on Computer Simulation and Experimental Assessment of Electrical Cardiac Function
- 2003 Session Chair, NASPE meeting
- 2002 Session Chair, Third International Workshop on Computer Simulation and Experimental Assessment of Electric Cardiac Function
- 2002 Cardiopulmonary Theme Chair, EMBS/BMES Conference
- 2002 Electrophysiology Track Chair and Session Chair, EMBS/BMES Conference
- 2002 Session Chair, Mechano-Electrical Feedback Meeting
- 2002 Session Chair, NASPE meeting
- 2001 Session Chair (2 sessions), IEEE/EMBS Conference
- 2001 Poster Session Moderator, IUPS Satellite Meeting "The Integrated Heart: Cardiac Structure and Function"
- 2001 Program Committee, Special Topic Conference on Medical and Biological Modeling
- 2000 Session Chair, Workshop on Mapping of Control of Complex Cardiac Arrhythmias
- 2000 Session Chair (3 sessions), World Congress and IEEE EMBS Conference
- 1999 Session Chair, EMBS/BMES meeting
- 1998 Track Co-Chair and Session Chair, IEEE EMBS Meeting
- 1997 Session Chair, Workshop "Computational Biology of the Heart"
- 1997 Track Chair and Session Chair, BMES Annual Meeting
- 1996 Conference Animator and Session Chair, IEEE/EMBS Conference
- 1994 Session Chair, World Congress on Medical Physics and Biomedical Engineering
- 1992 Session Chair, IEEE EMBS Conference

### ***Professional Memberships***

- Fellow:** Heart Rhythm Society
- Fellow:** American Heart Association
- Fellow:** American Institute for Medical and Biological Engineering
- Fellow:** Biomedical Engineering Society IEEE Engineering in Biology and Medicine Society
- International Society for Heart Research
- International Society for Computerized Electrophysiology
- Society for Industrial and Applied Mathematics
- American Association for Advancement of Science Cardiac Muscle Society
- Cardiac Electrophysiology Society
- Biophysical Society
- New York Academy of Sciences
- American Society for Engineering Education
- Sigma Xi Research Society

### ***External Advisory Boards, External Institutional Evaluation***

- 2015-present External Advisory Board, SCI Institute, University of Utah
- 2011 Chair of evaluation panel, Center for Biomedical Computing at Simula Research Laboratory, Oslo, Norway
- 2010 -2014 Member, National Biomedical Computation Resource Advisory Committee, UCSD

### ***Johns Hopkins University Institutional Service***

- 2014-present Research Council, School of Medicine, Johns Hopkins University
- 2014-2015 Whiting School of Engineering Dean of Research Search Committee
- 2014-2015 Team Leader, Research Council, School of Medicine, Johns Hopkins University
- 2013- 2014 Master Mentor Program, Johns Hopkins University
- 2013- 2014 BME Centennial Postdoctoral Fellowship Committee, Johns Hopkins University
- 2012-2013 Johns Hopkins University Provost Search Committee
- 2012-2013 Whiting School of Engineering Centennial Committee
- 2011 JHU High Performance Computing Committee

2008 Ad hoc tenure committee, Whiting School of Engineering  
2007 Whiting School of Engineering International Affairs Advisory Committee  
2007 JHU Health Professions Committee  
2007 Applied Math and Statistics Department Review Committee

### ***Tulane University Institutional Service***

2005 Honors Committee, School of Engineering  
2005 Honor Board, Tulane University  
2003 - 2005 Faculty Search Committee, Department of Biomedical Engineering  
2005 Outstanding Researcher Award Committee, School of Engineering  
2004 Presidential Early Career Development Awards Committee, Tulane University  
2003 Graduate Studies Committee, Department of Biomedical Engineering  
2003 Outstanding Researcher Award Committee (Chair), School of Engineering  
2003 Associate Dean of Research Search Committee, School of Engineering  
2002-2003 Promotion and Tenure Committee, School of Engineering  
2002-2003 Honors Committee, School of Engineering  
2002-2003 Faculty Search Committee (5 positions), Tulane Department of Mechanical Engineering  
2000-2001 ABET Task Force, Department of Biomedical Engineering  
2000-2001 Assessment Committee, School of Engineering  
2000 Undergraduate Curriculum Task Force, Department of Biomedical Engineering  
2000 Search and Rating Committee, School of Engineering  
1999-2005 Member, Tulane University Senate Committee on Teaching Quality  
1995-1999 International Program Committee, School of Engineering  
1995-2001 Director of Undergraduate Studies, Department of Biomedical Engineering  
1996-1998 Interviewer, Health Professions Advising Committee  
1995-1997 BMES Faculty Adviser, Department of Biomedical Engineering  
1995-1998 Member, Faculty Search Committee, Department of Biomedical Engineering

### ***Courses Taught at John Hopkins University***

BME 580.421 Systems Bioengineering I: Cellular and Cardiovascular Engineering. Core undergraduate course in Biomedical Engineering. Taught every year since 2006 (except 2015), 120-140 students in the course. The highest student-ranked course in the Department of Biomedical Engineering for 2010 and 2011  
EN.580.739 Advanced Seminars in Cardiac Electrophysiology and Mechanics, taught every semester since 2011

### ***Courses Taught at Tulane University***

BMEN 201 Introduction to BME Design Methods  
BMEN 272 Circuits, Systems and Signals  
BMEN 278 Circuits, Systems and Signals Lab  
BMEN 310/610 Electrophysiology  
BMEN 361/761 Introduction to Bioelectricity  
BMEN 490 Research and Professional Practice I  
BMEN 611 Cardiac Electrophysiology  
BMEN 676 Advanced Topics in Excitable Media  
BMEN 671 BMEN Departmental Seminar  
BMEN 613/MATH774 Cardiac Modeling

### ***Academic Mentorship***

#### ***• Postdoctoral Research Advisor***

Dr. Yasser Aboelkassem, January 2015 – present  
Dr. Dongdong Deng, August 2013 – present  
Dr. Dafang Wand, December 2012 – present  
Dr. Adityo Prakosa, August 2013 – September 2015

