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Travis J. A. Craddock, Ph.D.

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Nationality

Canadian Citizen

Aboriginal Status

Métis

Academic Networking Profiles

Research Gate	RGScore: 22.38	Impact Points: 47.48
Google Scholar	Citations: 326	H-Index: 9

EDUCATION

- 2012-2013 **Post-Doctoral Research in Systems Biology**
University of Alberta, Edmonton, Canada
Supervisor: Gordon Broderick
- 2008-2012 **Ph.D. in Physics**
University of Alberta, Edmonton, Canada
Advisor: Jack Tuszynski
Dissertation: *The Physical Basis for a Nanoneuroscience of Memory*
- 2005-2008 **M.Sc. in Physics**
University of Alberta, Edmonton, Canada
Advisor: Jack Tuszynski
Thesis: *Information Processing Capabilities of Microtubules at Physiological Temperature*
- 1997-2002 **B.Sc. in Physics (Honors, Co-op)**
University of Guelph, Guelph, Canada

POSITIONS & EMPLOYMENT

- 2013-Present **Associate Director**
Clinical Systems Biology Group (CSBG), Institute for NeuroImmune Medicine
Nova Southeastern University, Ft. Lauderdale, FL
CSBG Director: Gordon Broderick, Ph.D.
INIM Director: Nancy Klimas, M.D.

- 2013-Present **Assistant Professor**
Departments of Psychology, Medicine and Computer Science
Nova Southeastern University, Ft. Lauderdale, USA
Dean of Psychology: Karen Grosby, Ed.D.
- 2012-2013 **Senior Research Associate**
Department of Medicine, University of Alberta, Edmonton, Canada
PI: Dr. Gordon Broderick, Ph.D.
- 2010-2013 **Term Instructor**
Department of Engineering, Grant MacEwan University, Edmonton, Canada
Supervisor: Dr. Shelley Lorimer, Ph.D.
- 2006-2013 **Review Instructor**
Math and Applied Science Centre (MASC), University of Alberta, Edmonton,
Canada
Supervisor: Carmen Ropchan
- 2009 **Sessional Instructor**
Department of Science, University of Alberta – Augustana Campus, Camrose,
Canada
Supervisor: Dr. Gerhard Lotz, Ph.D.

GRANTS & FUNDING

Active

9/01/2014 – 4/30/2018

Gender Differences in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome.

NIH/ PAR12-032: R01 NS090200-01 (Fletcher)

Staff (6.75% Effort)

We aim to understand the mediators of persistence and relapse in men with ME/CFS, as we have in women. We will approach this by: (i) integration across several of the body's regulatory systems of data and knowledge collected from disparate sources, and (ii) mapping of the coordinated interactions between these physiologic systems and the potential for dysfunctional signaling networks. This project will extend this modeling of immune regulatory pathways and pathways that regulate latent viral expression in a way that will enable us to compare gender differences in illness mechanisms and explore gender-specific therapeutic targets.

7/1/2014 - 6/30/2015

A novel immune fingerprint for mTBI diagnosis and recovery prognosis

President's Faculty Research and Development Grant at Nova Southeastern University

Principal Investigator: Direct Funds \$10,000

This study will identify blood-borne immune markers that provide a reliable basis for assessing severity of mTBI and expected recovery through the characterization of peripheral cytokine signature profiles as they change in time post-mTBI.

9/01/2012 – 9/01/2016

Understanding Gulf War Illness: An Integrative Modeling Approach.

DOD GWIRP: GW120045 (Morris PI)

Co-Investigator (23% Effort)

Integrate two animal models of GWI with human clinical data to pinpoint the underlying mechanisms of disease and target treatment more effectively to re-establish normal well-coordinated signaling interactions. Specifically, our more detailed understanding of the dysfunction associated with key metabolic pathways involved in GWI would greatly expedite the identification of promising biomarkers for improved diagnosis over the short-term as well as selection and testing of more targeted therapeutic interventions over the longer term that will address the underlying mechanisms of disease.

Past Support

9/01/2010 – 4/30/2014 (ext. 4/30/2015)

Study of Chronic Fatigue Syndrome using comprehensive molecular profiling with network and control theory.

