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- 1993 - 1999 Ph.D., Physics, Northeastern University, Boston, MA
Thesis title: "*Theoretical Investigation of Spiral and Scroll Wave Instabilities Underlying Cardiac Fibrillation*".
Advisor: Dr. Alain Karma
- 1990 - 1993 M.S., Physics, Northeastern University, Boston, MA.
- 1985 - 1990 B.S., Physics, Universidad Nacional Autónoma de México, (UNAM) México City.
Thesis title: "*The Antikaon-Proton Interaction At Low Energies*".
Advisor: Dr. Manuel Torres Labansat

Professional Experience

- 2012 – Associate Professor
Physics Department, Georgia Institute of Technology, Atlanta, GA.
- 2006 – 2012 Research Associate
Veterinary School and Biomedical Sciences, Cornell University, Ithaca, NY.
- 2009 July Visiting Fellow, Sir Isaac Newton Institute for Mathematical Sciences,
Cambridge, UK.
- 2001 – 2006 Director of Electrophysiology Research.
The Heart Institute, Beth Israel Medical Center, New York, NY
- 2006 July-Aug Visiting Fellow, Kavli Institute of Theoretical Physics, Santa Barbara CA
- 2003 July-Aug Visiting Fellow, Kavli Institute of Theoretical Physics, Santa Barbara CA
- 2001 – 2005 Visiting Research Scientist
Department of Physics, Hofstra University, Hempstead, NY
- 1999 – 2001 Postdoctoral fellow
Department of Mathematics, Hofstra University, Hempstead, NY
- 1998 – 1999 Postdoctoral fellow
Long Island Jewish Medical Center, New Hyde Park, NY
- 1996 – 1998 Systems Administrator
Department of Physics, Northeastern University, Boston, MA
- 1996 – 1998 Research Assistant
Department of Physics, Northeastern University, Boston, MA
- 1996 – 1998 Teaching Assistant, Computational Physics, Mathematics for Engineers, and
General Physics
Department of Physics, Northeastern University, Boston, MA

- 1988 – 1990 Teaching Assistant for: Calculus, Algebra and Mathematical Methods
UNAM, Mexico City, Mexico.
- 1988 – 1989 High School Physics Teacher. La Salle del Pedregal High School, México City.

Honors and Awards

- 1990-1995 Full scholarship (stipend and tuition) from Universidad Nacional Autónoma de México, DGAPA (General Directorship of Academic Personnel Affairs) to attend Northeastern University
- 1990 Scholarship from Fermilab to attend the course “Accelerators in Physics” at Harvard University.
- 1993 Scholarship from Fermilab to attend the course “Computers in Accelerator Physics” at Harvard University.
- 1995 Best Poster Award at the Society for Industrial and Applied Mathematics Conference on Dynamical Systems.
- 1996 Travel Award by the Division of Biological Physics to attend the 1996 American Physical Society March Meeting.
- 2004 SIAM (Society for Industrial and Applied Mathematics) Student paper prize (Role: Advisor)
- 2005 The 9th Michael Servetus Educational Hall Award from the 2005 Madrid Arrhythmia and Myocardium Conference
- 2006 NSF Science and Engineering Visualization Challenge, Third Place, Interactive Media category. Published in *Science*, 313; 2006, 1730-1735.
- 2008 First Prize, International Acrobat 3D Contest in Interactive Technical Publishing.
- 2014 Hesburgh Award Teaching Fellow.
- 2014 CETL (Center for the Enhancement of Teaching and Learning)/BP Junior Faculty Teaching Excellence Award.

Current Grant Awards

- #1347015 FH Fenton (PI) \$ \$90,594 10/01/13-- 09/30/14
NSF (FDA scholars in residence program): “Development, verification, and validation of computer models of cardiac fibrillation”.
Role PI
- #1028261 FH Fenton (PI) \$690,107 09/01/10—08/31/14
NSF (Collaborative Research: CDI type II program): “Dynamics and control of Cardiac Tissue”
Role PI
- # 1341190 FH Fenton (PI) \$170,000 10/01/12—08/31/15
NSF (Collaborative Research: Dynamical Systems Program): “Intramural Forecasting of Cardiac Electrical Dynamics”
Role PI

#0926190 E.M. Clarke (PI). \$10,000,000 09/01/09 – 08/31/14
NSF (Expeditions in Computing): *“Model Checking and Abstract Interpretation”*
Role: PI for the Cornell section and Coordinator of the Atrial arrhythmia part of the grant.
\$437,872.00

#241526 L. Stephan(PI). €10,000,000 (Euros) 10/01/09 – 09/31/14
Seventh Framework Programme EUTrigTreat: *“Identification and therapeutic targeting of common arrhythmia trigger mechanisms”*. Grant contains 17 projects.
Role: Co-PI of project 11 *“Macroscopic modeling of ventricular arrhythmias initiation and termination in the heart”* €217,000.00 Euros.

#R01HL089271-01A2 N. Otani (PI) \$1,951,263 07/15/09 – 04/30/14
Dynamical Heterogeneity of Refractoriness and the Induction of Reentry
Role: Co-Investigator

MCB010053P. FH Fenton and EM Cherry (PIs) 55,000 CPU hours/year 01/01/02 –
NRSA: *“The Role of Anatomical Structure in Ventricular and Atrial Arrhythmias”*.
Successfully renewed every year since 2002.
Role: PI (from 2002-2005), Co-PI (from 2005 –)

MRI time FH Fenton (PI) 01/04/07 –
Pittsburgh NMR Center for Biomedical Research. *“Cardiac anatomy reconstruction from MRI images”*
Role: PI

Completed Grant Awards

#0800793. FH Fenton (PI). \$360,000 09/01/08 – 08/31/12
NSF (Dynamical Systems Program): *“Nonlinear Dynamics and Bifurcations in Cardiac Tissue”*
Additional supplements (Travel \$3,000 and REU student \$6,000)
Role: PI

HL075515-03S, -04S, -05S and 06S. FH Fenton (PI) \$449,608 03/01/06 –11/30/09
NIH-NHLBI: (Supplement for diversity in health related research to R01). *“Computer Model of the Canine Ventricle”*.
Role PI.

Faculty Innovation in Teaching Awards. FH Fenton (PI) \$20,000 06/01/06 – 05/30/07
Cornell University. *“Interactive Models for Cardiovascular Medicine”*.
Role PI with MS Kraus and EM Cherry.

#MRI-0320865 HM Hastings (PI). \$252,368 08/01/03 – 07/31/06
NSF, Acquisition of a Beowulf supercomputer for physical science research.
Role: Co- PI with T Brack, and S Sobel.

HL072816-01 HM Hastings (PI). \$152,835 05/01/03 – 04/30/05
NIH-R15 *“Atrial Fibrillation: Anatomy versus Cell Physiology”*.
Role: Co-PI with EM Cherry.

Peer-Reviewed Publications (h-index: 21)

Statistics:

(T) Theoretical papers	28	(Edu) Educational papers	2
(E) Experimental papers	7	(R) Review papers	4
(TE) Theoretical and Experimental papers	5	(C) Commentary papers	2
54 Journal Publications (Over 2,400 citations as of March 2014).			

Publications on major journals by impact factor and area.

