

CURRICULUM VITAE
Gordon Broderick, Ph.D. P.Eng.
 (updated February 19, 2016)

Current Appointment:

Professor, College of Psychology
 Nova Southeastern University, Fort Lauderdale, FL, USA

Business Address: Institute for Neuro-immune Medicine,
 Nova Southeastern University,
 University Park Plaza, Suite 3440
 3424 South University Drive
 Fort Lauderdale, FL 33328
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Citizenship: Canadian

Education and Training:

1980-1984	B.Eng. (Mechanical), McGill University, Montreal, Canada
1988-1989	M.Eng. (Chemical), McGill University, Montreal, Canada
1991-1994	Ph.D. (Chemical Eng.), École Polytechnique de Montréal, Montreal, Canada
2000-2001	Post-doctoral fellow (Computer Science), McGill University, Montreal, Canada
2002-2006	Post-doctoral research associate (Biochemistry), University of Alberta, Edmonton, Canada

Licensure and Certification:

1986-present	Ing. (P. Eng.) Ordre des Ingénieurs du Québec (#39881)
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Academic Appointments:

2000 – 2001	Visiting Scientist McGill School of Computer Science / Montreal General Hospital, Montreal, Canada
2002 – 2006	Project Leader, Institute for Biomolecular Design, University of Alberta, Edmonton, Canada
2004 – 2005	Consulting Biostatistician, Alberta Transplant Applied Genomics Centre, University of Alberta, Edmonton, Canada
2006 – 2013	Associate Professor with Tenure – Dept. of Medicine, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Canada
2010 – Present	Associate Professor (Voluntary) – Dept. of Medicine, Miller School of Medicine, University of Miami, USA
2013 – Present	Associate Professor (Voluntary) – Dept. of Medicine, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Canada
2013 – Present	Professor – College of Psychology, Nova Southeastern University, Fort Lauderdale, FL, USA

Research Appointments:

1989 - 1995	Research Engineer/Project Leader, Noranda Technology Center, Pointe-Claire, Canada
1995 – 1999	Senior Scientist, Noranda Technology Center, Pointe-Claire, Canada
1999 – 2002	Principal Scientist, Noranda Technology Center, Pointe-Claire, Canada

Awards/Honours:

1980 - 1984	J.B. Lynch Foundation Award (Bachelor)
1988 - 1989	R.M. Fowler Memorial Fellowship (Masters)
1988 - 1989	Natural Sciences and Engineering Research Council of Canada Award (Masters)
1991 - 1994	Natural Sciences and Engineering Research Council of Canada Award (Ph.D)
1992 - 1993	John S. Bates Centennial Fellowship (Ph.D)
1994	Dean of Graduate Studies and Research Award for best doctoral thesis, École Polytechnique de Montréal.
2007-2008	Teacher of the Year Award (Small Group Case Study), University of Alberta Medical Students Association
2009-2010	Discovery Learning Preceptor Excellence Award, University of Alberta Medical Students Association
2010	Nightingale Award for Community Service, ME Society of Edmonton
2010-2011	Discovery Learning Preceptor Excellence Award, University of Alberta Medical Students Association.
2011-2012	Discovery Learning Preceptor Excellence Award, University of Alberta Medical Students Association.

Professional Memberships and Administrative Activities:**Memberships:**

1986-present	Member, Ordre des Ingénieurs du Québec (#39881)
2010	Member, International Society for Interferon and Cytokine Research (#2634)

Grant Review:

2006	The Centre for Complexity Science, Jerusalem, Israel
2009	U.S.-Israel Bi-national Science Foundation, Jerusalem, Israel
2009	Chief Scientist Office of the Scottish Government Health Directorate, Edinburgh, UK (2 grant proposals)
2009	Microsoft Research PhD Scholarship Programme, Microsoft Research, Cambridge, UK (2 proposals)
2009	Canadian Institutes of Health Research (CIHR)
2009	Natural Sciences and Engineering Research Council of Canada (NSERC)

