JOSEPH V TRANQUILLO

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Biomedical Engineering Program
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EMPLOYMENT

Bucknell University Lewisburg, PA 2005- present
Assistant Professor of Biomedical and Electrical Engineering
Duke University Durham, NC
Associate in Research, Department of Biomedical Engineering 1998-1999

EDUCATION

Duke University Durham, NC 2005
Post Doctoral Fellow.
Experimental Cardiac Electrophysiology. Mentor: Nenad Bursac
Duke University Durham, NC 2004
Ph.D Biomedical Engineering,
Center for Emerging Cardiovascular Technologies Fellow
Field: Computational Cardiac Electrophysiology
Advisor: Craig Henriquez, Jeffrey N. Vinik Professor of Biomedical Engineering
Thesis Title: "Relationship between the monophasic action potential and transmembrane action potential: A theoretical, experimental and computational study.
Trinity College Hartford, CT 1997
BS in Engineering. Graduation with honors
Advisor: Joseph Bronzino, Vernon D Roosa Professor of Applied Science

TEACHING EXPERIENCE

Bucknell University 2005- present
BMEG 210, BMEG 200, BMEG 350, BMEG 401, BMEG 472
ELEC 105, ENGR 100
Duke University
Talent Identification Program
"Artificial Intelligence" Instructor summers 2003 and 2004
"Systems in the World" Instructor Spring 2004

SCHOLARLY ACTIVITIES

TECHNICAL PUBLICATIONS

PEER-REVIEWED JOURNAL PUBLICATIONS

J Tranquillo, A Sunkara, "Can we Trust the Transgenic Mouse? Insights from Computer Simulations". Lecture Notes in Computer Science Special Issue: Functional Imaging and Modeling of the Heart. 2007. 4466: 210-219.

A Grant, J Tranquillo, "Action Potetnial and QT Prolongation not Sufficient to cause Torsade de Pointes: Role of Action Potential Triangulation" *J Cardiovasc Electrophysiol*. 2007 18:204-5

Z Zhang, J Tranquillo, N Bursac, A Grant, "Sodium Channel Kinetics Changes that Produce Brugada Syndrome or Primary Conduction System Disease". *Amer J of Physiol*. 2007. 292: 399-407.

J Tranquillo, J Hlavacek, CS Henriquez. "An Integrative Model of Mouse Cardiac Electrophysiology From Cell to Torso" *Europace.* 2005 Suppl 2 56-70.
J Tranquillo, D Burwell, CS Henriquez, "Analytical Model of Extracellular Potentials in a Tissue Slab with a Finite Bath". *IEEE Trans on BME*. 2005 52(2): 334-338.
J Tranquillo, MR Franz, BC Knollmann, A Henriquez, DA Taylor, CS Henriquez, "Genesis of the Monophasic Action Potential: Role of the interstitial Resistance and Boundary Gradients", *Amer J of Physiol*. 2004 286(4): H1370-H1381.
D Weinstein, J Tranquillo, CS Henriquez and C Johnson, "BioPSE Case Study: Modeling Simulation and Visualization of Three Dimensional Mouse Heart Propagation" *J of Bioelectromag.* 2003 *5*(1):314-315.
BC Knollmann, J Tranquillo , SG Sirenko, CS Henriquez and MR Franz, "Microelectrode Study of the Genesis of the Monophasic Action Potential by Contact Electrode Technique" *J Cardiovasc Electrophysiol.* 2002 13(12): 1246-1252.

JOURNAL PUBLICATIONS IN PREPARATION
J Tranquillo, CS Henriquez. "Biophysical Origin of the Monophasic Action Potential" *Amer J of Physiol.*
J Tranquillo, C Henriquez, N Badie, N Bursac, "Stable Acceleration of spiral wave activity by application of a pacing pulse: the roles of ionic currents, resitution relationships and tissue boundaries" *Biophysics Journal.*

BOOK CHAPTERS
CS Henriquez, J Tranquillo, D Weinstein, E Hsu and CR Johnson . "Three Dimensional Propagation in Mathematical Models: Integrative Model of the Mouse Heart". in *Cardiac Electrophysiology: From Cell to Bedside*; 4th edition. Ed. Douglas Zipes and Jose Jalife. Saunders WB Co, Philadelphia, PA. 2004.
CS Henriquez and J Tranquillo. "Modeling the Impact of Cardiac Tissue Structure on Current Flow and Wavefront Propagation". Chapter 3 in *Quantitative Cardiac Electrophysiology.* Ed. Candido Cabo and David S. Rosenbaum. Marcel Dekker Inc, New York. 2002.

