CURRICULUM VITAE

I. BIOGRAPHICAL DATA

Edward Joseph Vigmond

IHU Liryc
Hôpital Xavier Arnozan
Avenue de Haut-Levêque
33600 Pessac France
edward.vigmond@u-bordeaux.fr

II. PROFESSIONAL RECORD

A. Academic Record

i) Undergraduate
B.A.Sc., 04/1988
Electrical and Computer Engineering
University of Toronto/Toronto/Canada

ii) Graduate
M.A.Sc., 04/1991
Electrical and Computer Engineering, Institute of Biomedical Engineering
University of Toronto/Toronto/Canada

Ph.D., 01/1997
Electrical and Computer Engineering, Institute of Biomedical Engineering
University of Toronto/Toronto/Canada

Diplôme d'habilitation à Diriger Des Recherches, 01, 2017
University of Bordeaux/Bordeaux/France

iii) Post-doctoral or other special training

- Postdoctoral Fellow, 06/1997–07/1999
  Biomedical Engineering
  Institut de génie biomédical/Université de Montréal/Montreal/Canada
  Supervisor: Dr. L. Josh Leon
- Postdoctoral Fellow, 08/1999–06/2001
  Biomedical Engineering
  Department of Biomedical Engineering,Tulane University/New Orleans/U.S.A
  Supervisor: Dr. Natalia A. Trayanova

B. Academic and Other Appointments

- Researcher, L'Institut Rythmologie et Modelisation Cardiaque (Liryc), Université de Bordeaux, 1/2012–present
- Associate Professor, University of Calgary, 07/2005–11/2011

- Assistant Professor, University of Calgary, 07/2001–06/2005

C. Administrative Responsibilities

- Head of Modelling Team, LIRYC Institute, 1/2012–present
- Associate Director for the Biomedical Engineering Undergraduate Specialization, 01/2008–8/2009
- Director, Center for BioEngineering Research and Education, 01/2009–11/2011

D. Professional Certification and Memberships in Learned Societies

- Professional Engineer, APEGGA, January 2003–Nov 2011
- Member, IEEE Engineering in Medicine and Biology, 1998–present
- Member, Libin Cardiovascular Institute, University of Calgary, 2005–present.

E. Awards, Distinctions, and Fellowships

International Congress on Electrocardiography Young Investigator Award	2003
NSERC Postdoctoral Fellowship	1997-99
IEEE EMBS Whitaker Student Paper Region 7 Finalist	1996
N.F. Moody Award	1996
Ontario Graduate Scholarship	1993–94
University of Toronto Open Scholarship	1992–93
Ontario Graduate Scholarship	1991–92
NSERC Post-Graduate Scholarship	1988–90
Gordon F. Tracy Scholarship	1987-88
John M. Empey Award	1986-87
University of Toronto Admission Scholarship	1984-85

III. EDUCATIONAL ACTIVITIES

A. Instruction

Undergraduate Level Instruction

- Introduction to Circuits/ENEL341, Fall 2006, lecture/lab/tutorial
- Bioelectricity/BMEN409, Winter 2006–9,2011 lecture/lab/tutorial
- Circuits for Software Engineers/ENEL329, Fall 2005, lecture/tutorial
- Programming Fundamentals/ENCM339, Fall 2003 and 2004, lecture/lab/tutorial
- Software Engineering for Computer Engineers/ENCM493, Winter 2003 and 2004, lecture/lab/tutorial
- Biomedical Signal Analysis/ENEL563, Fall 2001,2&7 lecture/lab/tutorial
- Signals and Systems/ENEL327, Winter 2001, lecture/lab/tutorial
- Numerical Methods in Engineering, ENGG407, Fall 2009, lecture/tutorial

Graduate Level Instruction

- Numerical Electromagnetic Field Computation/ENEL663(was 619.09), Fall 2002/4/6/9, lecture
- Bioelectromagnetism/ENEL(was 619.21), Fall 2003/5/7, W2011 lecture
- Frontiers in Biomedical Engineering/ENME619.81, Winter 2002 & Fall 2003, course coordinator
- Fundamentals of Biomedical Engineering ENBM 601, Fall 2004, guest lecture

Teaching at Foreign Institutions

- Tulane University, New Orleans, U.S.A: Topics in Excitable Media/BMEN 676, graduate/undergraduate, Winter 2001, lecture