- 2010 NIH Chronic Fatigue Review Panel, Neurotoxicology and Alcohol (NAL) Study Section, National Institutes of Health, Bethesda, MD (2 proposals).
- 2010 Health Research Awards, the Health Research Board (HRB) of Ireland, Dublin, Ireland
- 2010 Chief Scientist Office of the Scottish Government Health Directorate, Edinburgh, UK
- 2011 NIH Chronic Fatigue Syndrome Special Emphasis Panel (SEP), National Institutes of Health, Bethesda, MD (4 proposals).
- 2011 Biomedical Innovation in Public-private Research Partnership program, French National Research Agency (ANR), National Institutes of Health, Bethesda, MD (4 proposals).
- 2011 RCUK Shared Services Centre for Medical Research Council of the UK (RCUK SSC) Award program, Swindon, Wiltshire, UK (2 proposals).
- 2011 CFIDS Association of America, Application for access to CFIDS Bio-bank. Charlotte, NC, US.
- 2012 NIH Chronic Fatigue Syndrome Special Emphasis Panel (SEP), National Institutes of Health, Bethesda, MD (4 proposals).

Review of candidates for faculty positions.

- 2006 Candidate Senior Lecturer; Dept. of Bio-medical Eng., Ben Gurion University, Israel
2008. Candidate Senior Lecturer; Faculty of Life Sciences; University of Bar-Ilan, Israel

National and International Advisory Committees, Scientific Societies:

- 2010 Invited member; International Panel for Canadian Consensus Document on ME/CFS, Vancouver, Canada (*submitting author)
- 2010 Invited member; US Veteran's Administration Cooperative Study Committee for Genome-wide Association in Gulf War Illness, Washington DC, USA (CSP #585)
- 2011 Invited panellist; US National Institutes of Health - Office of Research on Women's Health (ORWH); State of the Knowledge on Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) Research, Washington DC, USA
- 2011 Invited member; Scientific Advisory Board, CFIDS Association of America, Charlotte, USA

Editorial activities:

- 2012- Member Editorial Board, *Brain Behavior and Immunity*, Elsevier, Amsterdam, NL (impact factor 5.061)
- 2011-2013 Guest Editor, 2013 Named Series: "Systems Biology in Brain, Behavior and Immunity", *Brain Behavior and Immunity*, Elsevier, Amsterdam, NL (impact factor 5.061)
- 2011- Member Editorial Board, *Systems Biomedicine*, Landes Bioscience, Austin, TX (new journal, Editor-in-chief: Sol Efroni, PhD, Bar Ilan University, Israel)

2010-	Associate Editor, <i>BMC Systems Biology</i> , Biomed Central, London, UK (impact factor 4.064)
Current	Review activities for: Brain Behavior and Immunity (*over 10 manuscripts; impact 5.061), Journal of Immunology, Journal of Infectious Diseases, BMC Medical Genomics, American Journal of Transplantation, Cellular and Molecular Life Sciences, Molecular Medicine, The Journal of Physical Chemistry, PLoS One, Transplantation, Bioinformatics (Oxford Press), BMC Neurology, Theoretical Biology and Medical Modeling, PLoS Computational Biology

Institutional Administrative and Leadership Contributions:

Organising committees

2007	Session Chair - Numerical Techniques for Creating Biological Insights “Omic” Technologies to Phenotype Disease: A Satellite Symposium of the 9th Banff Conference on Allograft Pathology, Edmonton, AB. June 18 -19, 2007
2009	Judge’s panel; Department of Medicine Research Day Graduate Student Poster Session (6 posters)

Administrative and Research Committees

2006- 2007	Head Computational Biology and voting member, Scientific Management Executive Committee, Alberta Transplant Applied Genomics Centre
2007	Member, Faculty Committee for University Wireless Services
2007- 2008	Member, Faculty Committee for Review of the Institute for Biomolecular Design
2007-2010	Member, Department of Medicine Research Committee
2006 - present	Member, Division of Pulmonary Medicine

Student Examination committees

2011	MED526 PCC Human Sexuality II OSCE Examiner
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Graduate student academic committees.

