

Curriculum Vitae

Kenneth R. Laurita, Ph.D.

TITLE Assistant Professor of Medicine and Biomedical Engineering
Case Western Reserve University
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ADDRESS

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DATE OF BIRTH March 22, 1963
West Islip, New York

FAMILY Judith A. Mackall, M.D.
Andrew (1/6/98)
Daniel (1/3/01)

FACULTY POSITIONS

Senior Scientist 1999 - present, Heart and Vascular Research Center
Metrohealth Campus, Case Western Reserve University, Cleveland, Ohio.

Assistant Professor 1998 - present, Department of Medicine (Cardiology) and Biomedical Engineering
Case Western Reserve University, Cleveland, Ohio.

Instructor 1997-1998, Department of Medicine (Cardiology) and Biomedical Engineering
Case Western Reserve University, Cleveland, Ohio.

Engineer III 1989 - 1993, Division of Cardiology
Case Western Reserve University, Cleveland, Ohio.

EDUCATION AND TRAINING

Case Western Reserve University Post Doc, Physiology and Biophysics, June 1997

Case Western Reserve University Ph.D., Biomedical Engineering, May 1996

Case Western Reserve University M.S., Biomedical Engineering, January 1989

Case Western Reserve University B.S., Biomedical Engineering, May 1985

AWARDS**Chester Scholar Award**

Mentor to recipient Michael Koo, 2001

Travel Award

Wyeth-Ayerst Electrophysiology Fellowship Program at NASPE, 1998

First Place Young Investigator Award,

North American Society of Pacing and Electrophysiology, 1996

First Place Advanced Category Oral Presentation

Case Western Reserve University Biomedical Engineering Research Day, 1994

Travel Grant for Electrophysiology Fellows

North American Society of Pacing and Electrophysiology, 1994

RESEARCH GRANTS**Whitaker Foundation Biomedical Engineering Research Grant**

"Mechanisms of impulse propagation, block, and reentry in heart: an integrative approach using fluorescent probes and computer simulations", P.I. Kenneth R. Laurita, Ph.D. 12/97 – 05/01, \$206,000

American Heart Association Affiliate Beginning Grant in Aid

"Intracellular Calcium Handling and Arrhythmias Associated with Long QT Syndrome"

P.I. Kenneth R. Laurita, Ph.D. 7/01 – 6/03 \$80,000

National Institute of Health

"Intracellular Calcium Handling and Arrhythmias Associated with Long QT Syndrome"

P.I. Kenneth R. Laurita, Ph.D. 7/01 – 6/05 \$525,000 *PENDING***Whitaker Foundation Biomedical Engineering Transitional Funds**"Mechanisms of impulse propagation, block, and reentry in heart: an integrative approach using fluorescent probes and computer simulations", P.I. Kenneth R. Laurita, Ph.D. 09/01 – 08/02, \$80,000 *PENDING***National Institute of Health**

"Cell Repolarization, alternans, and arrhythmogenesis"

P.I. David S. Rosenbaum, M.D. 7/01 – 6/06 \$1,150,000

RESEARCH TRAINEES

Micheal Koo	Premedical Student	Summer, 2001
John Chau	CWRU Medical Student	Summer, 2000
Rodolphe Katra	Research Advisor (M.S.)	Fall, 1999 - present
Leatmanoratn Zeng	Research Advisor (M.S.)	Spring, 1998 - Fall, 1999
Raymond Hwang	Premedical Student	Summer, 1999
Raja N. Ghanem	Research Advisor (M.S.)	Spring, 1997 - Fall, 1999
Ashish Singal	Research Advisor (M.S.)	Fall, 1997 - Spring, 2000
Imad Libbus	Committee Member (Ph.D.)	Fall, 1997 - present
Joseph Pastore	Committee Member (Ph.D.)	Fall, 1997 - Fall, 2000
Fadi Akar	Committee Member (Ph.D.)	Spring, 1998 - present
Steven Polzing	Committee Member (M.S., Ph.D.)	Fall, 1998 - present
Benjamin Eloff	Committee Member (M.S., Ph.D.)	Fall, 1998 - present
David Dinsmoor	Senior Project Advisor (B.S.)	Fall, 1998, Spring, 2000

COMMITTEES AND CHAIRS**Graduate Studies Committee of the Faculty Senate**

Case Western Reserve University, 2000-present

Chair, Research Days Committee

Rammelkamp Center for Education and Research, MetroHeath Campus, CWRU, 2000-present

Chair, Computer Committee

Rammelkamp Center for Education and Research, MetroHeath Campus, CWRU, 2000-present