NIH/ PA08-246: R01AR057853-01 (Klimas PI)

Co-investigator (9.2% Effort)

To improve our understanding of CFS pathogenesis by: (i) integrating data and knowledge collected from disparate sources across several of the body's regulatory systems, (ii) mapping the interactions that emerge at multiple scales of biology and identifying potentially altered "wiring" in these signaling networks specific rapid response to exercise in CFS.

1/1/2014 – 12/31/2014

Post-exertion malaise in CFS: A systems biology approach to understanding brain, inflammation and behavior interactions

The CFIDS Association of America: New account (Cooke PI)

Co-Investigator (2% Effort)

The main goal is to determine the dynamic relationships between brain structure and function, gene expression for sensory, adrenergic, and immune function and self-reported symptoms in chronic fatigue syndrome (CFS/ME) using an exercise model in a systems biology framework.

6/01/2010 – 6/01/2013 (ext. 08/31/2014)

Theory-driven Models for Correcting "Fight or Flight" Imbalance in Gulf War Illness.

DOD GWIRP/ IIRA: GW093042 (Broderick PI)

Staff (15% Effort)

The goal of this project is to create a comprehensive engineering model of endocrine-immune interaction dynamics in order to (i) detect and identify theoretical failure modes of the HPA-immune axis that align with manifestations of GWI and CFS, and (ii) use computer simulations to identify promising treatment strategies that exploit the regulatory dynamics of these systems in redirecting the overall system to normal coordinated activity.

Pending

6/01/2014 – 05/30/2018

Women vs. Men with GWI: Differences in Computational Models and Therapeutic Target.

VA Merit: GW120045 (Klimas PI)

Co-investigator

We hypothesize that GWI affects regulatory function differently in women than in men, with implications on therapeutic management. The objective of this study is to improve our understanding of GWI pathogenesis in women by: (i) integrating data across several of the body's regulatory systems, and (ii) mapping of dysfunctional signaling networks in GWI in each sex.

Systems Analysis of Age-related Drivers of Gliosis to Detect Unique Biomarkers in Alzheimer's
NIH Immune and Inflammatory Mechanisms in Alzheimer's Disease (R01)

Craddock (PI NSU): Schally (PI Miami VAMC)

Award Requested: **\$2,205,820 (Directs: \$1,950,052 ; Indirects: \$255,768)**

Identifying Immune Signatures in Female mTBI for Novel Diagnostics and Recovery Prognosis

NIH Exploratory/Developmental Research Grant Award (Parent R21)

Craddock (PI)

Award Requested: **\$345,856.00 (Directs: \$274,970.00 ; Indirects \$70,886.00)**

Disentangling the Effects of PTSD and mTBI from GWI

DOD CDMRP Gulf War Illness Research Program - New Investigator Award

Craddock (PI): Broderick (Co-PI)

Award Requested: **\$572,199 (Directs: \$499,066 ; Indirects: \$73,133)**

AWARDS & RECOGNITION

- | | |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2012 | 3rd Place - Campus Alberta Neuroscience Symposium Poster Competition
Campus Alberta Neuroscience, Institutional Award
\$100 |
| 2011 | J. Gordin Kaplan Graduate Award
University of Alberta, Institutional Award
\$1300, Travel grant |
| 2010 | President's Doctoral Prize of Distinction
University of Alberta, Institutional Award
\$5100, Recognition of academic and scholarly achievement |
| 2009-2011 | NSERC Postgraduate Scholarship (Doctoral)
Government of Canada, National Award
\$21,000/year, Outstanding Canadian Doctoral student in natural sciences |
| 2009 | President's Doctoral Prize of Distinction
University of Alberta, Institutional Award
\$10,000, Recognition of academic and scholarly achievement |
| 2009 | GSA Professional Development & Travel Grant
University of Alberta, Institutional Award
\$800, Travel grant |
| 2008-2009 | Queen Elizabeth II Scholarship (Doctoral)
Government of Alberta, Provincial Award
\$15,000, Academic achievement. |
| 2007 & 2009 | Billy Mills Award
University of Alberta, Institutional Award
\$500 each, Recognition of Aboriginal student academic achievement |
| 2006 | Graduate Student Scholarship |