2006-2009	Member, Ph.D. Committee – Mr. Zhipeng Cai, Dept. of Computer Science, University of Alberta
2006-2010	Member, Ph.D. Committee – Mr. Anmmd Kamruzzaman, School of Public Health, University of Alberta

Teaching Contributions:

Postgraduate/graduate Advisees:

1995-1997	<u>Mr. Trevor Fenton (M.Sc.)</u>
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Graduate student “Finite element modeling of porous networks of composite materials”

Funding: Noranda Technology Centre; NSERC

My Role: Private sector co-supervisor; Primary supervisor: Dr.

H. Budman (University of Waterloo)

1995-1997

Mr. Timothy Knapp (M.Sc.)

Graduate student “Adaptive geometry neural network based control of chemical processes”

Funding: Noranda Technology Centre; NSERC

My Role: Private sector co-supervisor; Primary supervisor: Dr.

H. Budman (University of Waterloo)

1996-1998

Mr. Jean Sébastien Bolduc (M.Sc.)

Graduate student “Cellular-automata based nonlinear adaptive controllers”

Funding: Noranda Technology Centre; NSERC

My Role: Private sector co-supervisor; Primary supervisor: Dr.

D. Thérien (McGill University)

1996-1998

Ms. Bodhana Ratitch (M.Sc.)

Graduate student “Continuous function identification with fuzzy cellular automata”

Funding: Noranda Technology Centre; NSERC

My Role: Private sector co-supervisor; Primary supervisor: Dr.

D. Thérien (McGill University)

1997-2000

Mr. Brendan Cote (M.Sc.)

Graduate student “Applicability of advanced computational networks to the modeling of complex geometry”

Funding: Noranda Technology Centre

My Role: Private sector co-supervisor; Primary supervisor: Dr.

D. Thérien (McGill University)

1997-2001

Ms. Paule Marceau (M.Sc.)

Graduate student “Modeling the impact of particle size distribution of mechanical properties of wood composites”

Funding: Noranda Technology Centre

My Role: Private sector co-supervisor; Primary supervisor: Dr.

A. Cloutier (Université Laval)

2006-2007

Mr. Eric Carpenter (M.Sc.)

Research fellow “Bi-stability in repair from injury and rejection of kidney allografts”

Funding: University of Alberta, Start-up funding

My Role: Primary Supervisor

2007-2010

Dr. J Fuite (Ph.D. 2008)

Research fellow “Network Theoretical Study of Neuro-immune Deficiency in Chronic Fatigue and Gulf war Illness”

Funding: CFIDS Association of America

	My Role: Primary Supervisor
2010-2011	<u>Dr. Scott Meadows</u> (Ph.D. 1994) Research fellow “Integrated Control and Multi-stability of the Fight or Flight Axis” Funding: U.S. Department of Defense My Role: Primary Supervisor
2012-present	<u>Dr. T. Craddock</u> (Ph.D. 2011) Research fellow “Integrated Control and Multi-stability of the Fight or Flight Axis” Funding: U.S. Department of Defense My Role: Primary Supervisor
2011-present	<u>Mr. Saurabh Vashishtha</u> (M.Sc., Ph.D. candidate) Ph.D. Graduate student, “Immune Network Dynamics in Complex Stress-mediated Illness” Funding: US National Institutes of Health My Role: Primary Supervisor
2011-present	<u>Mr. Sadiq Olayinka</u> (M.Sc., M.Eng., Ph.D. candidate) Ph.D. Graduate student “The Network Dynamics of gene Regulation in Breast Cancer” Funding: NA My Role: Primary Supervisor

Undergraduate Advisees:

1995-1996	Mr. Bernhard Handle (senior year metallurgical engineering design project) Undergraduate research assistant “Hydrometallurgical electro-refining of high-purity tellurium” Funding: Noranda Technology Centre, Principal My Role: Private sector co-supervisor; Primary supervisor Dr. P. Paschen, Montan-University, Leoben, Austria
2007	Ms. Ann Aspler (M.Sc.) and Ms Carly Bolshin (B.Sc.) (M.D. students, class of 2010) Undergraduate research assistants “Evidence of Altered Neuroendocrine- immune Function in a Population-based Study of Chronic Fatigue Syndrome” Funding: University of Alberta, start-up funds My Role: Primary Supervisor
2008-2009	Mr. Michael Gallagher (M.D. student, class of 2010) Undergraduate research assistant “Immune Biomarkers in Gulf War Syndrome” Funding: CFIDS Association of America, U.S. Dept. of Defense My Role: Primary Supervisor