- Dr. Hemenegild Arevalo, November 2013 – September 2015  
 Dr. Eran Ukatta, October 2013 – January 2016  
 Dr. Yong-tae Kim, September 2012-September 2013  
 Dr. Tom O'Hara, October 2011 – 2015  
 Dr. Patrick Boyle, August 2011- February 2014  
 Dr. Ge Wang, March 2012 – March 2013  
 Dr. Xiaozhong Chen, January 2008 – February 2012  
 Dr. Kimoo Lim, September 2010-September 2011  
 Dr. Fijoy Vadakkumpandan, July 2007 – June 2011  
 Dr. Gernot Plank, October 2006 – April 2008  
 Dr. Viatcheslav Gurev, November 2004 – October 2011  
 Dr. Takashi Ashihara, October 2002 – April 2004  
 Dr. Blanca Rodriguez, May 2002 – August 2004  
 Dr. Alexander Komendantov, June 2001 – May 2004  
 Dr. James Eason, July 2000 – September 2002  
 Dr. Edward Vigmond, August 1999 – July 2001
- *Ph.D. Dissertation Research Advisor*
    - Director:
      - Ryan O'Hara
      - Alexandra Bardeceanu
      - Thomas Karathanos
      - Joseph Yu
      - Sohail Zahid
      - Melanie Zile
      - Kelly Chang
      - Brent Millare
      - Yuxuan Hu, graduated January 2014
      - Kathleen McDowell, graduated July 2013
      - Lukas Rantner, graduated June 2013
      - Jason Constantino, graduated July 2013
      - Hermenegild Arevalo, graduated November 2013
      - Jason Bayer, graduated February 2013
      - Brock Tice, graduated September 2009
      - Xiao Jie, graduated March 2009
      - Molly Maleckar, graduated December 2008
      - Weihui Li, graduated March 2007
      - Sam Kuo, left the program 2006
      - David Bourn, graduated March 2006
      - ason Meunier, graduated January 2002
      - Felipe Aguel, graduated August 2001
      - Kirill Skouibine, graduated August 1998 (co-directed with Dr. Moore)
    - PhD Committee Member:
      - Claire Zhao
      - Matt Walker
      - Boombin Limpitikul
      - Laura Gautier (graduated 2013)
      - Sarah Parks (graduated 2012)
      - Seth Weiberg (graduated 2011)
      - Rajesh Babu Sekar (graduated 2009)
      - Mike Tadross (graduated 2008)
      - Joshua Cysyk (graduated 2008)
      - Valerie Franz (graduated 2007)
      - Kathleen Rhea (graduated 2004)
      - Brett Wingier (graduated 2003)
      - Adam Cates (graduated 1999)
      - Delilah Huelsing (graduated 1998)

George Cao (graduated 1999)

Lori Vidal (graduated 1999)

- PhD External Examiner:

Simone Scacchi, University of Pavia, Italy, 2007

Eugene Seneta, University of Technology, Sydney, Australia, 1997.

Amr Al Abed, The University of New South Wales, Australia 2011.

• *M.S. Thesis Research Advising*

- Director:

Carolyn Park (graduated 2011)

Shruthi Shankar (graduated 2010)

Yuxuan Hu (graduated 2010)

Sammy Long (graduated 2009)

Linmiao Xu (graduated 2009)

Claire Larson (graduated 2004)

Carlos Haro (graduated 2004)

Matthew Hillebrener (graduated 2003)

Lubomir Dragnev (graduated 2003)

Craig Campbell (graduated 2002)

Annette Lindblom (graduated 2000)

Cory Anderson (graduated 2000)

Gregory Siekas (graduated 1999)

Ezana Azene (graduated 1999)

Evan Atkinson (graduated 1999)

John T. Parry (graduated 1998)

Kristen Pasnak (graduated 1998)

Ira Nemeth (graduated 1998)

- Committee Member:

Lee Lovejoy (graduated 2000)

Darryl Overby (graduated 1997)

Rock Shi (graduated 1997)

Xiahong Wu (graduated 1996)

Michael Paris (graduated 1996)

Louis Lit (graduated 1996)

Tate Cantrell (graduated 1995)

Lisa Malden (graduated 1994)

• *Senior Projects Directed at Tulane University (\*Honors Thesis)*

2006 Paul George, David Siet

2004-2005 \*Jason Constantino

2003-2004 \*Hermenegild Arevalo, \*Brock Tice

2002-2003 \*Carlos Haro

2001-2002 \*Claire Larson, \*Ashley Schneider

2000-2001 \*Rachel Ruckdeschel, \*Craig Campbell, \*Mathew Hillebrener

1999-2000 \*Jason Gmyrek, Cristine Guidry

1998-1999 \*James Wall, Cory Anderson, \*Annette Lindblom

1997-1998 Abigail Moore (with Dr. Pollard), \*Ezana Azene, \*Evan Atkinson,

1996-1997 \*Peter Nelson, Garrett Sipple, Daniel Moller, \*Vipul Kapoor, \*Suzanne Baker, \*Marcella Woods (with Dr. Pollard)

1995-1996 \*Mark Bray, \*Felipe Aguel, Kristen Pasnak

1994-1995 \*Shrinivas Ganesh, Darren Porras

1993-1994 \*Rachel Winokur

1992-1993 \*Lisa Malden

• *Undergraduate research projects at JHU*

2014-present: Vignesh Ramchandran, Kaitlyn White, Erica Wood, Michael Murphy

2013-2014 Eric Xie, Anish Dalal, Kristina Li

2012-2014 Alexander Jebb



2012-2013 Seth Hochberg  
2007-2010 Carolyn Park  
2008-2009 Ted Lee  
2007-2009 Grace Tan  
2006-2008 Alex Artaki, Linmiao Xu, Francisco Conjitoch, Josef Wang

## ***Funding***

### *Current Support*

Supporting Agency: NIH  
Award: \$1,235,167  
Duration: 01/01/16-11/30/19  
Title: Exploration of Arrhythmogenic Triggers and Substrates in Heart Failure  
Principal Investigator Natalia A. Trayanova

Supporting Agency: SOM Discovery Innovation Award  
Award: \$50,000  
Duration: 07/01/15-06/30/16  
Title: Personalized Virtual Heart: Application to Ablation of Persistent Atrial Fibrillation in Patients with Fibrosis  
Principal Investigator Natalia A. Trayanova