B. Graduate and Undergraduate Supervision

Current Graduate Students

1. Yingjing Feng, Supervisor, IMB, Ph.D., 5/2018–4/2021 Thesis Title: *Machine Learning for Atrial Fibrillation.*

Past-Supervised Graduate Students

1. Jaspreet Kaur, Supervisor, Electrical and Computer Engineering, Ph.D., 9/2010–10/2017 Thesis title: *Computational Modelling of Electrical Cell-to-Cell Interactions in Cardiac Tissue: Applications to Model Parameter Selection and Pacemaker Function*
2. Elham Behradfar, Supervisor, Electrical and Computer Engineering, Ph.D., 9/2010–3/2016, Thesis title: *Purkinje System Ca-induced Arrhythmogenesis*
3. Kamran Bigdeley-Shamloo, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2009–9/2012, Thesis title: *Modeling a Novel Mechanism of Calcium-Induced Calcium Release in Vascular Smooth Muscle Cell*
4. Neal Gallagher, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2009–8/2012, Thesis: *Radio-Frequency Catheter Ablation for Treatment of Atrial Fibrillation: The Influence of Probe Contact Geometry on Lesion Formation*
5. Yves Pauchard, Supervisor, Electrical and Computer Engineering, Ph.D., 9/2007–1/2012 Thesis title: *In Vivo Monitoring of Longitudinal Changes in Bone Architecture Using High-Resolution Peripheral Computed Tomography*
6. Patrick Boyle, Supervisor, Electrical and Computer Engineering, Ph.D., 9/2005–8/2011 Thesis title: *Role of the Purkinje System During Electric Shocks and Arrhythmia*
7. Go Suzuki, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2006–12/2009, Thesis: *Disorganization in ICD Electrograms*
8. Mauricio Munoz, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2005–4/2009 Thesis title: *Onset of Atrial Arrhythmias by Autonomic Neural Stimulation and their Termination - A Simulation Study*
9. Makarand Deo, Supervisor, Electrical and Computer Engineering, Ph.D., 1/2004–9/2008 Thesis title: *Modeling the Role of the Purkinje System in Cardiac Arrhytmias*

10. Mark Ridler, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2004–6/2007 Thesis title: *Arrhythmogenic Consequences of Action Potential Duration Gradients in the Atria*
11. Hai Kim Diep, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2002–11/2005, Thesis title: *Modelling Electrical Communication in a Resistance Artery*
12. Naresh Bajaj, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2002–8/2005, Thesis title: *Quantification of Organization in ICD Electrograms*
13. Vincent Tsoi, Supervisor, Electrical and Computer Engineering, M.Sc., 9/2002–10/2004, Thesis title: *Vagal Effects on Atrial Arrhythmogenesis*

Senior Undergraduate students

- Karli Gilette, Medical University of Graz, 9/2019-2/2020
- Maria Strocchi, King's College London, 2/2020
- Jorge Sanchez, Karlesruhe Institute of Techniology,
- William Francheschi, Johns Hopkins University, 5/2017-8/2017
- Claudia Hawkes, University of Navarra, 5/2017-8/2017
- Paul Cole, Electrical and Computer Engineering, University of Calgary, 5/2011–9/2011, NSERC USRA
- Aron Su, Software Engineering, University of Calgary, 9/2010–12/2010, 4th year project
- Adarsh Madhaven, Electrical and Computer Engineering, University of Calgary, 5/2010–9/2010, NSERC USRA
- Gio DiFrancesco, Software Engineering, University of Calgary, 9/2009–4/2010, 4th year project
- Mike Lee, Electrical and Computer Engineering, University of Calgary, 5/2007–9/2007, NSERC USRA
- Sean Gifford, Electrical and Computer Engineering, University of Calgary, 5/2005–9/2005, NSERC USRA
- Jordan Choi, Electrical and Computer Engineering, University of Calgary, 5/2004–9/2004, NSERC USRA *Threaded Data Reader C++ Class for Visualization Tool*
- Kelvin Mok, Electrical and Computer Engineering, University of Calgary, 9/2003–4/2003, B.Sc. *A Visualization Tool for Electrophysiology Simulations of the Atria*
- Fourth Year Design Project, *Biomedical Visualization Tool*, 9/2003-4/2004
- Fourth Year Design Project, *Automatic GUI Generator*, 9/2003-4/2004
- Deborah Tang, Electrical and Computer Engineering, University of Calgary, 5/2002–8/2002, Research Assistantship
- Rachel Ruckdeschel, Biomedical Engineering, Tulane University, 9/2000–4/2001, 4^{th} year thesis, B.Sc., *Reentry in a Geometrically Accurate Model of the Atria*

C. Postdoctoral Fellow Trainees

1. Dr. Argyrios Petras, *Electromechanical arrhythmia*, 09/2019–08/2021
2. Dr. Jairo Padilla, *Electrogram Computation*, 6/2018–05/2020
3. Dr. Julien Bouyssier, *Cardiac Resynchronization Therapy*, 1/2018-12/2019
4. Dr. Peter Langfield, *Repolarization Abnormalities*, 10/2017-1/2020
5. Dr. Mirabeau Saha, *Atrial Arrhythmias*, 02/2017–01/2019
6. Dr. Namit Gaur, *Ionic modelling*, 09/2016–12/2019
7. Dr. Jaun Gomez, *Electrical Cardiac Resynchronization Therapy*, 05/2016–09/2017
8. Dr. Caroline Roney, *Atrial Electrophysiological Modelling*, 05/2015–08/2017
9. Dr. Ali Pashei, *Cardiac Electrophysiological Modelling*, 04/2014–06/2016
10. Dr. Jason Bayer, *Cardiac Electrophysiological Modelling*, 03/2013–08/2016
11. Dr. Martin Bishop, *Effect of Blood Vessels on Defibrillation Shocks*, May–July, 2009
12. Dr. Rafael Sebastian, *Parameter Sensitivity in Solving the Bidomain Equations*, March, 2007
13. Dr. Clyde Clements, *Modeling of Cardiac Mechano-Electrical Activity*, 1/01/04–01/03/06
14. Dr. Gernot Plank, *Modeling of Cardiac Electrical Activity*, 9/02-4/03