- 2009 Ms. Andrea Kreitz (B.Sc., M.D. student, class of 2011)
Undergraduate research assistant “Emergent Patterns of Cytokine Expression in Chronic Fatigue Syndrome and Gulf War Illness”
Funding: CFIDS Association of America; *Recipient of the PANDORA Summer Research Award*
My Role: Primary Supervisor
- 2009 Ms. Christina Yang (M.Sc., M.D. student, class of 2011)
Undergraduate research assistant “A Study of Cognitive Deficits in Patients with Chronic Fatigue Syndrome”
Funding: CFIDS Association of America; *Recipient of the Henry Anton Deutsch Medical Summer Research Award*
My Role: Primary Supervisor
- 2010-2011 Mr. Scott De Graff (B.Sc., M.D. student, class of 2012)
Undergraduate research assistant “Models for Cardiovascular Dysregulation in Chronic Fatigue Syndrome”
Funding: CFIDS Association of America
My Role: Primary Supervisor
- 2011- Ms. Jeanna Harvey (B.Sc., M.D. student, class of 2014, University of Miami)
Undergraduate research assistant “Exercise Induced Immune Gene Expression in Gulf War Illness”
Funding: US Veterans Affairs
My Role: Co-supervisor
- 2012 Ms. AnneLiese Smylie (B.Sc. Honours, M.D. student, class of 2015)
Undergraduate research assistant “A Cytokine-based Screening Test for Gulf War Illness”
Funding: Alberta Innovates Health Solutions (AIHS); *Recipient of an AIHS Summer Studentship Research Award.*
My Role: Primary Supervisor
- 2012 Mr. Henrique Fernandes (B.Eng. Distinction, M.D. student, class of 2015)
Undergraduate research assistant “Identifying Common Molecular Traits and Emergent Patient Sub-groups in Chronic Fatigue Syndrome”
Funding: Canadian Institutes for Health Research (CIHR); *Recipient of a CIHR Health Professional Student Research Award.*
My Role: Primary Supervisor
- 2013 Mr. Lundy McKibbin (B.Sc. Distinction, M.D. student, class of 2016)
Undergraduate research assistant “A study of the effects of PTSD co-morbidity on immune signature in Gulf War Illness”
Funding: US. Dept. of Defense.
My Role: Primary Supervisor

- 2013 Mr. Simar Singh (M.Sc. Distinction, Stanford University)
Graduate research assistant “A study of neuro-inflammatory mechanisms in Gulf War Illness”
Funding: US. Dept. of Defense.
My Role: Primary Supervisor
- 2013 Ms. Alanna Bowie (B.Sc. Distinction, M.D. student, class of 2016)
Undergraduate research assistant “Prognostic Clinical Markers for Early Detection Chronic Sequela from Infectious Mononucleosis”
Funding: Alberta Innovates Health Solutions (AIHS); *Recipient of an AIHS Summer Studentship Research Award.*
My Role: Primary Supervisor
- 2013 Ms. Melissa Hwang (B.Sc. Distinction, M.D. student, class of 2016)
Undergraduate research assistant “Mechanisms of Immune-endocrine Interaction in Episodic Exacerbation of Chronic Fatigue Syndrome”
Funding: Faculty of Medicine and Dentistry; *Recipient of the David and Beatrice Reidford Research Scholarship.*
My Role: Primary Supervisor
- 2013 Mr. Mark Rice (Computer Science student, class of 2014)
Undergraduate research assistant “Large-scale Circuit Models of Physiological Regulation”
Funding: US Dept. of Defense
My Role: Primary Supervisor
- 2013 Mr. Ryan del Rosario (Computer Science student, class of 2014)
Undergraduate research assistant “Large-scale Circuit Models of Physiological Regulation”
Funding: US Dept. of Defense
My Role: Primary Supervisor