Journal	Area	Impact factor	Number
Nature	<i>General Science</i>	36.10	1
Science	<i>General Science</i>	31.36	1
Circulation	<i>Medicine/Cardiology</i>	14.595	1
Computer Aided Verification	<i>Computer Science</i>	10.92	1
Physical Review Letters	<i>Physics</i>	7.32	3
Comp. methods in systems Biology	<i>Computer Science</i>	5.56	2
Progress Biophys Mol Biol,	<i>Biophysics</i>	5.0	2
Heart rhythm	<i>Medicine</i>	4.24	2
New Journal of Physics	<i>Physics</i>	3.84	1
Am. J. Physiology	<i>Physiology</i>	3.8	4
Europace	<i>Medicine/Cardiology</i>	2.765	1
Journal of Theoretical Biology	<i>Biology</i>	2.49	2
Phil. Trans. of the Royal Society A	<i>Mathematics</i>	2.62	1
Physical Review E	<i>Physics</i>	2.35	5
Chaos	<i>Physics</i>	2.1	3
Advances in Physiology Education	<i>Education</i>	1.38	1
SIAM Journal on Scientific Computing	<i>Mathematics</i>	1.22	1

Articles:

1. **(T) Fenton F**, Karma A. Vortex dynamics in three-dimensional continuous myocardium with fiber rotation: Filament instability and fibrillation. *Chaos* 1998; 8: 20-47.
2. **(T) Fenton F**, Karma A. Fiber-rotation-induced vortex turbulence in thick myocardium. *Physical Review Letters* 1998; 81: 481-484.
3. **(T) Rappel WJ**, **Fenton F**, Karma A. Spatiotemporal control of wave instabilities in cardiac tissue. *Physical Review Letters* 1999; 83: 456-459.
4. **(T) Fenton F**, Evans S, Hastings H. Memory in an excitable medium: A mechanism for spiral wave breakup in the low-excitability limit. *Physical Review Letters* 1999; 83: 3964-3967.
5. **(T) Hastings H**, **Fenton F**, Evans S, Hotomarov O, Geetha J, Gittelsohn K, Nilson J, Garfinkel A. Alternans and the onset of ventricular fibrillation. *Physical Review E* 2000; 62: 4043-4048.
6. **(T) Fenton F**, Karma A, Hastings H, Evans S. Transition from ventricular tachycardia to ventricular fibrillation as a function of tissue characteristics. IEEE Chicago 2000, World Congress on Medical Physics and Biomedical Engineering, paper no. 5617-90379 (2000).

7. **(T) Fenton F.** Numerical simulations of cardiac dynamics: What can we learn from simple and complex models? *Computers in Cardiology* (IEEE) 2000; 27: 251-254.
8. **(T) Fenton F,** Evans S, Hastings H, Karma A. Transition from ventricular tachycardia to ventricular fibrillation as a function of tissue characteristics in a computer model. *Europace* 2000; 1 (Supplement D): paper no. 109P/10.
9. **(T) Watanabe M, Fenton F,** Evans S, Hastings H, Karma A. Mechanisms for discordant alternans. *Journal of Cardiovascular Electrophysiology* 2001; 12: 196-206.
10. **(Edu) Fenton FH,** Cherry EM, Hastings HM, Evans SJ. Real-time computer simulations of excitable media: JAVA as a scientific language and as a wrapper for C and FORTRAN programs. *BioSystems* 2002; 64: 73-96.
11. **(T) Fenton FH,** Cherry EM, Hastings HM, Evans SJ. Multiple mechanisms of spiral wave breakup in a model of cardiac electrical activity. *Chaos* 2002; 12: 852-892.
12. **(T) Fenton FH,** Cherry EM, Hastings HM, Evans SJ. Computers and arrhythmias: Computational approaches to understanding cardiac electrical dynamics. Proceedings of the Second MIT Conference on Computational Fluid and Solid Mechanics, 2003.
13. **(E) Hastings, MH, Sobel GS, Fenton FH,** Chaterpaul S, Frank C, Pekor J, Russell E. The Onset of Fluctuations in the Ferroin-Catalyzed Belousov-Zhabotinski Reaction. *Experimental Chaos*, AIP, 2003;676, 275-280.
14. **(T) Cherry EM, Fenton FH.** Suppression of alternans and conduction blocks despite steep APD restitution: Electrotonic, memory and conduction velocity restitution effects. *American Journal of Physiology* 2004; 286: H2332-2341.
15. **(T) Fenton FH,** Cherry EM., Karma A., Rappel WJ. Modeling wave propagation in realistic heart geometries using the phase-field method. *Chaos* 2005; 15: 013502
16. **(T) Chen X, Fenton FH,** Gray RA. Head-tail interactions in numerical simulations of reentry in a ring of cardiac tissue. *Heart Rhythm* 2005; 2: 1038-46.
17. **(T) Bueno-Orovio A., Perez-Garcia VM., and Fenton FH.** Spectral methods for partial differential equations in irregular domains: The spectral smoothed boundary method. *SIAM Journal on Scientific Computing* 2006; 28: 886-900.
18. **(R) Chatterjee R, Cheng R, Brown WP, Fahrig R, Reinhart C, Yager D, Palais R, Benard L, Babaian C, DuBois C, Sparwasser N, Andresen T, Reiniger S, Meisner R, Borgeat L, Blais F, Taylor J, Lahanier C, Heving M, Suh C, Rajan K, Seig S, Koblin A, Berry D, Pickett-Heaps J, Tetaz F, Brennan J, Abdalati W, Mitchell H, Meier W, Vermilye T, Humphries S, Christensen A, Salver K, Bradbury J, Iacino G, Olsen E, Grotke R, Fenton F, Cherry E.** 2006 Visualization Challenge Winners. *Science* 2006; 313, 1730-1735.
19. **(E) Singh R, Bien H, Entcheva E, Fenton, FH.** Inherent Dispersion in Restitution Properties Over Space. Engineering in Medicine and Biology Society, 2006. EMBS '06. 28th Annual International Conference of the IEEE;1, 3935-3938
20. **(T) Cherry EM, Fenton FH.** A tale of two dogs: Analyzing two models of canine ventricular electrophysiology. *American Journal of Physiology* 2007; 292: H43-H55.
21. **(T) Cherry EM., Ehrlich JR, Nattel S, Fenton FH.** Pulmonary vein reentry-Properties and size matter: Insights from a computational analysis. *Heart Rhythm* 2007; 12: 1553-1562. (Article featured on the journal cover)

22. **(T)** Bueno-Orovio A, Cherry EM, **Fenton FH**. Minimal model for human ventricular action potential in tissue. *Journal of Theoretical Biology* 2008; 253: 544-560.
23. **(T)** **Fenton FH**, Cherry EM, Glass L. Cardiac arrhythmias. *Scholarpedia* 2008; 3, 1665.
24. **(TE)** Otani NF, Mo A, Mannava S, **Fenton FH**, Cherry EM, Luther S, Gilmour RF, Jr.. Predator-prey approach to analyzing complex dynamics in cardiac tissue. *Physical Review E* 2008; 78, 021913.
25. **(T)** **Fenton FH**, Cherry EM, Models of cardiac cell. *Scholarpedia* 2008; 3, 1868.
26. **(E)** **Fenton FH**, Cherry EM, Kornreich BG, Termination of equine atrial fibrillation by quinidine: An optical mapping study. *Journal of Veterinary Cardiology* 2008; 10 87-102. (Article featured on the journal cover)
27. **(TE)** Cherry EM. **Fenton FH**. "Visualization of spiral waves in simulated and experimental cardiac Tissue". *New Journal of Physics* 2008; 10, 125016 (43pp).
28. **(T)** Garzon A, Roman OG, **Fenton FH**. "Model-based control of cardiac alternans on a ring". *Physical Review E* 2009; 80, 021932.
29. **(TE)** **Fenton FH**, Luther S, Otani NF, Cherry EM, Pumir A, Bodenschatz E, Krinsky V, Gilmour RF Jr. "Termination of atrial fibrillation using pulsed low-energy far field stimulation". *Circulation* 2009; 120, 467-476.
30. **(TE)** Otani NF, Singh R, **Fenton FH**, Butcher J, DW Infanger DW, Neumann A, Luther S, Gilmour Jr RF "Use of Ultrasound Imaging to Map Propagating Action Potential Waves in the Heart" *Computers in cardiology*, 2009; 36: 617-620.
31. **(C)** **Fenton FH**, "The Value of Simulation" *Physics World* 2010;23:46-47.
32. **(C)** Cherry EM and **Fenton FH**, "Realistic cardiac electrophysiology modeling: are we just a heartbeat away? *J. Physiol.* 2010; 588, 2689.
33. **(R)** Fink M, Niederer SA, Cherry EM, **Fenton FH**, Koivumäki JT, Seemann G, Thul R, Zhang H, Sachse FB, Beard D, Crampin EJ, Smith NP. "Cardiac cell modeling: Observations from the heart of the cardiac physiome project", *Prog Biophys Mol Biol*, 2011, 104; 2-21
34. **(R)** Clayton RH, Bernus O; Cherry EM; Dierckx H; **Fenton FH**, Mirabella L, Panfilov S V, Sachse FB, Seeman G; Zhang H. "Models of cardiac tissue electrophysiology: Progress, challenges and open questions" *Prog Biophys Mol Biol* 2011;104; 22-48
35. **(T)** Niederer SA, Kerfoot E, Benson A, Bernabeu MO, Bernus O, Bradley C, Cherry EM, Clayton R, **Fenton FH**, Garny A, Heidenreich E, Land S, Maleckar M, Pathmanathan P, Plank G, Rodriguez JF, Roy I, Sachse FB, Seemann G, Skavhaug O, Smith NP. "Verification of cardiac tissue electrophysiology simulations using an N-version benchmark". *Philosophical Transactions of the Royal Society A* 2011;369:4331-4351
36. **(T)** Garzon A, Roman OG, **Fenton FH**. Model-based control of cardiac alternans in Purkinje fibers. *Physical Review E*, 84, 041927 (2011).
37. **(E)** Luther S*, **Fenton FH***, Kornreich BG, Squires A, Bittihn P, Hornung D, Zabel M, Flanders J, Gladuli A, Campoy L, Cherry EM, Luther GE, Hasenfuss G, Krinsky VI, Pumir A, Gilmour RF Jr., Bodenschatz E. "Low-energy control of electrical turbulence in the heart" *Nature*. Jul 13;475(7355):235-9; 2011. * **Co-first authors**.