IV. SCHOLARLY ACTIVITIES

A. Research Support

1. ERC H2020 2021–5, 5M€, *Numerical modeling of cardiac electrophysiology at the cellular scale (MICROCARD)*, Co-Investigator.
2. Aquitaine Region, 2018–21, 76k€, *A novel therapy to safely and painlessly cardiovert atrial fibrillation with EPIC: External Painless Cardioversion (EPIC)*, Principal Investigator.
3. Federation of French Cardiologists, 2018–20, 80k€, *Amélioration de l'imagerie cardiaque noninvasive par caractérisation de la cicatrice (Improving noninvasive cardiac imaging by characterizing scar)*, Prinicipal Investigator
4. Marie Curie International Training Network, 240k€, 2017–21 *Personalized Insilico Cardiology*, Local Coordinator
5. Fondation Recherche Médicale, Post-doc, 2017–9, 100k€, *Clinically and Experimentally Informed Personalized Computer Modeling to Improve Cardiac Ablation Therapy for Atrial Fibrillation*, Principal Investigator.
6. Conseil Régional d'Aquitaine, 2017–9, 184600 €, *Purkinje Characterization*, co-investigator.
7. PRACE Partnership for Advanced Computing in Europe, 2016–8, 5M compute hours, *CAMEL-Cardiac MechanoElectrics*, Principal Investigator

8. Medtronic research Contract, 2016–8, €150k, *Modelling tools for ventricular arrhythmias*, co-Principal Investigator.
9. Leducq Transatlantic Network of Excellence, 2016–20, €2M, *Repolarization Heterogeneity imaging for personalized therapy of heart arrhythmia*, co-investigator.
10. European Research Agency, ERACoSysMed, 2016–2108, €750K, *Personalized Multiphysics Simulations to Hone Cardiac Resynchronization Therapy*, Coordinator.
11. PRACE Partnership for Advanced Computing in Europe, 2014–6, 5M compute hours, *CAMEL-Cardiac MechanoElectrics*, Principal Investigator
12. Agence National de Récherche, 10/2014–10/2017, €50000/year, *High resolution numerical models for cardiac electrophysiology*, Coudiére , Vigmond, Co-investigator:
13. Canadian Institutes of Health Research, 7/2010–6/2013; $120,000/yr; *Clarifying the Nature of Cell-Cell Communication in Small Resistance Arteries*, Welsh, Vigmond; Co-investigator;
14. National Institutes of Health, 5/2010–4/2014; $49,000/yr. *Multi-scale Modeling of Calcium Mediated Triggered Activity in the Heart*; Shiferaw, Plank, Vigmond; Co-investigator;.
15. Canadian Heart & Stroke Foundation Operating Grant, 6/2010–5/2013, $58,000/yr, *Clarifying the Nature of Cell-Cell Communication in Small Resistance Arteries.*
16. St. Jude Medical, 5/2008-4/2009, $52,000, *Phase angle as a Predictor of Ablation Electrode Surface Area in Contact with Tissue.*
17. MITACS Project Grant, 07/2008–06/2010; $135,000/year; *Control of Cardiac Arrhythmias,* Glass, Nattel, Vinet, Leon, Vigmond; PI;
18. MITACS Networking Grant, 5/2008, $10,000, *CARP Modelling Workshop*
19. iCORE ISPR Grant, 4/2008, $3000, *CARP Modelling Workshop*
20. NSERC Operating Grant; 4/07–3/12, $38,680/yr; *Development of an Electro-mechano-fluidic Biological Model*; Vigmond; PI;
21. Mathematics of Information Technology and Complex Systems Project Grant, 07/2005–06/2010; $135,000/year; *Control of Cardiac Arrhythmias,* Glass, Nattel, Vinet, Leon, Vigmond; Co-Investigator;
22. Alberta Heart and Stroke Operating Grant, 6/2006–5/2009; $45,000/yr, *Localization of Neural Modulation of Atrial Excitation and Repolarization, and the Arrhythmogenic Consequences,* Vigmond, Vinet; PI;
23. NSERC Operating Grant; 4/02–3/07, $39,000/yr; *Modelling Cardiac Electrical Activity in 3D Using a Hybrid FEM/BEM Method*; Vigmond; PI
24. Mathematics of Information Technology and Complex Systems Project Grant, 07/2005–06/2007; $135,000/year; *Control of Cardiac Arrhythmias,* Glass, Nattel, Kapral, Vinet, Leon, Vigmond; Co-investigator
25. Alberta Heart and Stroke Operating Grant, 6/2004–9/2007; $65,000/year; *Computational and experimental investigation of the effects of spatial heterogeneity of refractoriness on inducibility and maintenance of atrial fibrillation in the mouse atria,* Nygren, Vigmond; Co-investigator

26. Alberta Heart and Stroke Operating Grant, 10/2004–9/2006; $15,000/year; *Cell-to-cell communication in the resistance vascular*; Welsh, Vigmond; Co-investigator

27. Alberta Ingenuity Fund New Faculty Grant, 4/04–03/06; $55,000/yr; *An Electromechanical Computer Heart Model Based on Discretization at the Single Cell Level*; Vigmond; PI

28. MITACS Project Grant, 6/03–5/05; $15,000/yr; *Control of Atrial Fibrillation*; Glass, Nattel, Kapral, Vinet, Leon, Vigmond; Co-investigator