Supporting Agency: *in*Health Pilot Project Discovery Award  
Award: \$75,000  
Duration: 01/01/16-04/30/17  
Title: Personalized Risk Stratification for Sudden Cardiac Death Using Cardiac MRI and Virtual Heart Electrophysiologic Studies (PuRSUit-Virtual Heart)  
Principal Investigator Katherine Wu  
Key personnel Natalia A. Trayanova

Supporting Agency: **NIH Director's Pioneer Award**  
Award: \$4,075,000  
Duration: 9/13-8/18  
Title: Virtual Electrophysiology Laboratory  
Principal Investigator Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$2,715,000  
Duration: 6/11-7/16  
Title: Resynchronizing the Failing Heart: Insights from a Multiscale Cardiac Model  
Principal Investigator Natalia A. Trayanova

Supporting Agency: NSF  
Award: \$600,000 (Trayanova portion)  
Duration: 9/11-8/15  
Title: CDI Type II: Collaborative Research: From Ion Channels to Blood Flow and Heart Sounds  
MPIs: Mittal, Trayanova, Huang

### *Completed Awards*

Supporting Agency: NIH  
Award: \$800,000 (Trayanova portion)  
Duration: 4/11-12/15  
Title: Redox Modification of the Arrhythmic Substrate in Heart Failure  
MPIs: Winslow, Trayanova, O'Rourke

Supporting Agency: NIH  
Award: \$300,000 (Trayanova portion)  
Duration: 4/10-3/15  
Title: Role of Cardiomyocyte Mitochondria in Heart Disease: An Integrated Approach  
MPIs: O'Rourke, Trayanova, Bers, Blatter, Van Eyk

Supporting Agency: NIH (BRP grant)  
Award: \$915,120 (Trayanova portion)  
Duration: 1/10-6/14  
Title: Improved Targeting and Assessment of Electrophysiology Intervention  
Principal Investigator: Henry Halperin  
Subcontract PI: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$375,685 (Trayanova portion)  
Duration: 07/10-06/15  
Title: LV Structural Predictors of Sudden Cardiac Death  
Principal Investigator: Katherine Wu  
Co-investigator: Natalia A. Trayanova

Supporting Agency: NIH (pre-doctoral fellowship)  
Award: \$123,528  
Duration: 2/10-1/13  
Title: Image-Based Models that Predict Arrhythmia Morphology in Post-Infarction Hearts  
Principal Investigator: Natalia A. Trayanova  
Graduate Assistant: Hermenegild Arevalo  
Supporting Agency: NIH (pre-doctoral fellowship)  
Award: \$124,140  
Duration: 7/10-6/13  
Title: Image-based models of electromechanics in normal and failing hearts  
Principal Investigator: Natalia A. Trayanova  
Graduate Assistant: Jason Lance Constantino

Supporting Agency: NSF  
Award: \$300,000  
Duration: 1/10-12/12  
Title: Mechanisms of Mechanically-Induced Arrhythmias in Myocardial Ischemia  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$2,130,611  
Duration: 1/07-12/11  
Title: Defibrillation Mechanisms in Infarcted Hearts  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$165,000 (Trayanova portion)  
Duration: 7/10-6/12  
Title: Early Detection and Mapping of Ischemia using Myocardial Elastography  
Principal Investigator: Elisa Konofagou (Columbia University)  
Subcontract PI: Natalia A. Trayanova

Supporting Agency: NIH (R21)  
Award: \$137,333 (Trayanova portion)  
Duration: 07/10-06/12

Title: Termination of Cardiac Arrhythmia by High Frequency Electric Field  
Principal Investigator: Leslie Tung  
Co-investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$1,029,219 (Trayanova portion)  
Duration: 5/07-4/12  
Title: Virtual Electrode Hypothesis for Defibrillation  
Principal Investigator: Igor Efimov (Washington University)  
Co-PI/subcontract PI: Natalia A. Trayanova

Supporting Agency: NIH (R21 grant)  
Award: \$170,000 (Trayanova portion)  
Duration: 1/10-12/11  
Title: Noninvasive Conduction Mapping Using Electromechanical Wave Imaging  
Principal Investigator: Elisa Konofagou (Columbia University)  
Subcontract PI: Natalia A. Trayanova

Supporting Agency: Medtronic Inc (External Research Program Award)  
Award: \$95,000  
Duration: 7/10-6/11  
Title: A Novel Method to Predict QT interval Instability from Intracardiac Electrograms  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: FDA  
Award: \$92,500  
Duration: 1/10-12/11  
Title: Critical Path Project: Pediatric Defibrillation  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: American Heart Association (pre-doctoral fellowship)  
Award: \$52,900  
Duration: 07/10 - 06/12  
Title: Mechanisms of T-wave Alternans in Human Heart Failure  
Principal Investigator: Natalia A. Trayanova  
Graduate Assistant: Jason Bayer

Supporting Agency: NSF  
Award: \$10,000  
Duration: 12/08-12/09  
Title: 2009 Cardiac Arrhythmia Mechanisms Gordon Research Conference  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NIH (R13 grant)  
Award: \$15,000  
Duration: 12/08-12/09  
Title: 2009 Cardiac Arrhythmia Mechanisms Gordon Research Conference  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$933,388  
Duration: 9/05-8/09  
Title: Cardiac Tissue Structure in the Defibrillation Process  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NSF

Award: \$344,098  
Duration: 9/06-8/09  
Title: Shock-induced Arrhythmogenesis in Regional Myocardial Ischemia  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$305,735 (JHU portion) + \$221,888 (Tulane portion)  
Duration: 09/04-08/08  
Title: The role of electroporation in defibrillation  
Principal Investigator: Igor Efimov (Washington University)  
Co-PI: Natalia A. Trayanova

Supporting Agency: AHA post-doctoral fellowship  
Award: \$70,000  
Duration: 07/07-06/09  
Title: Defibrillation mechanisms in ventricular dilatation: the role of active deformation  
Principal Investigator: Natalia A. Trayanova  
Post-doctoral fellow: Viatcheslav Gurev

Supporting Agency: AHA pre-doctoral fellowship  
Award: \$33,538  
Duration: 07/06-06/08  
Title: Investigation into the Mechanisms of Defibrillation Failure using High-Resolution Models of Cardiac Tissue  
Principal Investigator: Natalia A. Trayanova  
Graduate assistant: Brock Tice