Classroom Instruction (undergraduate):

- 2007 DMED 512 - Infection, Immunity and Inflammation, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 9.2/10.0
- DMED 514 – Cardiovascular, Pulmonary and Renal Systems, Small Group Facilitator, University of Alberta, Edmonton, AB:
Renal Block; Overall effectiveness rating 9.4/10.0
Pulmonary Block; Overall effectiveness rating 10.0/10.0
- 2008 MED516 /DDS510 Patient-centred Care I, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: Not transmitted

MED526 /DDS520 Patient-centred Care II, Small Group
Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: Not transmitted

MED521 /DDS506 – Gastroenterology and Nutrition, Small
Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 9.8/10.0

DMED 514 – Cardiovascular, Pulmonary and Renal Systems,
Small Group Facilitator, University of Alberta, Edmonton, AB:
Renal Block; Overall effectiveness rating 9.4/10.0
Pulmonary Block; Overall effectiveness rating 9.1/10.0
Cardiology Block; Overall effectiveness rating 9.4/10.0.

Substitute Teaching as Discovery Learning (DL) small group
facilitator in:
DMED 512 - Infection, Immunity and Inflammation
DMED 513 – Endocrinology and Metabolism

2009

DMED 512 - Infection, Immunity and Inflammation, Small
Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 9.4/10.0

MED522 Reproductive Medicine and Urology, Small Group
Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 10.0/10.0

MED526/DDS520 Patient-centred Care, Small Group Facilitator,
University of Alberta, Edmonton, AB
Overall effectiveness rating: Not transmitted

DMED 514 – MED524 Neurosciences and Organs of Special
Senses (A), Small Group Facilitator, University of Alberta,
Edmonton, AB
Overall effectiveness rating: 10.0/10.0

DMED 514 – MED524 Neurosciences and Organs of Special
Senses (B), Small Group Facilitator, University of Alberta,
Edmonton, AB
Overall effectiveness rating: Not transmitted

MED515 Community Health, Small Group Facilitator, University
of Alberta, Edmonton, AB
Overall effectiveness rating: 9.8/10.0

MED526/DDS520 Patient-centred Care II, Small Group
Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 8.0/10.0

- 2010
- DMED 512 - Infection, Immunity and Inflammation, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 10.0/10.0
- MED522 Reproductive Medicine and Urology, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 9.8/10.0
- MED526 Patient-centred Care, Small Group Facilitator, University of Alberta, Edmonton, AB (** 2 groups in parallel)
Overall effectiveness rating: 10.0/10.0
- DMED 514 – Cardiovascular, Pulmonary and Renal Systems (Cardiovascular block), Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 9.8/10.0
- MED524 Neurosciences and Organs of Special Senses (A), Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 9.4/10.0
- MED526/DDS520 Patient-centred Care, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: (no score provided)
- 2011
- DMED 512 - Infection, Immunity and Inflammation, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 10.0/10.0
- MED522 Reproductive Medicine and Urology, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 10.0/10.0
- MED526 Patient-centred Care, Small Group Facilitator, University of Alberta, Edmonton, AB (** 2 groups in parallel)
Overall effectiveness rating: 10.0/10.0
- 2012
- DMED 512 - Infection, Immunity and Inflammation, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 10.0/10.0
- MED522 Reproductive Medicine and Urology, Small Group Facilitator, University of Alberta, Edmonton, AB
Overall effectiveness rating: 9.89/10.0
- MED516 Patient-centred Care, Small Group Facilitator, University of Alberta, Edmonton, AB
(2 sessions: Medical Ethics, Patient Advocacy)
Overall effectiveness rating: Ongoing

MED 523/DDS 523 - Musculoskeletal System, Small Group
 Facilitator, University of Alberta, Edmonton, AB
 Overall effectiveness rating: Ongoing

Classroom Instruction (graduate):

1995 MTH 6301 Statistical Design and Analysis of Experiments
 Dept. Appl. Mathematics and Industrial Engineering,
 École Polytechnique de Montréal, Montreal, Canada.