PEER-REVIEWED CONFERENCE PROCEEDINGS
J Tranquillo and N Bursac, "The Role of Restitution in Pacing Induced Wave Acceleration", *IEEE Trans on BME* Suppl
BC Knollmann, J Tranquillo, Sirenko SG, Henriquez C. and Franz MR, "Origin of the Monophasic Action Potential: Which Electrode?" Pacing Clinic Electrophysiol 2003; 26 996.
J Tranquillo, MR Franz, BC Knollmann and CS Henriquez. "Monophasic Action Potentials In Murine Heart: A Model Study", *IEEE Trans on BME* Suppl p1415-1416 2002
J Tranquillo, and T Ning, "Chaotic Behavior of Respiration", *IEEE Trans on BME* Suppl p51-51 1997
J Tranquillo, T Ning, and J Bronzino. "The Correlation Dimension in CA1: A Promising Measure of Theta Rhythm Maturation", *IEEE Trans on BME* Suppl p1571-1572 1997
T Ning, J Tranquillo, and J Bronzino, "Quadratic Phase Coupling of the Maturing Hippocampal EEG" *IEEE Trans on BME* Suppl p1564-1565 1997
J Tranquillo, T Ning, and J Bronzino. "Maturation of Non-Linear Interactions: Bispectral Analysis of CA1 and the Dentate Gyrus," *IEEE Trans on BME* Suppl p99-100 1996

PEER_REVIEWED CONFERENCE PRESENTATIONS
A. Pasha Hosseinbor, J Tranquillo, "Classification of Cardiac Arrhythias using Nonlinear Analysis of Electrograms" Accepted for Presentation at BMES 2007. Los Angeles, CA
E Banerjee, J Tranquillo, "A First Step toward an Understanding of the Unique Characteristics of the Mouse Electrocardiogram" Accepted for Presentation at BMES 2007. Los Angeles, CA

J Tranquillo, "A Novel Mechanism for the Initiation and Evolution of Cardiac Fibrillation" Accepted for Presentation at BMES 2007. Los Angeles, CA
J Tranquillo, A Sunkara "Can We Trust the Transgenic Mouse? Insights from Computer Simulations" Presented at FIMH Conference 06/07/07 Salt Lake City, UT
N Badie, J Tranquillo, N Bursac, "Micropatterned Heart Slice Cultures for Studies of Intramural Cardiac Electrophysiology" Presented at AHA 2006. 11/15/06. Chicago, IL
A Sunkara and J Tranquillo, "Mutations in Cardiac Ion Channels have Different Effects on Mice and Humans" Presented at BMES 2006. 10/13/06. Chicago, IL
M Howes and J Tranquillo, "Spiral Wave Breakup to Cardiac Fibrillation is Sensitive to the Site of Reentry Initiation" Presented at BMES 2006. 10/14/06. Chicago, IL
J Tranquillo and N Bursac, "The Role of Resitution in Pacing Induced Wave Acceleration" Presentation at IEEE-EMBS. 9/1/06. New York, NY
J Tranquillo and N Bursac "The Role of Restitution and Ion Currents in the Acceleration of Functional Reentry". Presented at BMES 2005. 9/29/05. Baltimore, MD
J Tranquillo, A Grant, Z Zhang and N Bursac "DK1479 and DK1500 Mutations Result in Brugada Syndrome". Presented at BMES 2005. 9/29/05. Baltimore, MD
J Tranquillo "in silico Transgenic Mouse Models: From Ion Channel to Body Surface", Presented at the SIAM conference on Dynamical Systems. 2005 5/22/05. Snowbird, UT
N Bursac and J Tranquillo. "Experimental and computational studies on complex spiral waves in 2D cardiac substrates", Presented at Americal Physical Society. 2005. 3/5/05. Los Angeles, CA
J Tranquillo J Hlavacek, K Sampson and CS Henriquez. "Impact of APD Dispersion on the Mouse T-wave". Presented at BMES 2004. 10/14/04. Philadelphia, PA
J Tranquillo and CS Henriquez. "Factors that Impact the MAP Timecourse". Heart Rhythm 1(1): S189-S190. Presented at 2004 Heart Rhythm. 5/21/2004. San Fransciso, CA
J Tranquillo, P Rosenstiel, CS Henriquez, and DA Taylor. "Using Computer Models to Guide Cell Therapies". Presented at the 2003 Keystone Symposia. Keystone Symposia p.134 2003 4/1/2003 Steamboat Springs CO
K Sampson, S Roberts, J Tranquillo, J Pormann and CS Henriquez. "Action Potential Duration (APD) dispersion in the Mouse heart: A computer model of the impact of electrotonic coupling" Presented at the 2003 Keystone Symposia. 1/14/2003 Santa Fe, NM
J Tranquillo, MR Franz, BC Knollmann and CS Henriquez. "Monophasic Action Potentials In Murine Heart: A Model Study" Presented at the 24th Annual BMES-IEEE conference. 10/24/02 Houston, TX.
J Tranquillo, "MRI to Model" Presented at the 2002 IEEE Computer Visualization Conference. 10/28/02 Boston, MA
J Tranquillo, MR Franz, BC Knollmann and CS Henriquez. "3D Bidomain Modeling of the Sources Underlying a Monophasic Action Potential " PACE 25(4) p.605 2002 Presented at the 23rd Annual NASPE meeting. 5/9/02 San Diego, CA
BC Knollmann, J Tranquillo, CS Henriquez PhD and MR Franz. "Direct Evidence for Monophasic Action Potential Genesis by Contact Electrode Technique" PACE 25(4) p. 718 2002 Presented at the 23rd Annual NASPE meeting. 5/11/02 San Diego, CA
J Tranquillo, A Bhimani, R Emani, DA Taylor and CS Henriquez. "In Vivo Pace Mapping of the Rabbit Heart: Experimental and Modeling Studies" Ann of BME 29(1) S54. 2001 Presented at 23rd Annual BMES conference 10/7/01. Durham, NC
J Tranquillo, and T Ning, "Chaotic Behavior of Respiration" Presented at the 24th Annual Northeast Biomedical Engineering Conference 5/22/97. Durham, NH
J Tranquillo and T Ning. "The Correlation Dimension as a Measure of Maturing Theta Rhythm", Presented at National Conference on Undergraduate Research 4/23/97. Austin, TX.
J Tranquillo, T Ning, and J Bronzino. "The Correlation Dimension in CA1: A Promising Measure of Theta Rhythm Maturation", Presented at IEEE EMBS '96 conference 11/2/96. Amsterdam.