- Government of Alberta, Provincial Award
\$2000, Exceptional academic achievement of student in a Master of Science degree
- 2006 **Dorothy Leslie Memorial Award**
University of Alberta, Institutional Award
\$2500, Academic recognition for Aboriginal student
- 2006 **Marie Louise Imrie Graduate Student Award**
University of Alberta, Institutional Award
\$600, Travel Grant
- 2006 **UTS Graduate Student Teaching Award**
University of Alberta, Institutional Award
Honorary, Excellence in teaching

PEER REVIEWED JOURNAL PUBLICATIONS

1. **Craddock TJA**, Friesen D, Mane, J, Hameroff S, Tuszynski J. *The Feasibility of Coherent Energy Transfer in Microtubules*. J Roy Soc Interface 11(100): 20140677 (2014)
2. Atayoub AT, **Craddock TJA**, Klobukowski M, Tuszynski J. *Analysis of the Strength of Interfacial Hydrogen Bonds between Tubulin Dimers Using Quantum Theory of Atoms in Molecules*. Biophys J 107(3): 740-750 (2014)
3. Fritsch P, **Craddock TJA**, del Rosario R, Rice M, Smylie AL, Folcik V, de Vries G, Fletcher MA, Klimas N, Broderick G. *Succumbing to the Laws of Attraction: Exploring the Sometimes Pathogenic Versatility of Discrete Immune Logic*. Systems Biomedicine 1(3): 0-1 (2014)
4. **Craddock TJA**, Fritsch P, Rice MA Jr., del Rosario R, Miller DB, et al. *A Role for Homeostatic Drive in the Perpetuation of Complex Chronic Illness: Gulf War Illness and Chronic Fatigue Syndrome*, PLoS ONE 9(1): e84839.
5. Tuszynski JA, **Craddock TJA**, Mane JY, Barakat KH, Tseng CY, et al., *Modeling the Yew Tree Tubulin and a Comparison of its Interaction with Paclitaxel to Human Tubulin*, Pharm Res 29:3007-3021 (2012).
6. **Craddock TJA**, St. George M, Freedman H, Barakat KH, Damaraju S, et al., *Computational Predictions of Volatile Anesthetic Interactions with the Microtubule Cytoskeleton: Implications for Side Effects of General Anesthesia*, PLoS ONE 7(6): e37251 (2012)
7. **Craddock TJA**, Tuszynski JA, Goldstein LE, Chopra D, Hameroff S, et al., *The Zinc Dyshomeostasis Hypothesis of Alzheimer's Disease*, PLoS ONE 7(3): e33552 (2012)
8. **Craddock TJA**, Tuszynski JA, Hameroff S, *Cytoskeletal signaling: Is synaptic memory encoded in microtubule lattices by CaMKII phosphorylation?*, PLoS Comp Biol 8(3): e10024212011 (2012)

9. Saha AA, **Craddock TJA**, Tuszynski JA, *An investigation of the plausibility of stochastic resonance in tubulin dimers*, Biosystems 107(2): 81–87 (2012)
10. Hameroff S, **Craddock TJA**, Tuszynski J, “*Memory Bytes*” - *Molecular match for CaMKII phosphorylation encoding of microtubule lattices*, J Integr Neurosci 9: 253-267 (2010)
11. **Craddock TJA**, Tuszynski JA, *A Critical Assessment of the Information Processing Capabilities of Neuronal Microtubules Using Coherent Excitations*, J Biol Phys 36(1): 53-70 (2010)
12. **Craddock TJA**, Beauchemin C. Tuszynski JA, *Information processing mechanisms in microtubules at physiological temperature: Model predictions for experimental tests*, Biosystems 97(1): 28-34 (2009)