2013 MED 573 An Introduction to Clinical Systems Biology
 Dept. of Medicine, Faculty of Medicine and Dentistry
 University of Alberta, Edmonton, Canada.

Research Grants:

Currently Active Grants:

09/2010-08/2013 U.S. Department of Defense
 Title: "Theory-driven Models for Correcting "Fight or Flight"
 Imbalance in Gulf War Illness."
 Role: Principal Investigator
 Total Budget: CAN\$: 701,000 (\$679,000 USD)

10/2010-09/2014 U.S. National Institutes of Health (NIH)
 Title: "Study of Chronic Fatigue Syndrome using comprehensive
 molecular profiling with network and control theory (R01)"
 Role: Co-PI
 Total Budget: CAN\$: 398,000 sub-award (\$386,000 USD)

06/2012-07/2013 CFIDS Association of America
 Title: "Post-exertion malaise in CFS: A systems biology
 approach to understanding brain, inflammation and behavior
 interactions"
 Role: Co-Investigator
 Total Budget: CAN\$: 20,000 sub-award (\$20,000 USD)

08/2012-07/2014 U.S. National Institutes of Health (NIH)
 Title: "Microbial Translocation in Chronic Fatigue Syndrome
 (R21)"
 Role: Co-PI
 Total Budget: CAN\$: 100,000 sub-award (\$362,000 USD)

01/2013-01/2017 U.S. Department of Defense
 Title: "GW120045 -Understanding Gulf War Illness: An
 Integrative Modeling Approach."
 Role: Co-PI. - Director Computational Core
 Total Budget: CAN\$:1,200,000 sub-award (\$4,764,000 USD)

Completed Grants (past 5 years):

- 07/2006-06/2009 University of Alberta, Faculty of Medicine and Dentistry (Start-up Grant N031000099)
Title: "Mechanistic analysis of microarray signatures in transplant rejection"
Role: Principal Investigator
Total Budget: CAN\$: 60,000
- 07/2006-12/2007 Genome Canada
Title: "Transplant Transcriptome Project"
Role: Co-investigator
Total Budget: CAN\$: 90,000
- 01/2008-01/2010 U.S. National Institutes of Health (NIH)
Title: "A Prospective Study of CFS in Adolescents"
Role: Consultant
Total Budget: CAN\$: 5,000 consultancy (\$5,000 USD)
- 03/2009-02/2011 CFIDS Association of America
Title: "Molecular Patterns of Persistent Immune Activation in a Post-infectious Adolescent Cohort"
Role: Principal Investigator
Total Budget: CAN\$: 156,000 sub-award (\$125,000 USD)
- 06/2009-08/2009 University of Alberta, Faculty of Medicine and Dentistry
Henry Anton Deutsch Medical Summer Research Award in support of summer studentships for Ms. Christina Yang
Role: Principal Investigator
Total Budget: CAN\$: 2,400
- 07/2009-06/2012* U.S. Department of Defense
Title: "The Use of Comprehensive Molecular Profiling with Network and Control Theory to Better Understand GWI and Model Therapeutic Strategies"
Role: Co-PI
Total Budget: CAN\$: 164,000 sub-award (\$130,000 USD)
* Extended 1 year wo additional funding
- 05/2009-04/2014 Alberta Heritage Foundation for Medical Research
Title: "Etiology of Inflammatory Bowel Disease: Gene, Microbe, and Environment Interactions"
Role: Co-investigator
Total Budget: CAN\$: 200,000 sub-award (1.0 FTE Research Associate)
- 05/2009-04/2013 Patient Alliance for Neuroendocrine-immune Disorders
Organization for Research and Advocacy (PANDORA)
Research Award in Support of summer studentships in Broderick laboratory
Title: "Biomarkers for Gulf War Illness"