38. **(T)** Grosu R, Batt G, **Fenton FH**, Glimm J, Le Guernic C, Smolka SA, Bartocci E “From Cardiac Cells to Genetic Regulatory Networks” accepted to appear in 23rd International Conference on Computer Aided Verification, 6806, pp. 396-411, 2011
39. **(T)** Cherry EM, **Fenton FH** “Effects of boundaries and geometry on the spatial distribution of action potential duration in cardiac tissue” *Journal of Theoretical Biology*. 285; 164-76 2011.
40. **(T)** Murthy A, Bartocci E, Fenton FH, Glimm J, Gray RA, Smolka SA, and Grosu R, “Curvature Analysis of Cardiac Excitation Wavefronts”, CMSB 2011 9th International Conference on Computational Methods in Systems Biology, pages 151-160. ACM, 2011.
41. **(T)** Bartocci E, Cherry EM, Glimm J, Grosu R, Smolka SA, **Fenton FH** “*Toward Real-time Simulation of Cardiac Dynamics*”, CMSB 2011 9th International Conference on Computational Methods in Systems Biology, pages 103-110. ACM, 2011.
42. **(Edu)** Bartocci E, (29 more authors) and **Fenton FH**. “Teaching cardiac electrophysiology modeling to undergraduate students: Lab exercises and GPU programming for the study of arrhythmias and spiral wave dynamics” *Advances in Physiology Education*, 35: 427-437. 2011.
43. **(T)** Murthy A, Bartocci E, Fenton FH, Glimm J, Gray RA, Smolka SA, and Grosu R, “Curvature Analysis of Cardiac Excitation Wavefronts”, *IEEE/ACM Trans. Comp.Biol. Bioinform.* Oct. 2012
44. **(R)** Cherry EM, **Fenton FH**, Gilmour F. Jr. “Mechanisms of Ventricular Arrhythmias: a dynamical systems-based perspective” *Am. J. Physiol.* 302(12): H2451-63, 2012.
45. **(T)** Cherry EM, **Fenton FH**. “Contribution of the Purkinje network to wave propagation in the canine ventricle: Insights from a combined electrophysiological-anatomical model”. *Nonlinear Dynamics* 2012; 68: 365-379.
46. **(TE)** **Fenton FH**, Gizzi A, Cherubini C, Pomella N, and Filippi S. “Role of temperature on nonlinear cardiac dynamics”, *Phys. Rev. E*. 87 (4), 042717 2013.
47. **(E)** Gizzi A, Cherry EM, Gilmour Jr. RF, Luther S, Filippi S and **Fenton FH**. “Effects of pacing site and stimulation history on alternans” *Frontiers in Physiology*. (4) 71, 2013.
48. **(T)** A. Murthy, E. Bartocci, **Fenton FH**, J. Glimm, R.A. Gray, E.M. Cherry, S.A. Smolka, and R. Grosu, “Curvature Analysis of Cardiac Excitation Wavefronts,” *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, vol. 10, no. 2, pp. 323-336, Mar./Apr. 2013.
49. **(TE)** Kelly A, Ghouri IA, Kemi OJ, Bishop M, Bernus O, **Fenton FH**, Myles RC, Burton FL, Smith GL. “Sub-Epicardial Action Potential Characteristics Are a Function of Depth and Activation Sequence in Isolated Rabbit Hearts.” *Circ Arrhythm Electrophysiol.* 2013. *Circ Arrhythm Electrophysiol.* 2013;6:809-817
50. **(T)** Bragard J., Elorza J., Cherry EM, **Fenton FH**, “Validation of a Computational Model of Cardiac Defibrillation” *Computers in Cardiology*. Vol. 40, 851-854, 2013.
51. **(E)** Uzelac I., Holcomb M., Reiserer RS, Fenton FH, WikswojP. “High-Power Current Source with Real-Time Arbitrary Waveforms for In Vivo and In Vitro Studies of Defibrillation” *Computers in Cardiology* Vol. 40, 667-670, 2013.
52. **(T)** Bragard J. Simic A., Elorza J., Grigoriev RO, Cherry EM, Gilmour Jr RF., Otani NF, and **Fenton FH**. “Shock-induced termination of reentrant cardiac arrhythmias: Comparing monophasic and biphasic shock protocols” *Chaos*, 23 (4), 043119, 2013.

53. **(TE)** Filippi S., Gizzi A, Cherubini C., Luther S, and **Fenton FH**, “Mechanistic insights into hypothermic ventricular brillation: The role of temperature and tissue size”. *Euro pace*, 16 (3), 424-434, 2014.
54. **(T)** Islam A., Murthy A., Bartocci E., Cherry EM, **Fenton FH**, Glimm J, Smolka SA, Grosu R. “Model-Order Reduction of Ion Channel Dynamics Using Approximate Bisimulation”, *Theoretical Computer Science journal*, in press 2014.

Peer-Reviewed Abstracts

1. **Fenton F**, Cherry EM, Banville I, Gray RA, Hastings HM, Evans SJ. Validation of realistic 3D computer models of ventricular arrhythmias with optical mapping experiments. *Pacing and Clinical Electrophysiology* 2002 (Part II); 24: 538.
2. Cherry EM, **Fenton FH**, Hastings HM, Xie F, Garfinkel A, Weiss JN, Evans SJ. The role of decreased conduction velocity in the initiation and maintenance of atrial fibrillation in a computer model of human atria. *Pacing and Clinical Electrophysiology* 2002 (Part II); 24: 538.
3. Garfinkel A, **Fenton F**, Xie F, Weiss JN, Feliciano Z, Boyle N, Evans SJ, Hastings H, Cherry E. The effects of electrical restitution on the stability of scroll wave reentry in simulated human atrium. *Pacing and Clinical Electrophysiology* 2002 (Part II); 24: 538.
4. Xie F, Garfinkel A, Qu Z, Weiss JN, **Fenton F**, Evans SJ, Hastings H, Karma A, Cherry E. The effect of electrical restitution on the stability of scroll reentry in anatomically realistic simulated rabbit ventricles. *Pacing and Clinical Electrophysiology* 2002 (Part II); 24: 628.
5. **Fenton FH**, Cherry EM, Hastings HM, Evans SJ. The APD restitution hypothesis revised: Slope >1 does not always determine alternans and spiral wave breakup. *Pacing and Clinical Electrophysiology* 2003 (Part II); 26: 1026.
6. Chen X, **Fenton FH**, Gray RA. Restitution curves can not predict the dynamics in a numerical model of reentry in a ring. *Pacing and Clinical Electrophysiology* 2003 (Part II); 26: 1024.
7. Cherry EM, **Fenton FH**, Hastings HM, Evans SJ. Differences in reentry dynamics between two human atrial cell models. *Pacing and Clinical Electrophysiology* 2003 (Part II); 26: 985.
8. Cherry EM, Rappel WJ, Evans SJ, **Fenton FH**. Effects of wall heterogeneity in an anatomically realistic model of cardiac ventricles: A simulation study. *Pacing and Clinical Electrophysiology* 2003 (Part II); 26: 1109.
9. **Fenton FH**, Bueno Orovio A, Cherry EM, Evans SJ. Basis for the induction of phase two reentry in the Brugada syndrome: Insights from computer simulations. *Heart Rhythm* 2004; 1: S224-S225.
10. **Fenton FH**, Cherry EM, Ehrlich JR, Nattel S, Evans SJ. A simulation study of atrial fibrillation initiation: Differences in resting membrane potential can produce spontaneous activation at the pulmonary vein-left atrial junction. *Heart Rhythm* 2004; 1: S187-S188.
11. Cherry EM, Ehrlich JR, Nattel S, Evans SJ, **Fenton FH**. Heterogeneous conduction in pulmonary veins: A model of atrial fibrillation due to slow reentrant circuits appearing as focal activity. *Heart Rhythm* 2004; 1: S85.
12. **Fenton FH**, Cherry EM, Gray RA, Hastings H, Evans SJ. Fibrillation without alternans in Porcine Ventricles. *Heart Rhythm* 2005; 2: S301.