INVITED PEER REVIEWED JOURNAL PUBLICATIONS

1. **Craddock TJA**, Hameroff SR, Ayoub AT, Klobukowski M, Tuszynski JA. *Anesthetics Act in Quantum Channels in Brain Microtubules to Prevent Consciousness*. Curr Trend Med Chem (in-press, accepted Oct. 22/2014)
2. Friesen DE, **Craddock TJA**, Kalra AP, Tuszynski JA. *Biological wires, communication systems, and implications for disease*. Biosystems 127C: 14-27 (2015)
3. **Craddock TJA**, Priel A, Tuszynski JA. *Keeping Time: Could Quantum Beating in Microtubules be the Basis for the Neural Synchrony Related to Consciousness?* J Integr Neurosci 13(2): 293-311 (2014).
4. Hameroff SR, Tuszynski JA, **Craddock TJA**. *Quantum Effects in the Understanding of Consciousness*. J Inter Neurosci 13(2): 229-252 (2014)
5. Broderick G, **Craddock TJA**, *Systems biology of complex symptom profiles: Capturing interactivity across behavior, brain and immune regulation*, Brain Behav Immun 29: 1-8 (2012).
6. **Craddock TJA**, Tuszynski JA, *Molecular Models of Information Processing at the Level of Individual Neurons*, J Syst Sci Eng 20(1): 15-31 (2012)
7. **Craddock TJA**, Tuszynski JA, Priel A, Freedman H, *Microtubule Ionic Conduction and its Implications for Higher Cognitive Functions*, J Integr Neurosci 9(2): 103-122 (2010)
8. Woolf NJ, **Craddock TJA**, Friesen DE, Tuszynski JA, *Neuropsychiatric Illness: A Case for Impaired Neuroplasticity and Possible Quantum Processing Derailment in Microtubules*, NeuroQuant 8(1): 13-28 (2010)
9. Tuszynski JA, **Craddock TJA**, Carpenter RJ, *Bioferroelectricity at the Nanoscale*, J Theor Comput Nanosci 5: 2022-2032 (2008)

10. **Craddock TJA**, Tuszynski JA, *On the Role of Microtubules in Cognitive Brain Functions*, NeuroQuant 5(1): 32-57 (2007)

BOOK CHAPTERS

1. **Craddock TJA**, Tuszynski JA, *From Nano to Neuro and Beyond: A presentation of the emerging physics of consciousness from the ground up*. in Chopra D (ed.) Brain, Mind, Cosmos: The Nature of Our Existence and the Universe (Amazon Digital Services, Inc., 2014)
2. Friesen DE, **Craddock TJA**, Tuszynski JA, *Cytoskeletal Electrostatic and Ionic Conduction Effects in the Cell*, in Cifra M, Scholkmann F (eds.) Fields of the Cell, (Research Signpost, 2014), Chapter 13.

MEDIA COVERAGE

1. Bridging the blood-brain barrier, V. Wolters, *International Innovation* 128, 03/14
2. New Theories for origins of Alzheimer's, A. McIlroy, *Globe and Mail*, 04/26/12
3. The Molecular Architecture of Memory, F. Brynie, *Psychology Today*, 04/12/12
4. The "beans" in motion that preserve the memories (Translation), M.P. Palimarini, *Corriere della Sera*, 03/09/12

COURSES TAUGHT

**Grant
MacEwan
University**

ENGG 130 Engineering Mechanics

Seminar, 20-30 students

ENPH 131 Engineering Dynamics

Lecture, Seminar, Lab, 20-100 students

**University
of Alberta**

MED 573 Directed Reading in Clinical Medicine

Reading Course, 2 students

AUPHYS Mechanics

Lab, 20-30 students

ENPH 131 Engineering Dynamics

MASC Review & Lab

PHYS 124 Particles & Waves

MASC Review & Lab, 20-50 students

PHYS 130 Wave Motion, Optics & Sound

MASC Review & Lab, 20-100 students

PHYS 144 Newtonian Mechanics & Relativity

Lab, 20-30 students

PHYS 146 Fluids & Waves

Lab, 20-30 students

PHYS 230 Electricity & Magnetism

MASC Review & Lab, 20-50 students

**University
of Guelph**

Physics 1000 An Introduction to Mechanics

Lab, 20-30 students

Physics 1010 Introductory Electricity & Magnetism

Lab, 20-30 students

Physics 1020 Introductory Physics

Lab, 20-30 students

SUPERVISION & MENTORING

Co-Supervised Graduate Students

2014-Present **Tory Toole**, Doctor of Philosophy (Clinical Psychology) Student
Center for Psychological Studies, Nova Southeastern University