Role: Principal Investigator/ Program Director
Total Budget: CAN\$: 3,500 USD

07/2011-06/2012

U.S. Department of Defense
Title: "Gulf War Illness Research Program Consortium
Development Award"
Role: Co-Inv. - Director Computational Core
Total Budget: CAN\$: 15,000 (\$262,700USD total travel award)

Publications:

Peer-Reviewed Original Research (trainees directly supervised by me are underlined):

1. Broderick G, Valade JL, Paris J. High Yield Sulphite Pulping Based on a Plackett-Burman Design. Pulp and Paper Canada, 1993; **94(9)**: T248-251.
2. Broderick G, Paris, J, Valade JL. A Composite Representation of Pulp Quality. Chemometrics and Intelligent Laboratory Systems, 1995; **29(1)**: 19-28.
3. Broderick G, Paris J, Valade JL. Factors Affecting the Optimal Performance of a High-Yield Pulping Operation. Canadian Journal of Chemical Engineering, 1995; **73(3)**: 391-399.
4. Broderick G, Paris J, Valade JL, Wood J. Applying Latent Vector Analysis to Pulp Characterization. Paperi ja Puu, 1995; **77(6-7)**: 410-418.
5. Broderick G, Paris J, Valade JL. Fibre Development in Chemimechanical Pulp Refining, Tappi Journal, 1996; **79(4)**: 193-201.
6. Broderick G, Paris J, Valade JL. The Impact of High-yield Pulping Pretreatment Conditions on Spent Liquor Toxicity and Oxygen Demand. Paperi ja Puu, 1996; **78(1-2)**: 43-50.
7. Broderick G, Paris J, Valade JL, Wood J. Linking the Fibre Characteristics and Handsheet Properties of a High-Yield Pulp. Tappi Journal, 1996; **79(1)**: 161- 169.
8. Tessier P, Broderick G. Industrial Implementation of Motor Load and Freeness Control of Chemimechanical Pulp Refiners. Tappi Journal, 1997; **80(12)**: 135-142.
9. Handle B, Broderick G, Paschen P. A Statistical Response Surface Study of the Tellurium Electrowinning Process. Hydrometallurgy, 1997; (**46**): 105-120.
10. Broderick G, Lanouette R, Valade JL. Optimizing Refiner Operation with Statistical Modelling. Canadian Journal of Chemical Engineering, 1997; **75(1)**: 79-87.
11. Broderick G, Cacchione E, Heroux Y. The Importance of Distribution Statistics in the Characterisation of Chip Quality. Tappi Journal, 1998; **81(2)**: 131-142.
12. Broderick G, Handle B, Paschen P. Strategies for Optimal Operation of the Tellurium Electrowinning Process. Metallurgical and Materials Transactions B, 1999; **30B(1)**: 5-13.
13. Tessier P, Broderick G, Desrochers C. Chip Size Distribution for an Ultra-high-yield Sulfite Process. Tappi Journal, 2000; **83(4)**: 76.

14. Knapp T, Budman H, Broderick G. Adaptive Control of a CSTR with a Neural Network Model. *Journal of Process Control*, 2001; **11**: 53-68.
15. Tessier P, Broderick G, Plouffe P. Competitive Analysis of North-American Newsprint Producers Using Composite Statistical Indicators of Product and Process Performance. *Tappi Journal*, 2001; **84(3)**: 81.
16. Tessier P, Broderick G, Plouffe P. Competitive Analysis of North-American Newsprint Producers Using Composite Statistical Indicators of Product and Process Performance. *Pulp & Paper Canada*, 2002; **103(5)**: T140-143.
17. Fenton TE, Budman HM, Pritzker MD, Bernard E, Broderick G. Modeling and Simulation of Oriented Strandboard Pressing. *Ind Eng Chem Res*, 2003; **42(21)**: 5229 – 5238.