Review Committee

NHLBI Special Emphasis Panel, Washington DC, 1999

Program Committee

Biomedical Engineering Society (BMES) meeting, Cleveland Ohio, 1998

Chair, Cardiac Bioelectricity Track

Biomedical Engineering Society (BMES) meeting, Cleveland Ohio, 1998

Chair, Cardiac Activation Session

Computer in Cardiology meeting, Cleveland Ohio, 1998

Chair, Quantitative Approaches to Cardiac Arrhythmias Session

Biomedical Engineering Society (BMES) meeting, Cleveland Ohio, 1998

SCIENTIFIC REVIEWER

Journal of Clinical Investigation, Circulation, Journal of Cardiovascular Electrophysiology (Editorial Board), Annals of Biomedical Engineering, American Journal of Physiology, Journal of Biomedical Optics, Veterans Administration Research and Development Committee

PROFESSIONAL SOCIETIES

Biomedical Engineering Society, Cardiac Electrophysiology Society, AHA Basic Science Council (#109027870), North American Society of Pacing and Electrophysiology (#3761)

UNIVERSITY COURSES

PHOL 514 - Spring 2001-Present	Cellular Cardiac Electrophysiology – 3 lectures
Homeostasis I - Fall 1996,1997,1999	Cardiovascular Committee: Small Group Conference – 1 lecture
EBME 105 - Fall 1997-2000	Introduction to Biomedical Engineering, 7 lectures
EBME 414/324 - Fall 1999-Present	Laboratory Computation – Course Organizer (30 lectures)
EBME 313/314 - 1997-Present	Biomedical Engineering Laboratory – 1 lab
EBME 310 - Spring 1998,1999	Principles of Biomedical Instrumentation – 6 lectures
EBME 412 - Spring 1998,1999	Digital Signal Processing – 2 lectures
EP Fellows Training Program, 1998-Present	Didactic Lecture Series – 4 lectures
EBME 418 - Spring 1999	Electronics for BME – 2 lectures

RESEARCH INTERESTS

Cardiac Electrophysiology, Mechanisms of Arrhythmias

Spatial heterogeneity of cardiac repolarization kinetics and its influence on arrhythmia vulnerability.
 Fundamental mechanisms of cardiac impulse propagation, block, and reentry.
 Intracellular calcium and its role in arrhythmogenesis.
 Computer modeling of cardiac excitation.

Imaging the Electrical Activity and Cellular Function of the Heart

Optical imaging techniques using fluorescent indicators of transmembrane potential and intracellular calcium.
 Instrumentation and software design for quantifying the electrical activity of the heart.
 Real time digital signal processing techniques for analysis of cardiac electrograms and transmembrane potential.

INVITED LECTURES

Web-based Enhanced Education April 7, 2001

American Society for Engineering Education, Cleveland Ohio

Cardiology Grand Rounds February 25, 1999

Metrohealth Medical Center, Cleveland Ohio

Cardiac Electrophysiology Research Conference Dec 7, 1998

Cleveland Clinic Foundation, Cleveland Ohio

Annual Meeting of the Biomedical Engineering Society, October 9-13, 1998

Cleveland Ohio

Cardiac Electrophysiology Research Conference June, 1998

Metrohealth Medical Center, Cleveland Ohio

Cardiac Bioelectricity Research and Training Center Retreat, May 22, 1998

Case Western Reserve University, Cleveland Ohio

Optical Mapping of Cardiac Excitation and Arrhythmias Symposium, April 24-26, 1998

Scottsdale Arizona

Circulatory Homeostasis and its Failure Symposium, February 20, 1998

National Cardiovascular Center Research Institute, Osaka Japan

Cardiology Research Conference, June 4, 1997

Case Western Reserve University, Cleveland Ohio

MANUSCRIPTS

Hirose M, Leatmanorath Z, **Laurita KR**, Carlson MD. Mechanism for Pituitary Adenylate Cyclase-Activating Polypeptide-Induced Atrial Fibrillation. *Journal of Cardiovascular Electrophysiology*. In Review

Hirose M, Leatmanorath Z, **Laurita KR**, Carlson MD. Effects of pituitary adenylate cyclase-activating polypeptide on effective refractoriness of the canine atria. *American Journal of Physiology*. In Press

Laurita KR, Singal A. Mapping action potentials and calcium transients simultaneously from the intact heart. *American Journal of Physiology*. 2001;280:H2053-H2060

Akar FG, **Laurita KR**, Rosenbaum DS. Cellular basis for dispersion of repolarization underlying reentrant arrhythmias. *J Electrocardiology*. 2000;330 (suppl):23-31.

Laurita KR, Rosenbaum DS. The interdependence of modulated dispersion and tissue structure in the mechanism of unidirectional block. *Circulation Research*. 2000;87:922-928.

Pastore JM, Girouard SD, **Laurita KR**, Akar FG, Rosenbaum DS. A Mechanism Linking T Wave Alternans to the Genesis of Cardiac Fibrillation. *Circulation*. 1999;99:1385-1394.