2014-Present **Trevor Barker**, Doctor of Psychology Student
Center for Psychological Studies, Nova Southeastern University

2014-Present **Gaytri Patel**, Doctor of Psychology Student
Center for Psychological Studies, Nova Southeastern University

2015-Present **Mariam Viqar**, Doctor of Osteopathic Medicine Student
College of Osteopathic Medicine, Nova Southeastern University

Supervised Staff and Summer Students

2012-Present **Mark A. Rice, Jr.**, Chief Programmer
Institute for NeuroImmune Medicine, Nova Southeastern University

2014-Present **Patrick Gourdet**, Junior Matlab Developer
Institute for NeuroImmune Medicine, Nova Southeastern University

2013-2014 **Ryan M. del Rosario**, Lead HPC Programmer
Institute for NeuroImmune Medicine, Nova Southeastern University

2014 **Samuel Thomas**, Behavioral Neuroscience Intern
Farquhar College of Arts and Sciences, Nova Southeastern University

2014 **Shane Hills**, Medical Imaging Research Associate
Institute for NeuroImmune Medicine, Nova Southeastern University

- 2013 **Simar J. Singh**, Neurobiology and Neuroimmunology Research Associate
Institute for NeuroImmune Medicine, Nova Southeastern University
- 2012 **Paul Fritsch**, Undergraduate Summer Student
Broderick Clinical Systems Biology Lab, University of Alberta

Mentored Students

- 2012 **Alessio Prunotto**, M.Sc. Student
Tuszynski Pharmamatrix Group, University of Alberta
- 2008-2009 **Mentoring Aboriginal Peers Program**
Aboriginal Student Services Centre, University of Alberta
- 2006-2007 **WP Wagner Mentorship Program**
Outreach Program, University of Alberta

ADMINISTRATIVE POSITIONS

- 2013-Present **GWIRP Consortium Publication Committee Member**
- 2010 **Conference Organizer**
First Annual Symposium for Graduate Physics Research, University of Alberta
- 2008-2011 **Condensed Matter Physics Representative**
Graduate Physics Student Association, University of Alberta
- 2008-2009 **Graduate Physics Curriculum Committee Member**
Department of Physics, University of Alberta

PEER-REVIEW ACTIVITIES

- 2014 **Frontiers in Neuroscience**
Reviewer of 1 article
- 2014 **Physical Review E**
Reviewer of 1 article
- 2014 **Journal of Clinical Anesthesiology**
Reviewer of 1 article
- 2014 **Current Trends in Medicinal Chemistry**
Reviewer of 1 article
- 2014 **IEEE Transactions of NanoBioscience**
Reviewer of 1 article
- 2014 **Brain Disorders & Therapy**

	Reviewer of 1 article
2013	American Journal of Psychiatry Reviewer of 1 article
2013	Journal of Chemical and Information Modeling Reviewer of 1 article
2013	Systems Biomedicine Reviewer of 1 article
2012-2013	BMC Systems Biology Reviewer of 6 articles
2012	Brain, Behavior and Immunity Reviewer of 1 article