13. **Fenton FH**, Bueno Orovio A, Evans SJ, Hastings HM, Cherry EM. Reentrant arrhythmias in human ventricular models. *Heart Rhythm* 2006; 3: S186.
14. Cherry EM, Gilmour RF, Jr., **Fenton FH**. Tissue dynamics of two models of canine ventricular cell electrophysiology: Restitution, memory, and reentry properties. *Heart Rhythm* 2006; 3: S227.
15. **Fenton FH**, Cherry EM, Hastings HM, Evans SJ. Web-based programs for learning cardiac electrophysiology: Interactive simulations of heart cells and tissue. *Heart Rhythm* 2006; 3: S136.
16. Dierckx H, Cherry EM, Bernus O, Gilbert S, Holden A, Gilmour RF Jr, **Fenton FH**. Detailed anatomical reconstruction of the whole canine heart including fiber and sheet architecture using MRI and DTMRI. *Heart Rhythm* 2008; 5: S106.
17. Ji Y, Cherry EM, **Fenton FH**, Experimentally-based modified cable equation to reproduce alternans measured in cardiac tissue. *Heart Rhythm* 2014.
18. **Fenton FH**, Ji Y, Cherry EM, Near-real-time interactive simulations of complex cardiac cell models in tissue over the web on desktops, laptops and cell phones. *Heart Rhythm* 2014.

Invited Talks and Seminars

1. "Instabilities of vortex dynamics in 3D," Boston University, Boston, MA, 1997.
2. "Fibrillation due to vortex instabilities in 3D continuous myocardium with fiber rotation," Long Island Jewish Medical Center, New Hyde Park, NY, 1997.
3. "Instabilities of electrical vortex filaments and wave turbulence in thick cardiac muscle", Northeastern University, Boston, MA, 1998.
4. "Instabilities of spiral waves in the heart," Duke University, Durham, NC, 1999.
5. "Vortex dynamics in three-dimensional continuous myocardium with fiber rotation: Filament instability and fibrillation", State University of New York Upstate Medical Center, Syracuse, NY, 1999.
6. "Vortex dynamics in three-dimensional continuous myocardium with fiber rotation: Filament instability and fibrillation", University of California at Los Angeles, CA, 2000.
7. "Vortex dynamics in three-dimensional continuous myocardium with fiber rotation: Filament instability and fibrillation", University of California at San Diego, CA, 2000.
8. "Vortex dynamics in three-dimensional continuous myocardium with fiber rotation: Filament instability and fibrillation", Salk Institute (2000)
9. "Instabilities of spiral waves and the transition from ventricular tachycardia to ventricular fibrillation," New York Academy of Sciences, New York City, NY, 2001.
10. "Modeling cardiac electrophysiology and arrhythmias using Compaq Alphas," Beth Israel Medical Center, New York, NY, 2001.
11. "All-heart simulations of cardiac arrhythmias," University of Missouri at Saint Louis, 2001.
12. "Multiple mechanisms of spiral wave breakup in a model of the cardiac action potential," University of Alabama at Birmingham, 2002.
13. "Spiral wave breakup mechanisms and their relevance to cardiac arrhythmias," Clark University, Worcester, MA, 2002.

14. "Multiple mechanisms of spiral wave breakup and their relation to fibrillation," Cornell University, Ithaca, NY, 2002.
15. "Multiple mechanisms of spiral wave breakup and their relation to fibrillation," State University of New York Upstate Medical University, Syracuse, NY, 2002.
16. "Ventricular fibrillation in mammalian hearts," McGill University, Montréal, Canada, 2003.
17. "Reproducing the ECG in simulated canine ventricles with transmural heterogeneity," Masonic Medical Research Laboratory, Utica, NY, 2003.
18. "Computers and arrhythmias: Computational approaches to understanding cardiac electrical dynamics," Pfizer, Inc., Groton, CT, 2003.
19. "Computers and arrhythmias: Computational approaches to understanding cardiac electrical dynamics," Universidad de Castilla-La Mancha, Ciudad Real, Spain, 2003.
20. "Computers and arrhythmias: Computational approaches to understanding cardiac electrical dynamics," Federal Drug Administration, Washington, DC, 2004.
21. "Computational physics of the heart: Normal and abnormal rhythms in heart disease," Discovery Nights at Hofstra University, Hempstead, NY, 2004.
22. "Basis for the induction of phase two reentry in the Brugada syndrome: Insights from computer simulations," University of Leeds, United Kingdom, 2004.
23. "Computers and arrhythmias: Computational approaches to understanding cardiac electrical dynamics," Hofstra Summer Research Program, Hempstead, NY, 2004.
24. "Computers and arrhythmias: Computational approaches to understanding cardiac electrical dynamics," Grand Rounds, Beth Israel Medical Center, New York, NY, 2004.
25. "Computational Physics of the Heart: from normal rhythm to spiral waves" Nonlinear Science Seminar, Physics Department at Georgia Tech, Atlanta GA, 2005
26. "Alternans in cardiac ventricular myocardium", Department of Physiology, McGill University, Montreal, Canada, March 2007.
27. "Nonlinear dynamics in the heart: Modeling, simulating, and visualizing arrhythmias" Max Planck Institute for Dynamics and Self-Organization, Gottingen Germany, April 2007.
28. "Models of Ventricular Human Action Potentials", Computing Laboratory, Oxford University , United Kingdom, April 2007,
29. "Alternans and Border Collision bifurcations; Theory and Experiments", Department of Applied Physics, Universitat Politecnica de Catalunya, Barcelona, Spain. April 2007.
30. "Spiral wave dynamics and instabilities; Simulations and Experiments", Department of Mechanical & Biomedical Engineering, Kangwon National University, Chunchon, South Korea. Nov. 2007.
31. "Visualization and Simulations in Whole Hearts; Emphasis in Spatiotemporal alternans, and Brugada Syndrome" KRISS (Korean Research Institute of Standards and Science), Daejeon, South Korea. November 2007.
32. "Understanding Wave Instabilities in Cardiac Tissue", Physics Department, Georgia Tech. March 2008.
33. "Termination of fibrillation using pulsed low-energy far field stimulation", Dept. of cell Biology and Physiology. University of Pittsburgh, October 2008.