29. NSERC Collaborative Health Research Project Operating Grant; 4/02–3/05; $20,000/yr; *An Intelligent Approach to Automatic Choice of Defibrillation Shock Strength*; Leon, Kimber, Vigmond; Co-investigator

30. Medtronic Project Grant; 2003–2004; ($80,000 for multi-site study, no money but clinical data provided); *An Intelligent Approach to Automatic Choice of Defibrillation Shock Strength*; Leon, Kimber, Vigmond; Co-investigator

31. Alberta Heart and Stroke Operating Grant; 4/2002–3/2003; $20,000/yr; *Computer Modelling of Atrial Arrhythmias*; Leon, Vigmond; Co-investigator

32. University of Calgary Travel Grant; 4/2002; $1350; Vigmond; PI

33. University of Calgary Starter Grant; 6/2002–5/2004; $10,000; Vigmond; PI

34. Capital Startup Grant; 6/2001–5/2002; $25,000; *Electrophysiological Modeling*; Vigmond; PI

B. Publications

Peer-reviewed Journal papers

1 CH Roney, R Bendikas, F Pashakhanloo, C Corrado, **EJ Vigmond**, ER McVeigh, NA Trayanova, and SA Niederer, "Constructing a human atrial fibre atlas." *Annals of Biomedical Engineering*, vol. 49, p. 233, 2021.

2 J Corral-Acero, F Margara, M Marciniak, C Rodero, F Loncaric, Y Feng, A Gilbert, JF Fernandes, HA Bukhari, A Wajdan, MV Martinez, MS Santos, M Shamohammdi, H Luo, P Westphal, P Leeson, P DiAchille, V Gurev, M Mayr, L Geris, P Pathmanathan, T Morrison, R Cornelussen, F Prinzen, T Delhaas, A Doltra, M Sitges, **EJ Vigmond**, E Zacur, V Grau, B Rodriguez, EW Remme, S Niederer, P Mortier, K McLeod, M Potse, E Pueyo, A Bueno-Orovio, and P Lamata, "The 'digital twin' to enable the vision of precision cardiology." *European Heart Journal*, vol. 41, p. 4556, 2020.

3 M Strocchi, AWC Lee, A Neic, J Bouyssier, K Gillette, G Plank, MK Elliott, J Gould, JM Behar, B Sidhu, V Mehta, MJ Bishop, **EJ Vigmond**, CA Rinaldi, and SA Niederer, "His-bundle and left bundle pacing with optimized atrioventricular delay achieve superior electrical synchrony over endocardial and epicardial pacing in left bundle branch block patients." *Heart Rhythm*, vol. 17, p. 1922, 2020.

4 T Grandits, K Gillette, A Neic, J Bayer, **E Vigmond**, T Pock, and G Plank, "An inverse eikonal method for identifying ventricular activation sequences from epicardial activation maps." *Journal of Computational Physics*, vol. 419, 2020.

5 DJ Swenson, RT Taepke, JJE Blauer, E Kwan, E Ghafoori, G Plank, **E Vigmond**, RS MacLeod, P DeGroot, and R Ranjan, "Direct comparison of a novel antitachycardia pacing algorithm against present methods using virtual patient modeling." *Heart Rhythm*, vol. 17, p. 1602, 2020.

6 N Gaur, F Ortega, AO Verkerk, I Mengarelli, T Krogh-Madsen, DJ Christini, R Coronel, and **EJ Vigmond**, "Validation of quantitative measure of repolarization reserve as a novel marker of drug induced proarrhythmia." *Journal of Molecular And Cellular Cardiology*, vol. 145, p. 122, 2020.

7 PM Gemmell, K Gillette, G Balaban, R Rajani, **EJ Vigmond**, G Plank, and MJ Bishop, "A computational investigation into rate-dependant vectorcardiogram changes due to specific fibrosis patterns in non-ischæmic dilated cardiomyopathy." *Computers In Biology And Medicine*, vol. 123, p. 103895, 2020.

8 M Haïssaguerre, J Duchateau, R Dubois, M Hocini, G Cheniti, F Sacher, T Lavergne, V Probst, E Surget, **E Vigmond**, N Welte, R Chauvel, N Derval, T Pambrun, P Jais, W Nademanee, and O Bernus, "Idiopathic ventricular fibrillation: Role of Purkinje system and microstructural myocardial abnormalities." *JACC. Clinical Electrophysiology*, vol. 6, p. 591, 2020.

9 M Strocchi, MAF Gsell, CM Augustin, O Razeghi, CH Roney, AJ Prassl, **EJ Vigmond**, JM Behar, JS Gould, CA Rinaldi, MJ Bishop, G Plank, and SA Niederer, "Simulating ventricular systolic motion in a four-chamber heart model with spatially varying robin boundary conditions to model the effect of the pericardium." *Journal of Biomechanics*, vol. 101, p. 109645, 2020.

10 M Strocchi, CM Augustin, MAF Gsell, E Karabelas, A Neic, K Gillette, O Razeghi, AJ Prassl, **EJ Vigmond**, JM Behar, J Gould, B Sidhu, CA Rinaldi, MJ Bishop, G Plank, and SA Niederer, "A publicly available virtual cohort of four-chamber heart meshes for cardiac electromechanics simulations." *PloS One*, vol. 15, p. e0235145, 2020.