Laurita KR, Girouard SD, Akar FG, Rosenbaum, DS. Modulated dispersion explains changes in arrhythmia vulnerability during premature stimulation of the heart. *Circulation*. 1998;98:2774-2780.

- Gilat E, Girouard SD, Pastore JM, **Laurita KR**, Rosenbaum DS. Does angiotensin converting enzyme inhibition produce electrophysiological and antiarrhythmic effects in the intact heart. *The Journal of Cardiovascular Pharmacology*. 1998;31:734-740.
- Laurita KR**, Rosenbaum DS. Implications of ion channel diversity to ventricular repolarization and arrhythmogenesis: Insights from high-resolution optical mapping. *Canadian Journal of Cardiology*. 13(11):1069-1076, 1997.
- Laurita KR**, Girouard SD, Rudy Y, Rosenbaum DS. Role of passive electrical properties during action potential restitution in the intact heart. *American Journal of Physiology*. 273:H1205-H1214, 1997.
- Laurita KR**, Girouard SD, Rosenbaum DS. Modulation of ventricular repolarization by a premature stimulus: Effect of epicardial dispersion of repolarization kinetics demonstrated by high-resolution optical mapping. *Circulation Research*. 1996;79:493-503.
- Girouard SD, **Laurita KR**, Rosenbaum DS. Unique characteristics of cardiac action potentials recorded with voltage-sensitive dyes. *Journal of Cardiovascular Electrophysiology*. 1996;7:1024-1038.
- Pastore JM, **Laurita KR**, Girouard SD, Akar FG, Rosenbaum DS. Cellular mechanisms of T wave alternans. *Electrocardiology*. 1996.
- Girouard SD, Pastore JM, **Laurita KR**, Gregory KW, Rosenbaum DS. Optical mapping in a new guinea pig model of ventricular tachycardia reveals mechanisms for multiple wavelengths in a single reentrant circuit. *Circulation*. 1996;93:603-613.
- Zeng J, **Laurita KR**, Rosenbaum DS, Rudy Y. Two components of the delayed rectifier K^+ current in ventricular myocytes of the guinea pig type: Theoretical formulation and their role in repolarization. *Circulation Research*. 1995;77:140-152.
- Girouard SD, **Laurita KR**, Rosenbaum DS. Unique characteristics of optically recorded action potentials. *SPIE*. 1994;2132:347-357.
- Ortiz J, Igarashi M, Gonzalez HX, **Laurita KR**, Rudy Y, Waldo AL. Mechanism of spontaneous termination of stable atrial flutter in the canine sterile pericarditis model. *Circulation*. 1993;88:1866-1877.
- Rosenbaum DS, Girouard SD, **Laurita KR**. High resolution cardiac mapping with voltage sensitive dyes. *IEEE Engineering in Medicine and Biology Society*. 1992;14:1995-1996.
- Thomas CW, **Laurita KR**, Gang S, Liebman J, Waldo AL. A cardiac potential mapping system. *Journal of Electrocardiology*. 1989;Vol. 22 Supplement:64-71.
- Laurita KR**, Gang S, Thomas CW, Liebman J, Waldo AL. Interactive cardiac mapping I: data acquisition. *IEEE Engineering in Medicine and Biology Society*. 1989:204-205.
- Gang S, **Laurita KR**, Thomas CW, Liebman J, Wang J, Waldo AL. Interactive cardiac mapping II: data analysis. *IEEE Engineering in Medicine and Biology Society*. 1989:206-207.
- Laurita KR**, Thomas CW, Kavuru M, Vesselle H, Liebman J. Data acquisition systems for cardiac mapping. *IEEE Engineering in Medicine and Biology Society*. 1988:104-105.

BOOK CHAPTERS

- Laurita KR**, Rosenbaum DS. Mapping cardiac repolarization. In: Shenaza M (ed): Cardiac Mapping, 2nd edition, In Press
- Laurita KR**, Pastore JM, Rosenbaum DS. Mapping Arrhythmia Substrates Related to Repolarization: 1. Dispersion of Repolarization. In: Rosebaum D & Jalife J (eds): Optical Mapping of Cardiac Excitation and Arrhythmias. Futura Publishing Company, Armonk, New York, In Press
- Laurita KR**, Libbus I. Optics and Detectors Used in Optical Mapping. In: Rosebaum D & Jalife J (eds): Optical Mapping of Cardiac Excitation and Arrhythmias. Futura Publishing Company, Armonk, New York, In Press
- Libbus, I, **Laurita KR**, Rosenbaum DS: High-Resolution Measurement of Ventricular Repolarization Using Voltage-Sensitive Dyes. Monophasic Action Potentials. Futura Publishing Company, Armonk, New York, 2000 pp.291-306

Laurita KR, Pastore JM, Rosenbaum, DS. How restitution, repolarization, and alternans form arrhythmogenic substrates: Insights from high-resolution optical mapping. In: Zipes D & Jalife J (eds): *Cardiac Electrophysiology: From Cell to Bedside*. W.B. Saunders Co., Inc., Philadelphia, 2000, pp. 239-248.