34. "Electrotonic effects due to tissue boundaries in cardiac tissue", Institute of Membrane and Systems Biology, Leeds, UK. July 2009.
35. "Towards realistic 3D modeling of the human heart I", University Hospital Goettingen, Goettingen, Germany. September 8, 2009.
36. "Towards realistic 3D modeling of the human heart II", University Hospital Goettingen, Goettingen, Germany. September 10, 2009.
37. "Spiral waves and the heart: Modeling, simulating and visualizing the spatiotemporal organization of cardiac arrhythmias", Physics Department. University of Calgary. February 5, 2010.
38. "Spiral waves in the heart: Understanding cardiac arrhythmias using tissue-level experiments and simulations" Molecular & Integrative Physiology Work-in-Progress Series" Department of Biomedical Science, Cornell University, September 30, 2010.
39. "Ondas espirales en el corazón: Usando sistemas complejos en medicina para entender el inicio, la evolución, y la terminación de arritmias" Diplomado en Medicina y Complejidad, Torre de Ciencias y Humanidades, UNAM, Mexico, Octubre 20, 2010.
40. "Defibrillation Using Pulsed low energy far field stimulation: Applications for termination of atrial and ventricular fibrillation", Facolta di Ingegneria, Universita Campus Bio-Medico Di Roma. July 5, 2011.
41. "Spiral waves and the heart: A physics approach to the study and control of the complex spatiotemporal organization of cardiac arrhythmias." Physics Department, Georgia Institute of Technology, Atlanta GA, January 23th 2012.
42. "From Chaos to Cures; controlling the complex spatiotemporal dynamics of cardiac arrhythmias with a computational and experimental integrative approach." Center of Theoretical Biological Physics, University of California San Diego (UCSD), April 6, 2012.
43. "High-performance-computing challenges for heart simulations" Computational Science and Engineering Seminar, College of Computing, Georgia Institute of Technology. GA. August 31, 2012.
44. "Interactive Simulations of Complex Systems and Spiral Wave Dynamics: exploiting graphics processing units on a laptop or PC for real time calculations over the internet." Department of Computer Science, Northern Illinois University, October 4, 2012.
45. "Complexity, Chaos and Pattern Formation in Physical, Mathematical, Chemical and Biological Systems." Senior Seminar Series, School of Physics Georgia Tech. October 12, 2012.
46. "From Chaos to Cures; Controlling the complex spatiotemporal dynamics of cardiac arrhythmias" Analysis and Applied Mathematics Seminar, Dept. of Mathematics and Statistics, Kennesaw University, November 16, 2012.
47. "Complexity, Chaos and Pattern Formation in Physical, Mathematical, Chemical and Biological Systems." Society of Physics Students, School of Physics Georgia Tech. February 2, 2012.
48. "Complexity, Pattern Formation and Chaos in the heart; a combined experimental and applied math approach for the study of arrhythmias" School of Mathematics, Georgia Tech, February 26, 2013
49. "Studying heart dynamics; An experimental, theoretical and experimental integrative approach". Weekly Molecular Biophysics Research Review and Research Ethics Training. MoSE, Georgia Tech, January 13, 2014.

50. "Taking Risks to Build Connections that Help Students Learn". Celebrating Teaching Day Georgia Tech GA. March 6, 2014.

Conference Presentations

1. "The kaon-proton interaction at low energies using Feynman diagrams," XXXII National Congress of Physics (Mexico), León, Mexico, 1989.
2. "Analyzing the Noble model and spiral waves in 3D," Society for Industrial and Applied Mathematics Conference on Applications of Dynamical Systems, Snowbird, UT, 1995 (poster, Awarded Best Poster).
3. "A new three-variable mathematical model of action potential propagation in cardiac tissue," American Physical Society March Meeting, St. Louis, MO, 1996.
4. "Multiple mechanisms of spiral wave breakup in a model of the cardiac action Potential," American Physical Society March Meeting, Atlanta, GA, 1999.
5. "Memory in an excitable medium: A mechanism for spiral wave breakup in the low-excitability limit," Dynamics Days (Santa Fe, 2000)
6. "Memory in an excitable medium: A mechanism for spiral wave breakup in the low-excitability limit," American Physical Society March Meeting, Minneapolis, MN, 2000.
7. "Transition from ventricular tachycardia to ventricular fibrillation as a function of tissue characteristics in a computer model," Cardiostim (Nice France, 2000) (poster)
8. "Breakup of spiral waves in 3D and the onset of ventricular fibrillation," Society for Industrial and Applied Mathematics Annual Meeting, Puerto Rico, 2000.
9. "Transition from ventricular tachycardia to ventricular fibrillation as a function of tissue characteristics," World Congress on Medical Physics and Biomedical Engineering, Chicago, IL, 2000.
10. "Numerical simulations of cardiac dynamics: What can we learn from simple and complex models?," Computers in Cardiology Conference, Boston, MA, 2000.
11. "Real-time computer simulations of complex systems using JAVA as a wrapper for C and FORTRAN programs," American Physical Society March Meeting, Seattle, WA, 2001.
12. "Validation of full 3D numerical simulations of electrical dynamics in rabbit ventricles with experiments," Dynamics Days, Baltimore, MD, 2002.
13. "Validation of 3D simulations of electrical dynamics in rabbit ventricles with experiments," Society for Industrial and Applied Mathematics Conference on the Life Sciences, Boston, MA, 2002.
14. "Ventricular fibrillation in mammalian hearts: Simulation results," American Physical Society March Meeting, Indianapolis, IN, 2002.
15. "Validation of realistic 3D computer models of ventricular arrhythmias with optical mapping experiments," North American Society for Pacing and Electrophysiology Scientific Sessions, San Diego, CA, 2002.
16. "The APD restitution hypothesis revised: Slope >1 does not always determine alternans and spiral wave breakup," North American Society for Pacing and Electrophysiology Scientific Sessions, Washington, DC, 2003 (poster).

17. "Ventricular fibrillation in mammalian hearts," Society for Industrial and Applied Mathematics Annual Meeting, Montréal, Canada, 2003.
18. "The APD restitution hypothesis revised: Slope >1 does not always determine alternans and spiral wave breakup," Gordon Conference on Cardiac Arrhythmia Mechanisms, New London, NH, 2003 (poster).
19. "Multiple mechanisms of ectopy: Phase two reentry and membrane potential triggers," Upstate New York Cardiac Electrophysiology Society Annual Meeting, Ithaca, NY, 2003.
20. "Alternans suppression in cardiac tissue by electrotonic effects," American Physical Society March Meeting, Montréal, Canada, 2004.
21. "Basis for the induction of phase two reentry in the Brugada syndrome: Insights from computer simulations," North American Society for Pacing and Electrophysiology Scientific Sessions, San Francisco, CA, 2004 (poster).
22. "A simulation study of atrial fibrillation initiation: Differences in resting membrane potential can produce spontaneous activation at the pulmonary vein-left atrial junction," North American Society for Pacing and Electrophysiology Scientific Sessions, San Francisco, CA, 2004 (poster).
51. "Dynamics of spiral waves and their relation to cardiac arrhythmias," Nolineal 2004, Toledo, Spain 2004.
23. "Mechanisms of phase two reentry," Society for Industrial and Applied Mathematics Conference on the Life Sciences, Portland, OR, 2004.
24. "Fibrillation without alternans in porcine ventricles: Reassessing the importance of APD restitution during fibrillation," Upstate New York Cardiac Electrophysiology Society Annual Meeting, Utica, NY, 2004.
25. "Fibrillation without alternans in porcine ventricles," Heart Rhythm Society Scientific Sessions, New Orleans, LA, 2005.
26. "Fibrillation without alternans in porcine ventricles: Theory and Numerical Simulations," SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, 2005.
27. "Fibrillation without alternans in porcine ventricles: Theory, Experiments and Numerical Simulations," SIAM Annual Meeting, New Orleans, LA, 2005.
28. "Data Visualization in Physics II: VRML and Java for three-dimensional imaging and fully three-dimensional movies", APS annual Meeting, Baltimore MD, 2006.
29. "Web-based programs for learning cardiac electrophysiology: Interactive simulations of heart cells and tissue," Heart Rhythm Society Scientific Sessions, Boston, MA, 2006 (poster).
30. "Reentrant arrhythmias in human ventricular models," Heart Rhythm Society Scientific Sessions, Boston, MA, 2006 (poster).
31. "Spatiotemporal Control of Wave Instabilities in Cardiac Tissue" PhysCon 2007 (3rd International IEEE Scientific Conference on Physics and Control), Potsdam, Germany, 2007.
32. "Anatomically correct heart reconstructions by using MRI/DTMRI imaging and ionic models of human action potentials" APCTP (Asia Pacific Center for the Theoretical Physics) Focus Program on Dynamic Aspects of Biological Networks. APCTP Headquarters, Pohang, South Korea. 2007.