11 CH Roney, ML Beach, AM Mehta, I Sim, C Corrado, R Bendikas, JA Solis-Lemus, O Razeghi, J Whitaker, L O'Neill, G Plank, **E Vigmond**, SE Williams, MD O'Neill, and SA Niederer, "In silico comparison of left atrial ablation techniques that target the anatomical, structural, and electrical substrates of atrial fibrillation." *Frontiers In Physiology*, vol. 11, p. 1145, 2020.

12 M Haïssaguerre, W Nademanee, M Hocini, J Duchateau, C André, T Lavergne, M Takigawa, F Sacher, N Derval, T Pambrun, P Jais, R Walton, M Potse, **E Vigmond**, R Dubois, and O Bernus, "The spectrum of idiopathic ventricular fibrillation and J-wave syndromes: Novel mapping insights." *Cardiac Electrophysiology Clinics*, vol. 11, p. 699, 2019.

13 A Moreno, RD Walton, M Constantin, O Bernus, **EJ Vigmond**, and JD Bayer, "Wide-area low-energy surface stimulation of large mammalian ventricular tissue." *Scientific Reports*, vol. 9, p. 15863, 2019.

14 CH Roney, A Pashaei, M Meo, R Dubois, PM Boyle, NA Trayanova, H Cochet, SA Niederer, and **EJ Vigmond**, "Universal atrial coordinates applied to visualisation, registration and construction of patient specific meshes." *Medical Image Analysis*, vol. 55, p. 65, 2019.

15 PM Boyle, WH Franceschi, M Constantin, C Hawks, T Desplantez, NA Trayanova, and **EJ Vigmond**, "New insights on the cardiac safety factor: Unraveling the relationship between conduction velocity and robustness of propagation." *Journal of Molecular And Cellular Cardiology*, vol. 128, p. 117, 2019.

16 S Nayyar, E Downar, M Beheshti, T Liang, S Massé, K Magtibay, A Bhaskaran, Y Saeed, **E Vigmond**, and K Nanthakumar, "Information theory to tachycardia therapy: electrogram entropy predicts diastolic microstructure of reentrant ventricular tachycardia." *American Journal of Physiology. Heart And Circulatory Physiology*, vol. 316, p. H134, 2019.

17 CH Roney, J Whitaker, I Sim, L O'Neill, RK Mukherjee, O Razeghi, **EJ Vigmond**, M Wright, MD O'Neill, SE Williams, and SA Niederer, "A technique for measuring anisotropy in atrial conduction to estimate conduction velocity and atrial fibre direction." *Computers In Biology And Medicine*, vol. 104, p. 278, 2019.

18 N Gaur, T Hof, M Haissaguerre, and **EJ Vigmond**, "Propagation failure by TRPM4 overexpression." *Biophysical Journal*, vol. 116, p. 469, 2019.

19 C Dallet, C Roney, R Martin, T Kitamura, S Puyo, J Duchateau, C Dumas-Pomier, G Ravon, L Bear, N Derval, F Sacher, **E Vigmond**, M Haissaguerre, M Hocini, and R Dubois, "Cardiac propagation pattern mapping with vector field for helping tachyarrhythmias diagnosis with clinical tridimensional electro-anatomical mapping tools." *IEEE Transactions On Bio-Medical Engineering*, vol. 66, p. 373, 2019.

20 E Willemen, R Schreurs, PR Huntjens, M Strik, G Plank, **E Vigmond**, J Walmsley, K Vernooy, T Delhaas, FW Prinzen, and J Lumens, "The left and right ventricles respond differently to variation of pacing delays in cardiac resynchronization therapy: A combined experimental-computational approach." *Frontiers In Physiology*, vol. 10, p. 17, 2019.

21 J Zhao, O Aslanidi, P Kuklik, G Lee, G Tse, S Niederer, and **EJ Vigmond**, "Editorial: Recent advances in understanding the basic mechanisms of atrial fibrillation using novel computational approaches." *Frontiers In Physiology*, vol. 10, p. 1065, 2019.

22 JD Bayer, BJ Boukens, SPJ Krul, CH Roney, AHG Driessen, WR Berger, NWEvan den Berg, AO Verkerk, **EJ Vigmond**, R Coronel, and JRde Groot, "Acetylcholine delays atrial activation to facilitate atrial fibrillation." *Frontiers In Physiology*, vol. 10, p. 1105, 2019.

23 M Beheshti, S Nayyar, K Magtibay, S Massé, A Porta-Sanchez, S Haldar, A Bhaskaran, **E Vigmond**, and K Nanthakumar, "Quantifying the determinants of decremental response in critical ventricular tachycardia substrate." *Computers In Biology And Medicine*, vol. 102, p. 260, 2018.

24 CH Roney, SE Williams, H Cochet, RK Mukherjee, L O'Neill, I Sim, J Whitaker, O Razeghi, GJ Klein, **EJ Vigmond**, M O'Neill, and SA Niederer, "Patient-specific simulations predict efficacy of ablation of interatrial connections for treatment of persistent atrial fibrillation." *Europace*, vol. 20, p. iii55, 2018.

25 CH Roney, FS Ng, MT Debney, C Eichhorn, A Nachiappan, RA Chowdhury, NA Qureshi, CD Cantwell, JH Tweedy, SA Niederer, NS Peters, and **EJ Vigmond**, "Determinants of new wavefront locations in cholinergic atrial fibrillation." *Europace*, vol. 20, p. iii3, 2018.