Supporting Agency: AHA, Established Investigator Award  
Award: \$310,000  
Duration: 8/02-7/06  
Title: Analysis of defibrillation mechanisms in acute ischemia  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: Medtronic Inc.  
Award: \$95,000  
Duration: 7/04-6/06  
Title: Research Services Agreement  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$114,400 (Tulane portion)  
Duration: 12/02-11/07  
Title: Electrophysiological implications of cardiac bidomain  
Principal Investigator: John Wikswo (Vanderbilt University)  
Investigator: Natalia A. Trayanova

Supporting Agency: NIH, Pre-NPEBC  
Award: \$1,240,887  
Duration: 5/03 - 4/06  
Title: Biocomputing: Integrating Molecular/Organ-Level Function  
MPIs: Donald Gaver, Lisa J. Fauci  
Investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$792,433  
Duration: 7/99-6/05

Title: Cardiac Tissue Structure in the Defibrillation Process  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: Tulane Wall Fund  
Award: \$150,000  
Duration: 6/01 – 7/04  
Title: Center for Computational Science  
Principal Investigator: Lisa J. Fauci, Donald Gaver, Ricardo Cortez  
Investigator: Natalia A. Trayanova

Supporting Agency: Whitaker Foundation (subcontract to Washington&Lee University)  
Award: \$41,000 (Tulane portion)  
Duration: 9/02-8/04  
Title: The role of phase singularities in determining defibrillation efficacy  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NSF  
Award: \$220,000  
Duration: 9/98-2/03  
Title: ICD Transvenous lead placement: An active bidomain heart/torso simulation study of defibrillation efficacy  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NSF  
Award: \$22,000  
Duration: 9/98-2/03  
Title: REU Supplement to NSF GOALI award  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: DOE  
Award: \$1,920,000  
Duration: 5/01 – 6/03  
Title: Livingston Digital Millennium Center for Computational Science  
Principal Investigator: Lisa J. Fauci, Donald Gaver, Ricardo Cortez  
Investigator: Natalia A. Trayanova

Supporting Agency: American Heart Association  
Award: \$90,000  
Duration: 7/01-12/02  
Title: Roles of Structure and Heterogeneity in the Induction and Maintenance of Atrial Reentry  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NIH  
Award: \$15,000 (Tulane portion)  
Duration: 3/01-2/02  
Title: Magnetic Field of the Heart  
Principal Investigator: John Wikswo (Vanderbilt University)  
Investigator: Natalia A. Trayanova

Supporting Agency: Tulane ACLRT  
Total Award: \$6740  
Duration: 1999-2000  
Title: Virtual Bioelectricity Labs in BMEN 361/761  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: Louisiana Board of Regents (R&D Program)  
Total Award: \$109,713 plus \$12,500 match in cash  
Duration: 9/98-8/01  
Title: Cardiac Tissue in an Electric Field  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: ACLRT, Tulane University  
Total Award: \$7,000  
Duration: 8/99-9/00  
Title: Virtual Bioelectricity Labs  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: American Heart Association  
Total Award: \$25,000  
Duration: 9/98-8/99  
Title: Analysis of electrode configurations in a high-resolution model of cardiac defibrillation  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: Ventritex, a division of St. Jude Medical (research agreement)  
Total Award: \$50,000  
Duration: 9/97-8/98  
Title: Bidomain Model of the Ventricles  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: Medtronic, Inc. (research agreement)  
Total Award: \$17,000  
Duration: 9/97-8/99  
Title: Development of a Human Atrial Model  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: Medtronic, Inc. (research agreement)  
Total Award: \$7,000  
Duration: 10/97-9/99  
Title: Effects of Ablation and Shocks on Atrial Fibrillation  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: The Whitaker Foundation  
Total Award: \$179,205  
Duration: funding ended August 1, 1996  
Title: The Bidomain Model with Periodic Intracellular Junctions: A Study of Cardiac Stimulation  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NSF (subcontract from Duke University)  
Total Award: \$10,852  
Duration: summer 1995  
Title: Cardiac Membrane Polarization in Strong Electric Fields  
Investigator: Natalia A. Trayanova

Supporting Agency: NSF (subcontract from Duke University)  
Total Award: \$11,181  
Duration: summer 1996  
Title: Cardiac Membrane Polarization in Strong Electric Fields  
Investigator: Natalia A. Trayanova

Supporting Agency: Tulane Committee on Research  
Total Award: \$4,000  
Duration: summer 1996  
Title: Membrane Electroporation during the Defibrillation Shock  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: NSF  
Total Award: \$1,665  
Duration: 9/15/96 - 3/15/96  
Title: International Travel to Attend the 18th Conference of the IEEE EMBS, Nov. 1996, Amsterdam, The Netherlands  
Principal Investigator: Natalia A. Trayanova

Supporting Agency: LEQSF – Enhancement Program  
Total Award: \$126,000  
Duration: one year  
Title: Biomedical Engineering Enhancement: Establishing an Integrated Tissue Engineering Facility  
Principal Investigator: Donald Gaver  
Co-PI: Natalia A. Trayanova

Supporting Agency: NSF, Group Infrastructure Grant  
Total Award: \$528,779  
Duration: 9/97 – 8/02  
Title: Computational Science in Biomedical Systems  
Principal Investigator: Lisa J. Fauci  
Co-PI: Natalia A. Trayanova