33. "Termination of Atrial Fibrillation Using Low-energy Far-field Stimulation; A Computational and Optical Mapping Study" American Heart Association Scientific Session, New Orleans, USA 2008.
34. "Bifurcaciones de periodo doble en tejido cardíaco y control de alternacion". XIX Semana Regional de Investigacion y docencia en Matematicas. Hermosillo, Sonora, Marzo 5, 2009
35. "Low-energy Far-field Defibrillation" SIAM Conference on Applications of Dynamical Systems. Snowbird, Utah, May 18, 2009
36. "Cardiac Tissue Multistability" Isaac Newton Institute for Mathematical Sciences Cambridge, UK, July 10, 2009
37. "Termination of fibrillation using pulsed low-energy far-field stimulation: A computational and optical mapping study" Dynamics days, Goettingen, Germany August 3 2009
38. "Cardiac Alternans 3: Alternative Mechanisms" Dynamics in Systems Biology Abardeen, Scotland; September 16, 2009
39. "Spiral Waves in the Heart Space-time organization of electrical waves in the heart and relation to cardiac arrhythmias", Coherence in Health II; Heart-Brain-Heart Connection, Utrecht, Netherlands; October 9, 2009.
40. "Action Potential Restitution Curve Splitting: An Alternative Mechanism for Cardiac Alternans", Seventh Annual Cardiovascular diversity research supplement awardees session, AHA, Orlando, Florida, November 14, 2009.
41. "Multistability in cardiac tissue" SIAM: Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona, Spain May 31, 2010.
42. "From bifurcations and spiral waves to chaos: The many dynamics of cardiac tissue", Invited speaker to the 11th Experimental Chaos and Complexity Conference, Lille, France, June 1-4, 2010.
43. "Far field low energy defibrillation" NSF Expeditions in Computing CMACS PI review meeting. U of Maryland, April 28-29 2011
44. "Report from the Workshop on Computational Modeling of Complex Systems" NSF Expeditions in Computing CMACS PI review meeting. U of Maryland, April 28-29 2011
45. "Low Voltage Atrial Defibrillation in Vitro" Heart Rhythm Society. San Francisco, May 6, 2011.
46. "Overview of Multi-Scale Modeling of Cardiac Contraction", SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. May 25, 2011.
47. "Arrhythmia modeling in the mouse, rabbit and human heart" EUtrigTreat General Assembly; Utrecht. June 23-24; 2011
48. "Synchronization and termination of cardiac arrhythmias using low energy far field stimulation" Physcon 2011; Leon, Spain. September 5; 2011.
49. "In real time simulations of 2d and 3D cardiac dynamics using GPUs" Dynamics Days Europe 2011; Oldenburg, Germany. September 14; 2011.
50. "Atrial arrhythmia workshop: education and outreach report" NSF expeditions in Computing CMACS PI review meeting. Carnegie Mellon U. Nov 3, Pittsburgh 2011.

51. "Synchronization and termination of cardiac arrhythmias using low energy far field stimulation" Dynamics Days 2012. Baltimore January 4; 2012.
52. "Synchronization as a mechanism of chaos control; Applications to cardiac arrhythmias." German Physics Society meeting, Berlin March 28, 2012.
53. "Simulations of Complex Systems using WebGL and HTML5: Exploiting Your Computer's GPUs for Real Time and Platform-Independent Interactive Calculations", Spring 2012 CMACS Virtual PI Meeting April 20 and 27, 2012.
54. "Arrhythmia modeling in the mouse and human heart", 4th Annual meeting and general assembly of the EUTrigTreat large-scale consortium. Beatenberg/Bern, Switzerland, June 22, 2012.
55. "Interactive simulations of complex systems and spiral waves dynamics: *Exploring graphics processing units on a laptop or PC for real-time computations over the internet*" American Mathematical Society Meeting, Rochester Institute of Technology. NY, Sept. 22, 2012
56. "Dynamically generated complex spatiotemporal patterns in cardiac tissue" Annual Meeting of the German Biophysical Society. Gottingen, Germany Sept. 23-26, 2012.
57. "Low Energy Defibrillation. Theory and experiments in vitro and in vivo" Annual Cardiac Electrophysiology Society. Los Angeles November 3, 2012.
58. "Low Energy Control of the Fibrillating heart" Annual Meeting of the American Heart Association. Los Angeles November 4, 2012.
59. "In vitro and in vivo atrial and ventricular defibrillation using low energy pulses" Biomechanics Meeting, Department of Mathematics, Emory University. January 30 2013.
60. "Low energy Control of Electrical Turbulence", Heart Rhythm, Denver Co, May 11, 2013.
61. "Dynamically Generated Complex Spatiotemporal Patterns in Cardiac Tissue", SIAM conference on Applications of Dynamical Systems" Snowbird, Utah, May 19, 2013.
62. "Propagation of Electrical Activity in Cardiac Tissues; Experiment and Theoretical Validations for the Study of Spiral Waves in the Heart" XXXIII Dynamic Days, Madrid Spain, 2013.
63. "Propagation Computational modeling of Na⁺ and Ca⁺⁺ dependent arrhythmia mechanisms in tissue and heart", EUTrig Treat General Assembly, Padua, Italy, 5-7 June 2013.
64. "Complexity, Pattern Formation and Chaos in the Heart; A combined high performance computation and experimental approach for the study and treatment of arrhythmias." 11th Computational Methods in Systems Biology. Institute of Science and Technology, Vienna, Austria. Sept 23-25, 2013.
65. "Complexity, Pattern Formation and Chaos in the heart; a combined experimental and high performance computing approach for the study and control of arrhythmias". XI SBAI and DINCON (Brazilian Symposium on Intelligent Automation and Dynamics, Control and Applications), Fortaleza Brazil, October 14-17 2013.
66. "2013 NSF-CMACS Workshop on Atrial Fibrillation Report" CMACS PI Meeting .Pittsburgh PA, Nov 20-22, 2013.
67. "Towards Real Simulations of the Heart", Georgia Scientific Computing Symposium, Kennesaw State University , Kennesaw GA. February 21, 2014.

Workshop Invited Presentations

1. "Multiple mechanisms of spiral wave breakup," invited talk given at the Dynamics of Interfaces, Patterns and Domains Workshop, Los Alamos, NM, 1999.
2. "Multiple mechanisms of spiral wave breakup in a model in 2D and 3D", invited talk given at the Mapping and Control of Complex Arrhythmias Workshop, Montréal, Canada, 2000.
3. "Simulations in irregular domain for cardiac tissue using the phase field method," invited talk given at the Cardiac Nonlinear Dynamics Meeting, Vanderbilt University, Nashville, TN, 2001.
4. "Multiple mechanisms of spiral wave breakup," invited talk given at the Wave Dynamics in Biological Excitable Media Workshop, Aspen Center for Physics, Aspen, CO, 2002.
5. "Multiple mechanisms of spiral wave breakup," invited talk given at the Pattern Formation in Physics and Biology Workshop, Kavli Institute of Theoretical Physics, Santa Barbara, CA, 2003.
6. "Ten different physiological and structural mechanisms for spiral wave breakup in 2D and 3D," invited talk given at the Integrative Biology Workshop, University of Oxford, United Kingdom, 2004.
7. "Beyond Slope One: Alternans Suppression and Other Understudied Properties of APD Restitution" invited talk given at the Cardiac Dynamics Workshop, Kavli Institute of Theoretical Physics, University of California, Santa Barbara, CA, July-August 2006.
8. "Alternans, Restitution and Models of Human Ventricular Cells", invited talk given at the International Workshop on Non-linear Dynamics in Excitable Media, Gent University, Belgium, April 2007.
9. "Spatiotemporal Alternans and Control of Wave Instabilities in Cardiac Tissue", invited talk given at the APCTP (Asia Pacific Center for the Theoretical Physics) Workshop on Self-Organization in Biological Complex Systems, Pusan National University, South Korea. November 2007.
10. "Estudio de la dinámica de Ondas en el tejido cardiaco y sus instabilidades" Plenary talk given at the Biomathematics Workshop 45 anniversary of the department of Mathematics, Sonora University, Mexico. March 6, 2009
11. "Termination of fibrillation using low-energy far-field stimulation: A computational and optical mapping study" The Cardiac Physiome Project, The Isaac Newton Institute of Mathematical Sciences, Cambridge UK. July 22, 2009.
12. "Termination of fibrillation using low-energy far-field stimulation: A computational and optical mapping study" ESF (European Science Foundation) Workshop in Cardiac Dynamics, Slovakia, August 25, 2009.
13. "Caos, espirales y la dinámica del corazón" XII escuela de Otono en biología Matematica y VI Encuentro Nacional de Biología Matematica Pachuca Mexico, Octubre 14, 2010
14. Five lectures on "Complex Systems and the Heart; Experiments, Theory and Simulation" NSF-CMACS Workshop on Atrial Fibrillation. Lehman College, Bronx, NY Jan 3-7, 2011.
15. "Synchronization and Termination of Atrial and Ventricular fibrillation using low-energy far field stimulation; A theoretical and experimental approach" NHLBI-VCU World Congress and Workshop. Williamsburg, VA June 1st, 2011.