INVITED CONFERENCE PRESENTATIONS & SEMINARS

1. *The Feasibility of Quantum Coherent Effects in Microtubules and their Potential Role in Neuron Function (20 min. presentation).* Towards a Science of Consciousness 2014. Tucson Arizona, USA, April 21-26, 2014.
2. *Quantum Beating in Microtubules as the Basis for the Neural Synchrony Related to Consciousness.* Microtubules and Quantum Biology Pre-conference Workshop at Towards a Science of Consciousness 2014. Tucson Arizona, USA, April 21-26, 2014.
3. *Introduction to Quantum Consciousness – Part 2 – 1 hr. presentation for* The Neuroscience Journal Seminar Series at Nova Southeastern University, Ft. Lauderdale, Florida, USA, November 20, 2013.
4. *Using Ternary Logic to Explore Homeostatic Drive in the Perpetuation of Complex Chronic Illness – 40 min presentation for* The Mathematics Colloquium Series at Nova Southeastern University, Ft. Lauderdale, Florida, USA, October 23, 2013
5. *Introduction to Quantum Consciousness – Part 1 – 1 hr. presentation for* The Neuroscience Journal Seminar Series at Nova Southeastern University, Ft. Lauderdale, Florida, USA, October 16, 2013.
6. *Computational Systems Biology: Crossing Boundaries – 40 min. presentation for the* Graduate School of Computer and Information Sciences Faculty Meeting at Nova Southeastern University, October 15, 2013.
7. *A Physical Basis for a Nanoneuroscience of Memory and Consciousness – 40 min. plenary presentation for* Towards a Science of Consciousness 2013, Agra, India, March 5-9, 2013.
8. *A Role for Homeostatic Drive in the Perpetuation of Complex Chronic Illness – 40 min. presentation for* The MathBio Seminar Series at the University of Alberta, Edmonton, Canada, February 4, 2013.

9. *Towards an Integrative Model of Gulf War Illness* – 40 min. presentation for Institute of NeuroImmune Medicine Seminar at Nova Southeastern University, Fort Lauderdale, USA, January 28, 2013.
10. *Volatile Anesthetic Interaction with Tubulin* – 40 min. presentation for Michigan Technological University Physics Colloquium, Houghton, USA, October 18, 2012.
11. *Chromophores, Quantum Coherence and Microtubules: A Theoretical Investigation of a Quantum Mechanism of Signal Propagation Along a Microtubule* – 20 min. presentation at Towards a Science of Consciousness 2012, Tucson, USA, April 9-14, 2012.
12. *Volatile Anesthetic Interaction with Tubulin* - 45 min. presentation for University of Alberta Condensed Matter Physics Seminar, Edmonton, Canada, February 2, 2012.
13. *Volatile anesthetic interactions with tubulin and coherent energy transfer* - 20 min. presentation at Towards a Science of Consciousness 2011, Stockholm, Sweden, May 3-7, 2011.
14. *'Memory Bytes' – A Molecular Match for Activated CaMKII Encoding Microtubule Lattices* - 20 min. presentation at Towards a Science of Consciousness 2010, Tucson, USA, April 12-17, 2010.

REVIEWED CONFERENCE PRESENTATIONS & SEMINARS

1. *Getting Down to Detail: Exploring the Sometimes Pathogenic Versatility of Discrete Immune Logic (Poster).* International Association for Chronic Fatigue Syndrom/Myalgic Encephalomyelitis 2014 Conference. San Francisco, California, USA, March 20-23, 2014.
2. *Succumbing to the Laws of Attraction: Gender Differences in Homeostatic Drive and the Perpetuation of Chronic Illness (Poster).* International Association for Chronic Fatigue Syndrom/Myalgic Encephalomyelitis 2014 Conference. San Francisco, California, USA, March 20-23, 2014.
3. *Fire in the Head: Exploring the Role of Homeostatic Drive in the Perpetuation of Neuroinflammation in Brain Disorders (Poster).* Miami 2014 Winter Symposium – Molecular Basis of Brain Disorders. Miami, Florida, USA, January 26-29.
4. *The Zinc Dyshomeostasis Hypothesis of Alzheimer's Disease* – poster at Campus Alberta Neuroscience Symposium, Edmonton, Canada, October 30, 2012.
5. *Are Hydrophobic Grooves in Tubulin the Primary Sites of Anesthetic Action?* American Society of Anesthesiologists 2011 Annual Meeting, Chicago, USA, October 15-19, 2011
6. *Meyer–Overton meets quantum physics: conscious awareness, memory, and anaesthetic binding in tubulin hydrophobic channels,* 8th International

Symposium on Memory and Awareness in Anesthesia (MAA8), Milwaukee, USA, June 2–5, 2011