### ***Patents***

- Patent Number: EP1761300-A1 Title: Implantable cardioverter defibrillation electrode system for defibrillation therapy
- Application Number: 20060020316 (filed 2004, issued 2006) Title: Implantable cardioversion and defibrillation system including intramural myocardial electrode
- Application Number: 20120215269 (filed 2010, issued 2012) Title: Method and Device for Treating Cardiac Arrhythmias
- Application Number: 20130102912 (filed 2010, issued 2013) Title: NOVEL METHODOLOGY FOR ARRHYTHMIA RISK STRATIFICATION BY ASSESSING QT INTERVAL INSTABILITY
- Application Number: 20140088943 (filed 2012, issued 2014) Title: SYSTEM AND METHOD FOR PLANNING A PATIENT-SPECIFIC CARDIAC PROCEDURE
- Application Number: 20140122048 (filed 2012, issued 2014) Title: SYSTEM AND METHOD FOR PERSONALIZED CARDIAC ARRHYTHMIA RISK ASSESSMENT BY SIMULATING ARRHYTHMIA INDUCIBILITY
- Application PCT/US13/39680(submitted 2013) Title: A METHOD FOR LOW VOLTAGE DEFIBRILLATION WITH FAR-FIELD STIMULI OF VARIABLE TIMINGS BASED ON FEEDBACK FROM THE HEART
- Application PCT/US13/46531 (submitted 2013) Title: A METHOD FOR COMPUTATIONALLY PREDICTING OPTIMAL PLACEMENT SITES FOR INTERNAL DEFIBRILLATORS IN PEDIATRIC AND CONGENITAL HEART DEFECT PATIENTS
- Application C12794 (submitted 2013) Title: SUDDEN CARDIAC DEATH RISK ASSESSMENT BY ANALYSIS OF PATIENTS MYOCARDIAL WALL SHAPE
- Application FC12602-P12602-01 (submitted 2013) Title: PERSONALIZED COMPUTATIONAL MODELING OF ATRIAL FIBROSIS TO GUIDE CATHETER ABLATION OF ATRIAL FIBRILLATION
- Application C13278-P13278-01; 2240-373518 (submitted 2014) Title: Prediction of Targets for Catheter

Ablation of Persistent Atrial Fibrillation based on Analysis of Patient-Specific Fibrosis Patterns

- Application C13584 (submitted May 2015): Title: Simulation Prediction of Targets for Catheter Ablation of Left Atrial Flutter in Patients with Atrial Structural Remodeling
- Application C13583 (submitted May 2015), Title: Patient-Specific Modeling of the Heart for Prediction of Targets for Catheter Ablation of Ventricular Tachycardia in Patients with Implantable Cardioverter Defibrillators
- Application C14362 (submitted November 2016), Title: Risk Stratification for Ventricular Arrhythmia in Patients with Repaired Tetralogy of Fallot (TOF) via Image-Based Computational Simulations



## ***Selected Invited Talks***

- America heart Association Scientific Sessions, New Orleans, November 2016
- VT Symposium, New York, October 2016
- Institute for Engineering in Medicine, University of Minnesota, Minneapolis, September 2016
- Cardiac Mechanoelectric Coupling and Arrhythmias, Freiburg, Germany, September 2016 (keynote lecture and closing lecture)
- Gordon Research Conference on Healthcare Informatics, Hong Kong, July 2016
- Japanese Heart Rhythm Society, Sapporo, Japan, July 2016 (2 talks)
- ISC2016, Tokyo, Japan, July 2016 (keynote lecture)
- Cardiostim meeting, Nice, France, June 2016
- TRM Forum, Lugano, Switzerland, December 2015
- Asia-Pacific Heart Rhythm Scientific Sessions, Melbourne, Australia, November 2015
- Ohio State University Dorothy M. Davis Heart & Lung Research Institute's Annual Research Day (keynote address)
- Summer Course on Image-based Biomedical Modeling, Park City, UT July 2015 (keynote lecture)
- Lyric Institute, University of Bordeaux, June 2015
- Heart Rhythm Scientific Sessions, Boston, May 2015 (invited faculty, several talks)
- Stanford Biodesign Symposium, Boston, May 2015
- Arrhythmia Satellite Symposium, Physiome meeting, Auckland, New Zealand, April 2015 (keynote lecture)
- Gordon Research Conference on Cardiac Arrhythmia Mechanisms, Barga, Italy, March 2015
- Cell Biology of the Heart Symposium, Keystone, CO, March 2015
- Western Atrial Fibrillation Symposium, Park City, Utah, February 2015
- Cardiac Muscle Society, Baltimore, MD, February 2015 (keynote lecture)
- Center for Biomedical Image Computing and Analytics, University of Pennsylvania, Philadelphia, February 2015
- ICES, University of Austin, Austin, TX, January 2015
- Atrial Fibrillation Symposium, Orlando, FL, January 2015
- FDA CiPA Workshop, Washington DC, December 2014
- American Heart Association Scientific Sessions, Chicago, November 2014 (invited faculty)
- Cardiac Arrhythmias: Challenges for Diagnosis and Treatment, A symposium in honor of GR Mines, McGill University, Montreal, Canada, November 2014
- Women in EP Meeting, Orlando, FL, October 2014 (invited faculty)
- London VT Symposium, London, UK, September 2014
- SIAM Annual Meeting, Chicago, July 2014 (plenary lecture)
- Workshop on Large Scale Modeling of Cardiac Electrophysiology, Dalhousie University, Halifax, Canada, June 2014
- Cardiostim meeting, Nice, France, June 2014
- Radiology Department, Johns Hopkins School of Medicine, May 2014
- Heart Rhythm Scientific Sessions, San Francisco, May 2014 (invited faculty, four talks)
- Stanford Biodesign Symposium, Palo Alto, May 2014
- Medtronic Inc., Minneapolis, MN, April 2014
- Western Atrial Fibrillation Symposium, Park City, UT, March 2014
- Cardiovascular Research Center, University of Wisconsin - Madison, Madison, WI, January 2014
- The Texas Academy of Medicine, Science and Engineering. Austin, TX, January 2014 (keynote lecture)
- TRM Forum, Lugano, Switzerland, December 2013
- American Heart Association Scientific Sessions, Dallas, TX, November 2013 (invited faculty)
- MEDICON meeting, Seville, Spain, September 2013
- Denis Escande Symposium, Amsterdam, September 2013
- IEEE EMBC meeting, Osaka, Japan, July 2013 (keynote lecture)
- Europace, Athens, Greece, July 2013
- Modeling Physiological Flows Meeting, Sardinia, Italy, 2013
- Heart Rhythm Scientific Sessions, Denver, May 2012 (invited faculty, several talks)
- Stanford Biodesign Symposium, Denver, May 2013
- David Rosenbaum Symposium, Metro Health, Cleveland, May 2013
- Department of Biomedical Engineering, Stony Brook University, New York, March 2013