16. "Low energy defibrillation, theory and experiments in vitro and in vivo" TRM Forum on Computer Simulations and Experimental Assessment of Cardiac Function. Lugano, Switzerland; December 6, 2011.
17. "Integrating partial differential equations in 2 and 3D using GPUs and a web browser: Applications to heart dynamics" 2nd Conference of Computational Interdisciplinary Science (CCIS 2012) Guanajuato Mexico, August 1, 2012.
18. "Biologia Matematica del Corazon", XV Escuela de Otono de Biologia Matematica y IX Encuentro Nacional de Biologia Matematica. Universidad de Sonora, 11-15 Noviembre 2013.
19. "From Chaos to Cures; Controlling the complex spatiotemporal dynamics of cardiac arrhythmias using a combined computational and experimental integrative approach" From the Clinic to Partial Differential Equations and Back: Emerging challenges for Cardiovascular Mathematics *ICERM* Brown University, RI. January 20 - 24, 2014

Conference Sessions and Workshops Organized

1. "Models of the Whole Heart," Biomedical Engineering Society Annual Meeting, Raleigh, NC, 2001.
2. "Cardiac Electrical Dynamics in Realistic Anatomical Models," Society for Industrial and Applied Mathematics Annual Meeting, Montréal, Canada, 2003.
3. "Electrical Dynamics of Cardiac Tissue, Parts I, II, III, and IV," Society for Industrial and Applied Mathematics Conference on the Life Sciences, Portland, OR, 2004.
4. "Instabilities and complexities in the heart: Models, experiments, and simulations, Parts I, II, III, and IV," Society for Industrial and Applied Mathematics Conference on Applications of Dynamical Systems, Snowbird, UT, 2005.
5. "Cardiac Dynamics: Period-doubling Bifurcations and Arrhythmias", SIAM on Applications of Dynamical Systems, Snowbird, UT, 2009.
6. "Cardiac Dynamics, Parts I,II,III, and IV" SIAM: Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona, Spain 2010.
7. "NSF-CMACS Workshop on atrial fibrillation" Lehman College, January 10-28, 2011.
8. "Dynamics of Cardiac Contraction and Mechanical Deformation" SIAM on Applications of Dynamical Systems, Snowbird, UT, May 2011
9. "Second NSF-CMACS Workshop on atrial fibrillation" Lehman College, January 7-25 2013.
10. "Dynamically Generated Complex Spatiotemporal Patterns in Cardiac Tissue" SIAM on Applications of Dynamical Systems, Snowbird, UT, May 2013.
11. "Dynamics Days 2014" (co-organizer), Georgia Tech, January 2-5, 2014.
12. "Mechanisms for defibrillation and control of cardiac tissue" SIAM Life Sciences meeting, August 4-7 in Charlotte, NC, 2014.

Professional Services

Review Editorial Board for the following journals

1. Frontiers in Cardiac Electrophysiology.

2. Frontiers in Computational Physiology and Medicine.
3. (International Scholarly Research Network) ISRN Biomathematics.
4. Scholarpedia.

Reviewer for the following journals:

1. American Journal of Physiology
2. Annals of Biomedical Engineering
3. Applied Physics Letters
4. Biomedical Engineering OnLine
5. Biophysical Journal
6. Bulletin of Mathematical Biology
7. Cardiovascular Research
8. Circulation
9. Circulation Research
10. Chaos
11. Communications in Nonlinear Science and Numerical Simulation
12. Dynamics of Continuous, Discrete and Impulsive Systems
13. Encyclopedia of Biomaterials and Biomedical Engineering
14. Europace
15. Europhysics Letters
16. Experimental Physiology
17. Frontiers in Cardiac Electrophysiology.
18. Frontiers in Computational Physiology and Medicine.
19. Heart Rhythm
20. Human Frontiers Science Program (HFSP) Journal
21. IEEE Transactions on Biomedical Engineering
22. IEEE Transactions on Magnetism
23. Interface Focus
24. ISRN Biomathematics
25. Journal of Biological Physics
26. Journal of Biomechanical Engineering
27. Journal of Biomedical Optics
28. Journal of Computational Physics
29. Journal of Molecular and Cellular Cardiology
30. Journal of the Royal Society Interface
31. Journal of Statistical Physics
32. Journal of Theoretical Biology
33. Mathematical Biosciences
34. Mathematical Medicine and Biology
35. Medical and Biological Engineering and Computing
36. Nature Communications.
37. New Journal of Physics
38. Physica D: Nonlinear Phenomena
39. Physical Review E
40. Physical Review Letters
41. PLoS ONE
42. PLoS Computational Biology
43. Progress in Biophysics and Molecular Biology.
44. Scholarpedia

45. SIAM Journal on Applied Dynamical Systems.
46. The Journal of Physiology.
47. Theoretical Biology and Medical Modeling.

Reviewer for the following granting organizations:

1. Agencia Nacional de Evaluación y Prospectiva, Ministerio de Ciencia e Innovación (Spain)
2. Austrian Science Fund, FWF (Austria)
3. Engineering and Physical Sciences Research Council (U.K.)
4. Human Frontier Science Program (International)
5. Marsden Fund from the Royal Society of New Zealand (New Zealand)
6. Mathematics of Information Technology and Complex Systems (Canada)
7. Natural Sciences and Engineering Research Council of Canada (Canada)
8. National Science Foundation, NSF, (USA)
9. Netherlands Research Council (Netherlands)

Grant Review Panels

- (1) NSF panelist for the Dynamical Systems program.,
- (2) NSF panelist for the Cyber Physical Systems program.

Book Reviewer

Physics text book review for W.W. Norton and Company.

Science Competition Judge

- Syosset High School Science fair, 2005.
- Siemens Foundation Math, Science & Technology competition, Judge for Southeast finals, November 2012.
- Georgia Tech Research & Innovation Conference, February 2013.

School Committees

- Graduate Physics Committee (2012-2013)
- GoSTEM Committee (2013- 2014)
- Undergraduate Physics Committee (2013-2014)
- Faculty Honors Committee (2013-2014)
- Physics Space Committee (2013-2014)
- Physics Outreach Committee (2013-2014)
- Exploratory Astrophysics Major Committee (2014)

Teaching

Workshops designed and taught

- Minicurso en medios excitables y sistemas complejos. Facultad de Ciencias, UNAM. Mexico Octubre 18-20, 2010.
- CMACS Atrial arrhythmia workshop for underrepresented minorities. Lehman College, Bronx NY. January 3-21. 2011.
- CMACS Atrial arrhythmia workshop for underrepresented minorities. Lehman College, Bronx NY. January 7-25. 2013.

- Workshop on pattern formations. XV Escuela de Otoño de Biología Matemática y IX Encuentro Nacional de Biología Matemática, Universidad de Sonora, 11-15 November 2013.