7. *Quantum Mechanisms of Electronic Signal Propagation Along a Microtubule* – poster at American Physical Society March Meeting 2011, Dallas, USA, March 21-25, 2011.
8. *Investigating Quantum Mechanisms of Energy Transfer in Microtubules* – poster at University of Alberta 1st Annual Symposium on Graduate Physics Research, Edmonton, Canada, September 17th, 2010.
9. *Probing for Functional sites of Consciousness with Anesthetics: The Role of the Cytoskeleton* – poster at Association for the Scientific Study of Consciousness 14th Annual Meeting, Toronto, Canada, June 24-27, 2010.
10. *The Effect of General Anesthetics on Intracellular Signaling via Cytoskeletal Ionic Conduction* – poster at 8th International Conference on Mechanisms of Anesthesia, Toronto, Canada, June 15-18, 2010.
11. *Computational Determination of Putative Binding Sites of Anesthetics to the Cytoskeleton* – poster at 7th Canadian Computational Chemistry Conference, Halifax, Canada, July 20-24, 2009.
12. *Cytoskeletal Putative Binding Sites of General Anesthetics* - 20 min. presentation at Chemical Biophysics Symposium 2009, Toronto, Canada, April 24-26, 2009.
13. *The Quantum Basis of Consciousness: Quantum Based Microtubule Cellular Automata at Physiological Temperature* – poster at Towards a Science of Consciousness 2007, Budapest, Hungary, July 23-27 2007.
14. *Examining the Effect of Physiological Temperature on the Dynamics of Microtubules* - 25 min. presentation at Quantum Mind 2007, Salzburg, Austria, July 17-21 2007.
15. *Cellular Automata Model of a Microtubule using a Double Potential Well Found in Tubulin* – poster at Towards a Science of Consciousness 2006, Tucson, USA, April 2006.

INVITED WORKSHOP PRESENTATIONS

1. *Keeping Time: Quantum Beating in Microtubules and its relation to Higher Cognitive Processes* - 35 min. presentation in, Microtubules and Quantum Biology Pre-Conference Workshop, Towards a Science of Consciousness – Pre-conference Workshop, Tucson, USA, April 21, 2014.
2. *Coherent Energy Transfer: Photosynthesis to Consciousness* - 20 min. presentation in, Quantum Consciousness Update Workshop, Towards a Science of Consciousness – Pre-conference Workshop, Tucson, USA, April 10, 2012.

3. *Coherent Energy Transfer: From Photosynthesis to Microtubules* - 30 min. presentation in, Quantum Biology Workshop, Towards a Science of Consciousness – Post-conference Workshop, Stockholm, Sweden, May 7, 2011.
4. *Phosphorylation sites on tubulin: a molecular code for memory and consciousness?* - 20 min. presentation in, Update on Microtubules and Quantum Biology – Part II, Towards a Science of Consciousness – Pre-conference Workshop, Tucson, USA, April 13, 2010.
5. *Cytoskeletal Putative Binding Sites of General Anesthetics* - 40 min. presentation in, Update on Microtubules and Quantum Biology – Part I, Towards a Science of Consciousness – Pre-conference Workshop, Tucson, USA, April 12, 2010.

TECHNICAL REPORTS

1. *Validation Exercise 1 Report for ORIGEN-S (version SCALE 4.2)*, Ontario Power Generation Internal Document VE-REP-ORIGEN, August 2000.
2. *Software Design Description for BETA-S (version 3)*, Ontario Power Generation Internal Document SDD-BETAS, August 2000.
3. *Software Requirement Specification for BETA-S (version 3)*, Ontario Power Generation Internal Document SRS-BETAS, August 2000.
4. *Test Design Report for BETA-S (version 3)*, Ontario Power Generation Internal Document TD-REP-BETAS, December 1999

PROFESSIONAL AFFILIATIONS

- | | |
|--------------|--------------------------------------------------------------------------------------------------|
| 2014-Present | International Association of Chronic Fatigue Syndrome/Myalgic Encephalomyelitis
Member |
| 2010-2011 | American Physical Society
Student Member |
| 2009-2011 | Association for the Scientific Study of Consciousness
Student Member |