- SIAM Conference on Computational Science and Engineering, Boston, February 2013 (plenary speaker)
- Western Atrial Fibrillation Symposium, Park City, UT, March 2013
- Fourth Chilean Workshop on Numerical Analysis of Partial Differential Equations, Concepcion, Chile, January 2013 (invited talk)
- ICM Distinguished Seminar Series, Johns Hopkins University, December 2012
- IMAG Consortium, NIH, November 2012
- American Heart Association Scientific Sessions, Los Angeles, CA, November 2012 (invited talk)
- Physiome meeting, San Diego, November 2012 (plenary speaker)
- Metro Health Hospital, CWRU, Cleveland, OH, October 2012
- Department of Physiology, CWRU, Cleveland, OH, October 2012
- 4th Computational Pharmacy Workshop, Krakow, Poland, September 2012 (keynote speaker)
- 8th European Solid Mechanics Conference, Cardiac Electromechanics Minisymposium, Graz, Austria, July 2012 (invited talk)
- Cardiostim Meeting, Nice, France, June 2012 (2 invited talks)
- Cardiovascular Research Retreat, Department of Medicine, Johns Hopkins University, June 2012 (invited talk)
- Heart Rhythm Scientific Sessions, Boston, May 2012 (invited faculty, 3 talks)
- Murray B. Sachs Endowed Chair Installation Presentation, May, 2012
- Conference on Engineering Frontiers in Pediatric and Congenital heart Disease, Stanford University, April 2012 (keynote speaker)
- Biomedical Engineering Department, Johns Hopkins University, April 2012
- Cardiovascular Symposium, UC Davis, CA, March 2012
- Western Atrial Fibrillation Symposium, Park City, Utah, February 2012
- National Research Laboratory for Mitochondrial Signaling, Department of Physiology, College of Medicine, Inje University, Busan, South Korea, January 2012 (COOL Lecture)
- Seoul Mini-Workshop on recent Progress in Biosimulation, Seoul, South Korea, January 2012 (keynote speaker).
- Challenges in Computing Conference, Oslo, Norway, December 2011 (keynote speaker)
- CaMo Workshop, Simula Laboratory, Oslo, Norway, December 2011.
- Sixth International Workshop on Computer Simulation and Experimental Assessment of Electrical Cardiac Function, Lugano, Switzerland, December 2011.
- American Heart Association Scientific Sessions, Orlando, Florida, November 2011
- Center for Arrhythmia Research, University of Michigan School of Medicine, Ann Arbor, October 2011
- Cardiology, University of Michigan School of Medicine, Ann Arbor, October 2011 (Founders Lecture)
- Physiome meeting, Oxford, UK, July 2011.
- Imperial College London, UK, July 2011.
- St. Jude Medical, Sunnyvale, CA, June 2011 (Research Lyceum Lecture)
- St. Jude Medical, Silmar, CA, June 2011 (Research Lyceum Lecture)
- NFSI & ICBEM 2011 conference, Banff, Canada, May 2011 (plenary speaker).
- Heart Rhythm Society Scientific Sessions, San Francisco, CA, May 2011.
- American Congress on Pharmacometrics, San Diego CA, April 2011.
- Gordon Research Conference on Cardiac Arrhythmia Mechanisms, Galveston TX, February 2011.
- Department of Biomedical Engineering, Columbia University, NY, January 2011.
- NIH, National Institute for Aging, January 2011.
- FDA, Silver Springs, MD, December 2010.
- Boston Scientific, Inc, Minneapolis, MN, July 2010.
- Simula Research Laboratory, Oslo, Norway, June 2010.
- Cardiostim meeting, Nice, France, June 2010.
- Heart Rhythm Society Scientific Sessions, Denver, Co, May 2010.
- ISCE meeting, Albuquerque, NM, April 2010.
- Division of Cardiology, Johns Hopkins Medical Institutions, April 2010
- Department of Electrical Engineering and Computer Science, University of Calgary, Canada, March 2010.
- Beth Israel Deaconess Medical Center, Boston, MA, March 2010.
- UC Davis Cardiovascular Symposium, Davis, CA, February 2010.
- American Heart Association meeting, Orlando, November 2009.
- NHLBI/VCU workshop, Richmond, VA, October 2009

- University of Pittsburgh School of Medicine, Pittsburgh, October 2009
- Cardiac Physiome meeting, Cambridge, July 2009
- Japanese Society of Electrocardiology and Japanese Heart Rhythm Society Joint Meeting, Kyoto, July 2009 (2 invited presentations)
- ISHR meeting, Baltimore MD, June 2009.
- Heart Rhythm Society Scientific Sessions, Boston, MA, May 2008 (4 invited presentations).
- Mount Sinai, NYC, March 2009.
- Applied Math Department, JHU, November 2008.
- Joint JHU-Thisingua University meeting, Beijing, China, October, 2008
- BMES annual meeting, St. Louis, MO, October 2008.
- CARP User's Meeting. Banff, Canada, September 2008.
- Cardiostim meeting, Nice, France, June 2008.
- Heart Rhythm Society Scientific Sessions, San Francisco, CA, May 2008.
- Workshop on Multi-scale Modelling of the Heart, Auckland, New Zealand, March 2008 (plenary speaker).
- Workshop on Computer Methods for Cardiovascular Devices, Washington DC, March 2008.
- Department of Veterinary Medicine, Cornell University, October 2007.
- Biomedical Engineering Graduate Program Retreat, Johns Hopkins University, Ocean City, MD, September 2007.
- EMBS meeting, Lyon, France, August 2007.
- NHLBI workshop "Systems Approach to Understanding Electromechanical Activity in the Human Heart", Washington DC, August 2007.
- Dalhousie University, Halifax, Nova Scotia, Canada, June 2007.
- Heart Rhythm Society Meeting, Denver, CO, May 2007 (3 invited presentations).
- International Society for Computerized Electrocardiography Meeting, Cancun, Mexico, April 2007.
- Whiting School of Engineering, Johns Hopkins University, April 2007.
- Mechanoelectric Feedback and Arrhythmias Meeting, Oxford University, April 2007
- Department of Pharmacology, Columbia University School of Medicine, March 2007
- Cardiovascular Research Laboratory, UCLA, February 2007.
- Department of Bioinformatics and Computational Biology, George Mason University, January 2007.
- Institute for Molecular Cardiobiology, Johns Hopkins University, January 2007.
- Fifth International Workshop on Computer Simulation and Experimental Assessment of Electrical Cardiac Function, Lausanne, Switzerland, December 2006.
- Third Technion-Johns Hopkins Symposium in Medical Science and Biomedical Engineering, Johns Hopkins University, October 2006 (Fred Hittman Distinguished Lecture).
- Cardiac Electrophysiology and Arrhythmia, Mathematical Biosciences Institute, October 2006.
- Cardiac Mechanics and Remodeling, Mathematical Biosciences Institute, September 2006.
- Symposium on Biomedical Engineering, Zurich, Switzerland, September 2006 (keynote address).
- 4th Fairberg Cardiac Workshop, April 2006.
- Department of Bioengineering, University of Utah, April 2006.
- Department of Bioengineering, UCSD, April 2006.
- Medtronic, Inc., April 2006.
- Department of Biomedical Engineering, University of Minnesota, April 2006.
- Department of Biomedical Engineering, Columbia University, March 2006.
- Department of Biomedical Engineering, Tulane University, March 2006.
- Department of Bioengineering, University of Washington, February 2006.
- Department of Biomedical Engineering, Johns Hopkins University, January 2006.
- Department of Biomedical Engineering, University of Florida, January 2006.
- Department of Bioengineering, UCSD, December 2005.
- Department of Biomedical Engineering, Washington University, St. Louis, December 2005.
- Integrative Biology Meeting, Oxford, UK, October 2005 (keynote address).
- EMBS meeting, Shanghai, China, September 2005.
- 82nd Annual Meeting of the Physiological Society of Japan, Sendai, Japan, May 2005.
- Computational Physiology: From Genome to Physiome Conference, San Diego, March 2005.
- Department of Biomedical Engineering, Vanderbilt University, December 2004.
- Department of Physiology, Nagoya University, Japan, November 2004.
- International Symposium on "Leading Project for Biosimulation", Kyoto, Japan, November 2004.