26 M Beheshti, K Magtibay, S Massé, A Porta-Sanchez, S Haldar, A Bhaskaran, S Nayyar, B Glover, DC Deno, **EJ Vigmond**, and K Nanthakumar, "Determinants of atrial bipolar voltage: Inter electrode distance and wavefront angle." *Computers In Biology And Medicine*, vol. 102, p. 449, 2018.

27 RD Walton, A Pashaei, ME Martinez, M Constantin, J Duchateau, L Bear, C Cros, C Pascarel-Auclerc, Y Guo, D Benoist, V Dubes, NR Faye, S Chaigne, S Dupuis, D Détaille, L Pourtau, P Pasdois, F Brette, J Rogier, L Labrousse, M Hocini, **EJ Vigmond**, M Haïssaguerre, and O Bernus, "Compartmentalized structure of the moderator band provides a unique substrate for macroreentrant ventricular tachycardia." *Circulation. Arrhythmia And Electrophysiology*, vol. 11, p. e005913, 2018.

28 M Haïssaguerre, M Hocini, G Cheniti, J Duchateau, F Sacher, S Puyo, H Cochet, M Takigawa, A Denis, R Martin, N Derval, P Bordachar, P Ritter, S Ploux, T Pambrun, N Klotz, G Massoullié, X Pillois, C Dallet, JJ Schott, S Scouarnec, MJ Ackerman, D Tester, O Piot, JL Pasquié, C Leclerc, JS Hermida, E Gandjbakhch, P Maury, L Labrousse, R Coronel, P Jais, D Benoist, **E Vigmond**, M Potse, R Walton, K Nademanee, O Bernus, and R Dubois, "Localized structural alterations underlying a subset of unexplained sudden cardiac death." *Circulation. Arrhythmia And Electrophysiology*, vol. 11, p. e006120, 2018.

29 A Satriano, **EJ Vigmond**, DS Schwartzman, and ES Di Martino, "Mechano-electric finite element model of the left atrium." *Computers In Biology And Medicine*, vol. 96, p. 24, 2018.

30 CH Roney, JD Bayer, H Cochet, M Meo, R Dubois, P Jaïs, and **EJ Vigmond**, "Variability in pulmonary vein electrophysiology and fibrosis determines arrhythmia susceptibility and dynamics." *PLoS Computational Biology*, vol. 14, p. e1006166, 2018.

31 J Bayer, AJ Prassl, A Pashaei, JF Gomez, A Frontera, A Neic, G Plank, and **EJ Vigmond**, "Universal ventricular coordinates: A generic framework for describing position within the heart and transferring data." *Medical Image Analysis*, vol. 45, p. 83, 2018.

32 K Balasundaram, S Massé, T Farid, K Nair, Asta, R Cusimano, **E Vigmond**, K Nanthakumar, and K Umapathy, "Morphologically constrained signal subspace characterization of electrograms during ventricular fibrillation," *Biomedical Signal Processing And Control*, vol. 38, p. 379, 2018.

33 PM Boyle, JB Hakim, S Zahid, WH Franceschi, MJ Murphy, **EJ Vigmond**, R Dubois, M Haïssaguerre, M Hocini, P Jaïs, NA Trayanova, and H Cochet, "Comparing reentrant drivers predicted by image-based computational modeling and mapped by electrocardiographic imaging in persistent atrial fibrillation." *Frontiers In Physiology*, vol. 9, p. 414, 2018.

34 J Liu, JD Bayer, R Aschar-Sobbi, M Wauchop, D Spears, M Gollob, **EJ Vigmond**, R Tsushima, PH Backx, and VS Chauhan, "Complex interactions in a novel SCN5A compound mutation associated with long QT and Brugada syndrome: Implications for Na+ channel blocking pharmacotherapy for de novo conduction disease." *PloS One*, vol. 13, p. e0197273, 2018.

35 ME Martinez, RD Walton, JD Bayer, M Haïssaguerre, **EJ Vigmond**, M Hocini, and O Bernus, "Role of the Purkinje-muscle junction on the ventricular repolarization heterogeneity in the healthy and ischemic ovine ventricular myocardium." *Frontiers In Physiology*, vol. 9, p. 718, 2018.

36 M Saha, CH Roney, JD Bayer, M Meo, H Cochet, R Dubois, and **EJ Vigmond**, "Wavelength and fibrosis affect phase singularity locations during atrial fibrillation." *Frontiers In Physiology*, vol. 9, p. 1207, 2018.

37 A Ghazanfari, **E Vigmond**, and A Nygren, "Arrhythmia vulnerability in diabetic cardiac tissue is species-dependent: Effects of I_{KATP}, uncoupling, and connexin lateralization." *Cardiovascular Engineering And Technology*, vol. 8, p. 527, 2017.

38 **EJ Vigmond**, IR Efimov, SL Rentschler, R Coronel, and BJ Boukens, "Fractionated electrograms with ST-segment elevation recorded from the human right ventricular outflow tract." *HeartRhythm Case Reports*, vol. 3, p. 546, 2017.