ABSTRACTS

Laurita, KR, Katra R, Chau J. C, Optical Mapping Reveals Heterogeneities of Intracellular Calcium Handling Across Intact Canine Transmural Wall, *PACE*. 2001;25 (4, Part II).

Masamichi H, Zeng Leatmanoratn, **Laurita KR**, Carlson MD. Regional parasympathetic denervation increases vulnerability to vagally mediated atrial fibrillation. *PACE*. 2000;23 (4, Part II):70

Masamichi H, Carlson MD, Zeng Leatmanoratn, **Laurita KR**. Dispersion of refractoriness is not required for initiation of atrial fibrillation. *Circulation*. 1999;18:I-340.

Laurita KR, Singal A, Pastore JM, Rosenbaum DS. High-resolution optical mapping of intracellular calcium and transmembrane potential during reentry. *PACE*. 1999;22:II-702.

Shin DG, **Laurita KR**, Wallick DW, Carlson MD. Vagal effects on the conduction of right atrial premature beats. *PACE*. 1999;22:II-763.

Shin DG, **Laurita KR**, Wallick DW, Carlson MD. The mechanism of initiation of spontaneous vagally mediated atrial fibrillation. *PACE*. 1999;22:II-706.

Ghanem RN, Waldo AL, **Laurita KR**. Simultaneous analysis of unipolar and bipolar electrograms for enhanced automated mapping of atrial fibrillation. *PACE*. 1999;22:II-879.

Laurita KR, Singal A, Pastore JM, Rosenbaum DS. Spatial Heterogeneity of Calcium Transients May Explain Action Potential Dispersion During T-wave Alternans. *Circulation*. 1998.

Laurita KR, Singal A. Mapping intracellular calcium and transmembrane potential in the same heart. *Annals of Biomedical Engineering*. 1998;26:S-18.

Ghanem RN, Waldo AL, **Laurita KR**. A new weighted function for the automated detection of activation times. *Annals of Biomedical Engineering*. 1998;26:S-19.

Shin DG, **Laurita KR**, Wallick DW, Carlson MD. Vagal stimulation decreases right atrial conduction time in a direction dependent fashion. *PACE*. 1998;21:II-919.

Laurita KR, Girouard SD, Rosenbaum DS. Modulated dispersion explains unidirectional block following a premature stimulus. *PACE*. 1997;20:II-1050.

Girouard S, **Laurita KR**, Pastore JM, Rosenbaum DS. Cardiac wavelength adaptation explains initiation of reentry and its prevention by d-sotalol. *Circulation*. 1996;94:I-160.

Laurita KR, Akar FG, Girouard SD, Rosenbaum DS. Modulated dispersion explains changes in arrhythmia vulnerability during premature stimulation of the heart. *PACE*. 1996;19:II-643.

Akar FG, Pastore JM, **Laurita KR**, Girouard SD, Rosenbaum DS. Time-dependent transmembrane potential change during shocks can explain refractory period extension and reduced dispersion following shocks. *PACE*. 1996;19:II-666.

Pastore JM, **Laurita KR**, Akar FG, Girouard SD, Rosenbaum DS. Cellular electrophysiology of electrical alternans: observations from high-resolution optical mapping in the intact ventricle. *PACE*. 1996;19:II-704.

Gilat E, Pastore JM, **Laurita KR**, Girouard SD, Rosenbaum DS. Demonstration of significant electrophysiological effects of the angiotensin converting enzyme inhibitor enalaprilat in the intact heart using high-resolution optical action potential mapping. *PACE*. 1996;19:II-684.

Laurita KR, Girouard SD, Rudy Y, Rosenbaum DS. Influence of electrotonus on repolarization during premature stimulation. *Circulation*. 1994;90:I-412.

Laurita KR, Girouard SD, Rosenbaum DS. Arrhythmogenic preconditioning by single premature stimuli. *PACE*. 1994;17:II-762.

Girouard S, **Laurita KR**, Rosenbaum DS. Optical mapping can resolve propagation and recovery in the intact beating heart. *PACE*. 1993;16:II-104.

Rosenbaum DS, Girouard S, **Laurita KR**, Salama G. Dispersion of membrane recovery properties are dependent on anisotropic tissue structure. *Circulation*. 1992;86:1-3262.

Ortiz J, Igarashi M, Gonzalez X, **Laurita KR**, Rudy Y, Waldo AL. Mechanism of spontaneous termination of atrial flutter in the canine pericarditis model. *PACE*. 1991;14:627.