T Ning, J Tranquillo, and J Bronzino, "Quadratic Phase Coupling of the Maturing Hippocampal EEG", Presented at IEEE EMBS '96 conference 11/2/96. Amsterdam.
J Tranquillo, T Ning, and J Bronzino. "Maturation of Non-Linear Interactions: Bispectral Analysis of CA1 and the Dentate Gyrus," Proceedings of the 23rd Annual Biomedical Engineering Conference. Presented 3/15/96. Rutgers University.

EDUCATION SCHOLARSHIP
J Tranquillo "A First Experience with External Senior Design Mentors" Featured Speaker at BME-IDEA Design workshop. BMES 2007. Los Angeles, CA
J Tranquillo "Stand up and Think: Kinesthetic Learning During Lecture" Accepted for Presentation at BMES 2007. Los Angeles, CA.
J Tranquillo and D Cavanagh, "A Project-Driven Approach to Biomedical Signals and Systems" Presented at ASEE 2007. 6/26/07. Honolulu, HI
J Tranquillo and D Cavanagh, "Building Engineering Communication Skills Through a Sequence of Short Assignments" Presented at ASEE 2007. 6/27/07. Honolulu, HI
D Cavanagh, J Tranquillo and D Ebenstein, "A Four Year Progression of Open-Ended Projects in an Undergraduate Biomedical Engineering Curriculum" Presented at ASEE 2007. 6/26/07. Honolulu, HI
D Ebenstein, J Tranquillo and D Cavanagh, "Developing Student Design and Professional Skills in an Undergraduate Biomedical Engineering Curriculum" Presented at ASEE 2007. 6/27/07. Honolulu, HI
J Tranquillo and V Zimmerman, "Stand Up and Think", Bucknell Friday Faculty Learning Series.
J Tranquillo "Biomedical Engineering 210: Fundamentals of Biomedical Engineering" Presented at the Bucknell Teaching and Learning Center Engaged Learning Session 11/9/06.
J Tranquillo and D Cavanagh, "Integration of Novel Teaching Techniques into a Biosignals and Systems Design Project" Presented at BMES 2006. 10/13/06. Chicago, IL
J Tranquillo "Qualitative, Quantitative, Open-ended Design: A Progression in Laboratory/Lecture Learning". Presented at ASEE 2006. 6/20/06. Chicago, IL
J Tranquillo "Biomedical Engineering at Bucknell: An Interactive Engineering Education Experience for Undergraduates". BEACON Medi 2005 conference. 10/25/05 Hartford, CT