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Invited Talks

- "openCARP as an *in silico* Research Tool," Atrial Signals Symposium 2021, Karlsruhe, Germany, Sept, 29021.
- "Modelling Arrhythmia and the Purkinje System," MCF2020 – Modelling the Cardiac Function, Milano, Italy (on-line), Aug 31, 2020.
- "Modelling Arrhythmia in the His / Purkinje System," Simula Research Laboratory, Oslo, Norway, March 5, 2020.
- "Pacing and Reentry in the Purkinje System," 10^{th} TRM Forum, Lugano, Switzerland, Dec 8, 2019.
- "Modelling Atrial Fibrosis," 18^{th} Atrial Fibrillation Symposium, Copenhagen, Denmark, Feb 8, 2019.
- "Biophysical Models of the Fibrillating Atria: Fibrosis and Electrophysiological Considerations", *The Heart by Numbers,* Biophysical Society Thematic Meeting, Berlin, September 2018.
- "Treatment of Cardiac Electrophysiological Problems", CARS 2018, Berlin, June 2018.
- "Computer model-assisted AF therapy guidance", EHRA 2018, Barcelona, March, 2018.
- "Quantification of Cardiac Conduction and Repolarization Reserves," TRW Forum, Lugano, Switzerland, Dec 5, 2017.

- "PUSHCART - Personalized Multiphysics Simulations to Hone Cardiac Resynchronization Therapy," Systems Medicine Workshop, Ljubljana, Slovenia, June 8, 2017
- "Atrial fibrillation: A wine and silicone informed view," Montreal Heart Institute, Montreal, Canada, June 17, 2016.
- "Clinical Application," Medtronic, Minneapolis, Minnesota, USA, May 16, 2016.
- "Is lesion modelling a reliable substitute for lesion visualization?", 15^{th} Atrial Fibrillation Symposium, Rome, Italy, Feb 18, 2016.
- "Le coeur virtuel : quand l'électrogramme ne suffit plus," Soirée de santé, Université de Bordeaux, Bordeaux, France Dec. 10, 2015.
- "Percolation as a Mechanism for Atrial Arrhythmogenesis," TRW Forum, Lugano, Switzerland, Dec 7, 2015.
- "Atrial Fibrillation: Scars and Ablation," Peter Munk Cardiac Center, Toronto General Hosptal, Rounds, October 23, 2015.
- "Cardiac Applications of Computational Electrophysiology," BCAM Workshop on Quantitative Biomedicine for Health and Disease, Bilbao, Spain, February 17–18, 2015.
- "Phase mapping from the heart to the torso,", Simula, Oslo, Norway, Nov 6, 2014.
- "Arrhythmia Thy Name Be Purkinje," State of Electrophysiology Meeting, Halifax, Canada, June 28, 2014.
- "Wide Area Defibrillation, and Safety Factor of Cardiac Propagation ," Department of Medical Biophysics, Medical University of Graz, Graz, Austria, June 4, 2014.
- "Effects of the Purkinje System on Cardiac Electrical Activity," ICENet 2014, Moscow, Russia, May 29, 2014.
- "Recreating Atrial Rotors In Silico," TRW Forum, Lugano, Switzerland, Dec 3, 2013.
- "The Role of the Purkinje System in Reentry: Insights from modelling," *Heart Rhythm Society Conference*, May 9, 2013.
- " Modelling Arrhythmogenic Consequences of the Purkinje System," *The 1st HD Physiology International Symposium: Integrative Multi-level Systems Biology for In Silico Cardiology and Pharmacokinetics*, Tokyo, Japan, January 20–21, 2012.
- "Electromechanical Modelling of the Left Atrium," Symposium de GRSTB, École Polytechnique, Montreal, Canada, Oct 14, 2011.
- "High Performance Electrophysiological Computer Modelling with CARP," Bordeaux University, Bordeaux France, May 20, 2011.
- "Modelling Effects of the Purkinje System,"Division of Imaging Sciences, King's College, London UK, May 24, 2011.
- "High Performance Electrophysiological Computer Modelling using CARP," Centre for Arrhythmia Research, University of Michigan, Jan 7, 2011.

- "Investigating the Arrhythmogenic Role of the Purkinje System through Computer Simulation," CAMBAM, McGill University, Feb 11, 2010.
- "Investigating the Arrhythmogenic Role of the Purkinje System through Computer Simulation," Faculty of Biomedical Engineering, Dalhousie University, Jan 28, 2010.
- "Investigating the Purkinje System through Computer Simulation," Libin Cardiovascular Institute, University of Calgary, Jan 13, 2010.
- "Large-scale Modelling of the Heart," Virginia Commonwealth University, Richmond, VA, Oct 16, 2009.
- "Large-scale and detailed electrophysiological modelling," Mathematical Modeling and Computing in Electrocardiology, University of Nantes, France, June 2009
- "The Virtual heart: Recent Advances and Applications of Modelling," EP Rounds, Foothills General Hospital, Nov. 26, 2008.
- "Computer Modeling of the Purkinje System," McGill University, Montreal, QC, June 4, 2008.
- "Reentry Induction and Maintenance in the Heterogeneous Atria," GEPROM Conference, Montreal, QC, June 20, 2008
- "Understanding Cardiac Function Through Computer Modelling," Medtronic CRMD, Minneapolis, MN, Dec 7, 2007.
- "Heart Function and CARP," University of California at San Francisco Medical Center, San Francisco, CA, Oct 30, 2007
- "The Growth of CARP," Oxford University, Oxford, UK, Sept 28, 2007.
- "Understanding Cardiac Function Through Computer Modelling," McGill University, Montreal, QC, June, 2007.
- "Understanding Cardiac Function Through Computer Modelling," Université de Montréal, Montreal, QC, June, 2007.
- "Modelling the Whole Heart,", Oxford University, Oxford, UK, Sept 28, 2006.
- "Modelling of Blood Flow and Electromechanical Coupling in the Human Heart," University of Montreal, Montreal, Quebec, November 20, 2006.
- "Mathematical Techniques for Simulating Activity of Cardiac Tissue," Integrated Biology Workshop, Oxford University, Oxford, UK, September 29, 2006.
- "Modelling the Whole Heart," Integrated Biology Workshop, Oxford University, Oxford, UK, September 28, 2005.
- "Large-Scale Biological Simulation,"

  Tulane University, New Orleans, Louisiana, April 20, 2004.