- Defibrillation Workshop, Medtronic Inc., Minneapolis, October 2004
- Physiological Sciences Meeting, Oxford, UK, October 2004.
- Integrative Biology Meeting, Oxford, UK, September 2004.
- Russian Physiome Project Meeting, Ekaterinburg, Russia, September 2004.
- Workshop Cardiac Cellular Electrophysiology: From funny currents to the current Physiome, Montpellier, France, September 2004.
- SIAM Annual Meeting, Portland, Oregon, July 2004.
- Medical School, Shiga University, Shiga Prefecture, Japan, July 2004.
- 31st International Congress on Electrophysiology, Kyoto, Japan, June 2004.
- Laboratory of Precision Biomedical Engineering, Tokyo University, Tokyo, Japan, June 2004.
- Fourth International Workshop on Computer Simulation and Experimental Assessment of Electrical Cardiac Function, Cap d'Ail, France, June 2004
- Cardiotim 2004, Nice, France, June 2004
- Integrative Biology Workshop, Oxford University, UK, June 2004.
- Oxford Institute for Industrial and Applied Mathematics, Oxford University, UK, June 2004.
- Department of Physiology, Oxford University, UK, June 2004.
- NASPE Heart Rhythm Society Annual Meeting, debate, San Francisco, May 2004
- NASPE Heart Rhythm Society Annual Meeting, core curriculum, San Francisco, May 2004
- Workshop on Multiscale Computational Models for Biomedical Research, University of California San Diego, March 2004
- Department of Medical Physics and Biophysics, University of Graz, Austria, February 2004
- Scientific Computing and Imaging Institute, University of Utah, November 2003.
- Gordon Conference on Cardiac Arrhythmia Mechanisms, New Hampshire, August 2003.
- SIAM Annual Meeting, Montreal, Canada, June 2003.
- North American Society for Pacing and Electrophysiology Annual Meeting, clinical tutorial, Washington, DC, May 2003.
- International Society for Computerized Electrophysiology Annual Meeting, Snowbird, Utah, April 2003
- Department of Biomedical Engineering, University of Florida, April 2003
- Department of Electrical Engineering and Computer Science, University of Calgary, March 2003.
- SIAM Conference on Computational Science and Engineering, San Diego, February 2003.
- Department of Pharmacology, Tulane School of Medicine, New Orleans, January 2003.
- Workshop on Computer Simulation and Experimental Assessment of Electrical Cardiac Function, Lausanne, Switzerland, December 2002.
- Outstanding Research Award Ceremony, Tulane School of Engineering, New Orleans, November 2002
- Medtronic, Inc., October 2002.
- Department of Physiology, Tulane School of Medicine, New Orleans, October 2002.
- Mechano-Electric Feedback Meeting, Oxford, UK, September 2002.
- Aspen Institute of Physics, Aspen, Colorado, August 2002.
- Cardiotim meeting, Nice, France, June 2002 (two invited talks).
- Department of Mathematics, University of Liverpool, Liverpool, UK, March 2002.
- Departamento de Ingenieria Electronica, Universidad Politecnica de Valencia, Valencia, Spain, February 2002.
- School of Biomedical Sciences, University of Leeds, Leeds, UK, January 2002
- University Laboratory of Physiology, University of Oxford, Oxford, UK, January 2002.
- The integrated heart: Cardiac structure and function, Satellite meeting of the 34th World Congress of the International Union of Physiological Science, Queenstown, New Zealand, August 2001.
- Cardiology Grand Rounds, Department of Medicine, Division of Cardiology, Tulane University, July 2001.
- Living State Physics Group, Department of Physics, Vanderbilt University, April 2001.
- Department of Cardiology, Cornell Medical School, April 2001.
- Department of Mathematics, Southern Methodist University, March 2001.
- Workshop on Computer Simulation and Experimental Assessment of Electrical Cardiac Function, Lausanne, Switzerland, December 2000.
- Workshop on Mapping and Control of Complex Arrhythmia, Montreal, Oct. 2000.
- Living State Physics Group, Department of Physics, Vanderbilt University, Sept. 2000
- World Congress on Medical Physics and Biomedical Engineering, Chicago, July 2000.
- North American Society for Pacing and Electrophysiology, clinical tutorial, Washington, DC, May 2000.
- Cardiac Rhythm Management Laboratory, University of Alabama, Birmingham, December 1999.