Classes taught

- High school Physics, three courses, La Salle del Pedregal, Mexico City. 1988-1989 school year. (3 sections, 50 students each)
- Introductory Physics Phys-2211, Georgia Tech. Fall 2012. (206 students)
- Introductory Physics Phys-2211, Georgia Tech. Spring 2012. (194 students)
- Introductory Physics Phys-2211, Georgia Tech. Fall 2013. (175 students)

Mentored Students.

Undergraduate Students (9); degree, school, project, year.

- Catalina Peralta; Chemistry, Hofstra, BZ reaction and ionic cell modeling. 2004 (*Won second place, Undergraduate research competition, NY sectional of APS meeting, 2004*).
- Alex Zaharakis; Physics, Hofstra, fluctuations in the BZ reaction, 2004 (*Tied second place also at the Undergraduate research competition, NY sectional of APS meeting, 2004*).
- Claudia Frank; Physics, Hofstra, fluctuations in the BZ reaction 2004.
- Jordan Pekor; Physics, Hofstra, fluctuations in the BZ reaction 2004.
- Stephen Chaterpaul; Chemistry Hofstra, fluctuations in the BZ reaction 2004.
- Alisa Mo, Cornell University Analysis of optical mapping data 2007.
- Andrew Filipski, Software engineer, Rochester Institute of Technology, Java codes, 2011.
- Casey Trimble, Physics, Georgia Institute of Technology, Turing patterns, 2014.
- Amier Naji, Computer Science, Georgia Institute of Technology, WebGL, 2013-

Graduate students (22); degree, school, project, year.

- Alex Chen, Bioengineering, U of Alabama, splitting of CV restitution, 2002-2004.
- Alfonso Bueno, Engineering, U. de Castilla-La Mancha, ionic cell modeling, 2003-2006 (*Won SIAM best student paper prize*).
- Alejandro Garzon, Physics, Georgia Tech, Control of alternans, 2007-2010.
- Amgad Squire, Physics, Cornell, Defibrillation mechanisms, 2008-2011
- Rupinder Singh, Biomedical Engineering, Cornell, Cardiac contraction modeling, 2009-2013
- Fred Von Stein. Physiology, Cornell, Purkinje network reconstruction 2010-2012.
- Siddhartha Sinha, Biomedical Engineering Cornell. MRI image segmentation. 2010.
- Alessio Gizzi, Engineering, Universita Campus BioMedico Di Roma, Characterization of alternans in space, 2010-2012
- Philip Bittin, Physics, Max Planck, Lyapunov Vectors, 2010-2012
- Daniel Hornung, Physics, Max Planck, fiber reconstruction from DTMRI 2011-
- Ariful Islam, Computer Science, Stony Brook, Model reduction 2011-
- Abishek Murthy, Computer Science, Stony Brook, Curvature of reentrant waves 2011-
- Chagit Sima Braiman, Cornell University, Conduction velocity in cardiac tissue, 2011
- Danielle Toupo, Cornell University, Modeling complex systems, 2011-
- Nicholas Braiman, Cornell University, Conduction velocity in cardiac tissue, 2011
- Marco Piangerelli, Cornell U/U of Bologna, hypocalcemia, 2012-2013.
- Rajath Prasad, Georgia Tech, Computer Science, WebGL, 2013.
- Eliza Nunez, UNAM, Biomedical Engineering, Andersen-Tawil syndrome, 2013.
- Archana Venkatesh, Georgia Tech, Computer Science, WebGL, 2014.
- Jairo Rodriguez, Georgia Tech, Math, scroll wave dynamics, 2014.

- Yan Yan Ji, Georgia Tech, Physics, tissue modeling and calcium dynamics, 2013-
- Dian Dian Chen, Georgia Tech, Physics, oscillations in dynamical systems, 2013-
- Andrea Welsh, Georgia Tech, Synchronization of oscillatory systems.

Post-Doctorate supervised (4); degree, school, project, year

- Wonho Oh, Applied Math, Brookhaven NL, Bidomain simulations 2004-2005.
- Young-Seon Lee, Mathematics, Cornell, Calcium dynamics 2007-2009
- Ezio Bartocci, Computer sciences, Stony Brook, Large scale simulations of cardiac dynamics, 2010- 2012
- Ilija Uzelac, Physics, Georgia Tech, Optical mapping and defibrillation. 2012-

Ph.D. Dissertation Committees.

1. Kim, Youngeun, PhD, Stony Brook University. Thesis: "A simulation of the breakup of spiral waves using bidomain equations in electrical cardiology" 2005.
2. Alfonso Bueno-Orovio PhD. Universidad de Castilla-La Mancha, Spain. Thesis: Mathematical modeling and spectral simulation of genetic diseases in the human heart "2007.
3. Rebecca M. Smith, PhD. Syracuse University, NY 2009.
4. Hans Dierckx PhD. Ghent University. Belgium 2010.
5. Philip Bittihn, Ph.D. Goettingen University, Germany 2013.
6. Cesar Flores, Ph.D. Georgia Tech., Atlanta GA. 2014

Journal Covers

Heart Rhythm 2007; 12: for article "Pulmonary vein reentry-Properties and size matter: Insights from a computational analysis"

Journal of Veterinary Cardiology 2008, 10: for article "Termination of equine atrial fibrillation by quinidine: An optical mapping study".

Computational Biology and Bioinformatics: Volume 10, number 10. 2013. For article "Curvature Analysis of Cardiac Excitation Wavefronts," .

Research reviewed in the news

- "Working a Beat" in *DOE Computational Science Graduate Fellowship Magazine*, 2002.
- "Hearts Gone Wild" in *Projects in Scientific Computing*,. Pittsburgh Super Computer Center 2003 public report. Nov, 2003.
- "Excitable Media: The Belousov-Zhabotinsky Chemical Reaction and the Heart", Hofstra Horizons, 2004 19-25.
- "The beat goes on" in *Scientific Computing World Magazine* Jan/Feb 2005.
- "Critical Exponents, Cardiac Dynamics, and History in the DSWeb tutorial section" in *Dynamical Systems Magazine* October, 2005.
- "2006 Visualization Challenge" in *Science Magazine* Vol. 313, 1735 Sept 2006.
- "Cornell scientists honored for making science interactive and visually exciting" in *Cornell Chronicle*. Oct 4, 2006.

- “The Human Heart Laid Bare” in *News-journal of the Society for industrial and Applied Mathematics*, SIAM news Vol 39 Nov 9, 2006.
- “Visualization award announcement” in *The Biological Physicist* Vol 6 p 19 Oct 2006,
- “The Cardiac Museum” in *Web 3D art* 2007
- “Exploring Time” in *Discovery channel documentary*, Feb, 2007.
- “Visualization sheds light on cardiac dynamics” in *medical physics web* Dec 16, 2008.
- “Visualizing Ventricular Fibrillation” Seeing Science section in *Biomedical Computation review magazine*, Winter 2008/2009
- “Computing Luminaries Receive NSF Grant to Develop Modeling Tools for Complex Systems” *Dr. Dobb’s Digest*. August 19, 2009.
- “Cornell Vet Researchers Investigate Atrial Fibrillation” TheHorse.com, Article#15624, January 12, 2010.
- “Off Bet Hearts” Pittsburgh Supercomputer Center 2010. Highlight projects in scientific computing.pg 28-31. January 2011.
- New method defibrillates heart with less electricity, pain” Cornell University Chronicle, July, 2011
- “A Gentler Defibrillator Jolt”, in IEEE Spectrum inside technology, July 2011
- “Kinder, Gentler Defibrillator Uses Multiple, Small Jolts”, Scientific American, July 2011
- “A kinder, gentler defibrillator”, Nature News, July 2011
- “A Less Shocking Way to Reset a Broken Heart” Science, July 13, 2011
- “New technologies aim to take shock out of treating irregular hearts”, Nature Medicine 17, 906, August 2011
- “Walk or run in the rain?” TV NBC Atlanta, local 11pm news. Sept 20, 2012.
- Atlanta Science Festival, WSB-TV Channel 2, Atlanta, March 16, 2012.