C. Technology Transfer

Start-ups

- Numericor, GmbH
- CardioSolv, LLC

V. SERVICE ACTIVITIES

Associate Editor: *IEEE Transactions on Biomedical Engineering*, 2007–2013

Advisory Boards

1. Chairman, International Scientific Advisory Board, BioTechMed Graz, Graz University, Graz, Austria, 2012-present.

Journal Reviews

1. IEEE Transactions on Biomedical Engineering.
2. Medical and Biological Engineering and Computing:
3. SIAM Journal on Scientific Computing
4. Heart Rhythm
5. Journal of Computational Physics
6. Chaos
7. Mathematical Biosciences
8. Canadian Journal of Cardiology
9. Computational Methods in Biomechanics and Biomedical Engineering
10. International Journal Artificial Intelligence in Medicine
11. Proceedings of the Royal Academy
12. Circulation Research
13. American Journal of Physiology
14. Transactions of the Royal Society
15. Progress in Biophysics and Molecular Biology
16. International Journal of Numerical Methods in Biomedical Engineering
17. International Journal of High Performance Computing Applications

Grant Reviews

1. JTL Demonstrators for Individualised Medicine call, 2018.
2. King's College London Health Partner's Fund 2016–7
3. Norwegian Research Council, 2014–5, 2017

4. ERACoSysMed JTC-2 Call, 2017.
5. Swiss Science Fund, 2018, 2016
6. Ontario Research Excellence Fund, 2011
7. Swiss National Supercomputing, 2011
8. Ohio SuperComputing Centre, 2011
9. Wellcome Trust external reviewer: 2009,2015,2017,2018
10. HSFC external reviewer, 2008-10
11. AIF Scholarship Committee, 2006
12. CFI Grid Computing Infrastructure User Panel, 2006
13. Canadian Institutes of Health Research primary internal grant reviewer (06/2004)
14. Canadian Institutes of Health Research primary external grant reviewer (12/2003)
15. NSERC external reviewer, 2004, 2009
16. Research Council of Norway, 2014–5
17. Swiss Research Council, 2015
18. TV3 Marato, Spain, 2015
19. ERACoSysMed, 2017

Conference Organization

- Co-Chair Elect - Gordon Research Conference: Cardiac Arrhythmia Mechanisms, 2023
- Co-Vice-Chair - Gordon Research Conference: Cardiac Arrhythmia Mechanisms, Galvez, Tx, 2021
- Session Chair - Computing in Cardiology Conference, Rimini, Italy, September, 2020.
- Co-organizer - Functional Imaging and Modeling of the Heart, Bordeaux, France, June 6–8, 2019.
- Session Judge - EHRA Conference, Lisbon, Portugal, March 19, 2019.
- Organizer - 2^{nd} CARPentry Workshop, Bordeaux, France, Sept 17-19, 2018.
- Co-organizer - Workshop on Mathematical Methods in Cardiac Electrophysiology, Ottawa, Canada, Nov 4–6, 2017.
- Co-organizer - CARPentry Workshop, Graz, Austria, July 12-4, 2017.
- Session Chair - Heart Rhythm Society Conference, Chicago, USA, May 2017.
- Session Chair - CardioStim, Nice, France, June 2016.

- Symposium organizer - COSINE6, Bordeaux, France, May 2016.
- Associate Editor - IEEE EMBS Conference, 2011–5.
- Track Chair - IEEE EMBS Conference in Boston, MA, Aug, 2011.
- Co-Chair - 11th Noninvasive Functional Source Imaging and International Bioelectromagnetism Society, Banff AB, May 2011.
- Session Chair - Heart Rhythm Society Conference, Denver, CO, May, 2010.
- Session Chair - Alberta Biomedical Engineering Conference, Banff, Alberta, Oct., 2009,
- Session Chair - Canadian Medical and Biological Engineering Conference, Calgary, May, 2009.
- Organizer - CARP Workshop, Banff, September, 2008.
- Session Chair - IEEE EMBS Conference in Vancouver, BC, Aug, 2008.
- Session Chair - 5th International Conference on Bioelectromagnetism and 5th International Symposium on Noninvasive Functional Source Imaging within the Human Brain, Minneapolis, Minnesota, May, 2005
- Session Chair - Alberta Biomedical Engineering Conference, Banff, Alberta, Oct., 2005
- Session Chair - Alberta Biomedical Engineering Conference, Banff, Alberta, Oct., 2004
- Session Chair - Alberta Biomedical Engineering Conference, Banff, Alberta, Oct., 2003
- Session Chair - IEEE EMBS Conference in Houston, TX Oct, 2002.