- Biocomputing Symposium'99, Mauna Lani, Hawaii, Jan. 1999.
- International Workshop on Computer Simulation and Experimental Assessment of Electrical Cardiac Function, Lausanne, Switzerland, Dec. 1998.
- 20th Annual International Conference of the IEEE/EMBS, Hong Kong, Oct-Nov, 1998.
- Cleveland Clinic Foundation, Sept. 1998.
- Cardiac Rhythm Management Laboratory, University of Alabama, Birmingham, August 1998.
- International Society for Computerized Electrocardiology, Keystone, Colorado, April 1998.
- Annual Meeting of the BMES, San Diego, October 1997.
- Department of Biomedical Engineering, University of Memphis, Memphis, TN, July 1997.
- Cardiac Rhythm Management Laboratory, University of Alabama, Birmingham, July 1997.
- Workshop "Computation Biology of the Heart", University of California at San Diego, June 1997.
- Medtronic, Inc., June 1997.
- Department of Biomedical Engineering, University of Memphis, Memphis, TN, February 1997.
- Department of Physiology, Tulane University Medical Center, February 1997.
- IEEE/EMBS 17th Annual International Conference, Amsterdam, The Netherlands, November, 1996.
- Auckland University Medical Center, Auckland, New Zealand, July 1996.
- University of Technology, Sydney, Australia, July 1996.
- Tasmania Medical Center, Hobart, Australia, July 1996.
- Department of Engineering Science, Auckland University, Auckland, New Zealand, June 1996.
- First International Conference on Bioelectromagnetism, Tampere, Finland, June 1996.
- Defibrillation Workshop, Birmingham, Alabama, April 1996.
- IEEE/EMBS 16th Annual International Conference, Montreal, Canada, September, 1995 (two talks).
- Defibrillation Workshop, Durham NC, April 1995.
- Annual Fall Meeting of the BMES, Tempe, Arizona, October 1994.
- Department of Biomedical Engineering, University of Memphis, Memphis, TN, July 1994.
- Department of Biomedical Engineering, Tulane University, New Orleans, LA, June 1994.
- Defibrillation Workshop, Durham NC, April 1994.
- Department of Biomedical Engineering, Duke University, Durham NC, March 1994.
- Cray Conference on High-Performance Computing in Biomedical Research, Research Triangle Park, NC, October, 1992.
- IEEE/EMBS 13th Annual International Conference, Orlando, Fla., November, 1991.
- Annual Meeting of the BMES, Charlottesville, Va., October 1991.
- Erasmus University, Rotterdam, The Netherlands, September 1991.
- CVRTI, The University of Utah, Salt Lake City, Utah, August 1991.
- Department of Biomedical Engineering, Duke University, Durham, NC, October 1990.
- Department of Physiology The University of Arizona, Tucson, Az., November, 1987.
- Department of Physiology, University of Alberta, Calgary, Canada. June 1987.

### ***Recently in the News***

<https://med.stanford.edu/news/all-news/2016/09/newborns-deadly-heart-arrhythmia-caused-by-mosaic-of-mutant-cells.html>

<http://www.healthcanal.com/blood-heart-circulation/heart-disease/74870-newborn%E2%80%99s-deadly-heart-arrhythmia-caused-by-mosaic-of-mutant-cells.html>

<http://www.pnas.org/content/113/41/11373.full>

<http://releases.jhu.edu/2016/09/12/light-tames-lethal-heart-disorders-in-mice-and-virtual-humans/>

<http://hub.jhu.edu/2016/09/12/heart-arrhythmia-healing-light/>

<http://finance.yahoo.com/news/optical-defibrillator-shows-promise-less-171040981.html>

<http://www.digitaltrends.com/cool-tech/optical-defibrillator/>

[http://www.huffingtonpost.co.uk/entry/light-beams-heart-treatment\\_uk\\_57d7c7ece4b0a32e2f6c8f32](http://www.huffingtonpost.co.uk/entry/light-beams-heart-treatment_uk_57d7c7ece4b0a32e2f6c8f32)

<http://www.medgadget.com/2016/09/optical-defibrillation-soothe-arrhythmic-hearts.html>

<https://www.dotmed.com/news/story/32907>

<http://www.globalfuturist.org/2016/09/new-breakthrough-restarts-hearts-with-light/>

<http://www.ndtv.com/health/gentle-light-beams-may-treat-lethal-heart-condition-study-1458165>

<https://www.engadget.com/2016/09/14/future-heart-defibrillators-could-save-lives-with-light-pulses/>

[http://www.upi.com/Health\\_News/2016/09/13/Light-beams-may-replace-electricity-for-heart-disorder-treatment/4031473781431](http://www.upi.com/Health_News/2016/09/13/Light-beams-may-replace-electricity-for-heart-disorder-treatment/4031473781431)

<http://www.labroots.com/trending/cardiology/4070/optical-defibrillation-heart>  
<http://www.futurity.org/arrhythmia-light-optogenetics-1245752-2/>  
<http://medicalxpress.com/news/2016-09-termination-lethal-arrhythmia.html>  
[http://www.pubnicher.com/papyrus/ZG9pOjoxMC4xMTcyL0pDSTg40TUw/?utm\\_content=buffer4b2af&utm\\_medium=social&utm\\_source=twitter.com&utm\\_campaign=buffer](http://www.pubnicher.com/papyrus/ZG9pOjoxMC4xMTcyL0pDSTg40TUw/?utm_content=buffer4b2af&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer)  
<http://www.technology.org/2016/09/13/light-tames-lethal-heart-disorders-mice-virtual-humans/>  
<http://electronics360.globalspec.com/article/7329/scientists-treat-arrhythmias-with-light-beams-instead-of-electrical-shocks>  
<http://newatlas.com/optical-defibrillation/45442/>  
<http://www.massdevice.com/light-based-arrhythmia-treatment-skips-shocks/>  
<http://www.valuewalk.com/2016/09/fix-heartbeat-replace-shocks-red-light/>  
<http://www.dailymail.co.uk/health/article-3785725/Could-end-defibrillators-Technique-using-gentle-light-waves-instead-electric-shocks-stops-life-threatening-heart-failure.html>  
<http://www.itechpost.com/articles/29233/20160913/light-beams-heart-disease-research.htm>  
<http://esciencenews.com/articles/2016/09/13/termination.lethal.arrhythmia.with.light>  
<http://www.medgadget.com/2016/09/optical-defibrillation-soothe-arrhythmic-hearts.html>  
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### *Selected Abstracts*

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