INVITED PRESENTATIONS
"Problem Based Learning: A War Story " How to Engineer Engineering Education Workshop 7/17/07
"Don't Know Much about Epilepsy" Bucknell University Physics Seminar Series 7/05/07.
"Cardiac Biophysics and Biomedical Design: Geisinger-Bucknell Interactions" Geisinger Cardiology Department Seminar Series. 5/21/07 Danville, PA
"Epilepsy: Through the Eyes of an Engineer" Geisinger Neurology Department Seminar Series. 5/22/07. Danville, PA
"The Role of Computer Models in Biomedical Research", Temple University Electrical and Computer Science Seminar Series. 3/23/07. Philadelphia, PA
"The Academic Job Search", Duke University Graduate Student Chalk Talk Series. 3/19/07. Durham, NC
"Electrical Currents and Potentials in the Heart", Bucknell University Physics Seminar Series 6/8/06. Lewisburg, PA
"Biophysics of the Electric Heart". Bucknell University Physics Seminar Series. 7/7/05. Lewisburg, PA
"Multi-scale Simulations of Electrical Activity in the Heart". University of Minnesota Biomedical Engineering Seminar Series. 4/4/05. Minneapolis, MN.
"Muli-Scale Modeling of Electrical Activity in the Heart", Bucknell University Engineering Seminar Series 3/8/05. Lewisburg, PA

"Growing 2D Heart Slices *in vitro*". Center for Biolomolecular and Tissue Engineering Chalk Talk Series. 10/21/04. Durham, NC.
"Integrative Computer Modeling of Murine Cardiac Electrophysiology" Eastern Carolina University Department of Internal Medicine Seminar, 1/9/04. Greenville, NC
"The Anatomy of Biomedical Engineering" Elon Engineering Week, 2/31/03. Elon, NC
"Extracellular Detection and Quantification of Inhomogeneities in the Mouse Heart" Presented at the Duke Biomedical Engineering Seminar Series. 1/31/03. Durham, NC.
"MRI to Model" Presented at the 2002 IEEE Computer Visualization Conference. 10/28/02 Boston, MA
"Getting a Ph.D.: What's in it for me?" Trinity College Career Day. 9/20/02. Hartford, CT
"Large Scale Computer Models of Electrical Propagation in Cardiac Tissue: Applications to Cellular Cardiomyoplasty" Presented at the Scientific Computing and Imaging Institute Seminar Series. 8/20/2001 Salt Lake City, UT
"The Electrical Safety of Cellular Cardiomyoplasty" Presented at the Center for Emerging Cardiovascular Technologies Seminar Series 11/13/00. Durham, NC

GRANTS RECEIVED

Pittsburgh Supercomputing (IBN050003P): 2005
Title: Large Scale Simulations of Cardiac Electrophysiology Renewed 06 and 07
Role: Principle Investigator

Connecticut NASA Space Grant: 1996
Title: "Design of a Portable ECG Monitor"
Role: Principle Investigator

PROFESSIONAL ACTIVITIES

Expert witness for Plantiff in patent law case (Embrex vs. Breuil)	2004 - present
Heart Rhythm Elected Member	2004 - present
IEEE Engineering in Medicine and Biology Member	1995 - present
Biomedical Engineering Society Member.	1998 - present
American Society of Engineering Education Member	2006 - present

SERVICE

BUCKNELL

Biomedical Engineering Society Advisor
Aikido Club Advisor
Engineers Without Borders Advisor
ABET Accreditation Week May 2005
Engineering College Curriculum Committee
Chair and Organizer for First Year Faculty Working Group
FACT Orientation Workshop Panelist August 17, 2006
Academic Planning Group
Engineering Long Range Planning Committee

BIOMEDICAL ENGINEERING

Reviewer for IEEE Transactions on Biomedical Engineering
Reviewer for IEEE Transactions on Neural Systems and Rehabilitation Engineering
Reviewer for Neuromuscular Disorders
Reviewer for Engineering in Medicine and Biology Conference
Reviewer for BME section of ASEE Conference Proceedings

Reviewer for National Center for Replacement, Refinement and Reduction of Animals Student Chairperson for 2001 BMES conference. Durham, NC
BMESource site editor
Elected Member-at-Large, Biomedical Engineering Division of ASEE

HONORS AND AWARDS

Senior Fellow of IEEE
Elected Member to Heart Rhythm Society.
Phi Beta Kappa National Honor Society for outstanding achievement.
Sigma Xi Scientific Research honor society.
President's Fellow Selected by Trinity Engineering Department as the top student.
Senior Achievement Award One of five seniors honored for outstanding service to Trinity.
Connecticut Scholar Awarded to outstanding Connecticut Residents.
Edwin P. Nye Award Trinity award for balance between technology and society.