Life science works

18. Broderick G, Ru'aini M, Chan E, Ellison MJ. A Life-like Virtual Cell Membrane Using Discrete Automata. *Invited Paper*, *In Silico Biology*, 2004; **5**: 0016.
19. Lopez-Campistrous A, Semchuk P, Burke L, Palmer-Stone T, Brokx SJ, Broderick G, Bottorff D, Weiner JH, Ellison MJ. Localization, Annotation & Comparison of the Escherichia coli K-12 Proteome under Two States of Growth. *Mol Cell Proteomics*, 2005 May 19; 10.1074/mcp.D500006-MCP200.
20. Broderick G, Craddock RC, Whistler T, Taylor R, Klimas N, Unger ER. Identifying illness parameters in fatigue syndromes using classical projection methods. *Pharmacogenomics*, 2006; **7(3)**: 407-419.
21. Whistler T, Craddock RC, Taylor R, Broderick G, Klimas N, Unger ER. Gene expression correlates of fatigue. *Pharmacogenomics*, 2006; **7(3)**: 395-405.
22. Craddock RC, Taylor R, Broderick G, Whistler T, Klimas N, Unger ER. Exploration of statistical dependence between illness parameters using the Entropy Correlation Coefficient. *Pharmacogenomics*, 2006; **7(3)**: 421-428.
23. Mueller TF, Einecke G, Reeve J, Sis B, Mengel M, Jhangri G, Bunnag S, Cruz, J, Wishart D, Meng C, Broderick G, Kaplan B, Halloran PF. Microarray analysis of rejection in human kidney transplants using pathogenesis-based transcripts sets. *Am J Transplant*, 2007; **7(12)**: 2712-2722.
24. Famulski KS, Broderick G, Einecke G, Hayl K, Cruz J, Sis B, Mengel M Halloran PF. Transcriptome analysis reveals heterogeneity in the injury response of kidney transplants. *Am J Transplant*, 2007; **7**: 1–13.
25. Einecke G, Broderick G, Sis B, Halloran PF. Early loss of renal transcripts in kidney allografts: relationship to morphologic changes and alloimmune effector mechanisms. *Am J Transplant*, 2007; **7(5)**: 1121–1130.

26. Ben-Zvi A, Vernon SD, Broderick G. Model-based Therapeutic Correction of Hypothalamic Pituitary Adrenal Axis Dysfunction. *PLoS Comput Biol*, 2008; **5(1)**: e1000273. doi:10.1371/journal.pcbi.1000273.
27. Aspler AL, Bolshin C, Vernon SD, Broderick G. Evidence of Inflammatory Immune Signaling in Chronic Fatigue Syndrome: A Pilot Study of Gene Expression in Peripheral Blood. *Behav Brain Funct*, 2008 Sep 26; **4(1)**: 44. doi:10.1186/1744-9081-4-44. [18 citations, May, 2011]
28. Fuite J, Vernon SD, Broderick G. Neuroendocrine and Immune Network Re-modeling in Chronic Fatigue Syndrome: An Exploratory Analysis. *Invited submission*, *Genomics* 2008; **92(6)**: 393-399. doi:10.1016/j.ygeno.2008.08.008 (issue cover).
29. Zhao J, Ridgway D, Broderick G, Kovalenko A, Ellison M. Extraction of elementary rate constants from global network analysis of E. coli central metabolism. *BMC Systems Biology*, 2008; **2**: 41, doi:10.1186/1752-0509-2-41.
30. Ridgway D, Broderick G, Ru'aini M, Winter P, Lopez-Campistrous A, Ellison MJ. Coarse-grained molecular simulation of diffusion and reaction kinetics in a crowded virtual cytoplasm. *Biophys J*, 2008 May 15; **94(10)**: 3748-59.
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36. Broderick G, Kreitz A, Fuite J, Fletcher MA, Vernon SD, Klimas N. A pilot study of immune network remodeling under challenge in Gulf War Illness. *Brain Behav Immun*. 2011 Feb; **25(2)**: 302-13.
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38. Broderick G, Katz BZ, Fernandes H, Fletcher MA, Klimas NG, Smith FA, O'Gorman MRG, Vernon SD, Taylor R. Cytokine Expression Profiles of Immune Imbalance in Post-mononucleosis Chronic Fatigue. *J Transl Med*. 2012, **10**: 191.

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41. Fritsch P, Craddock TJA, Smylie AL, Folcik Nivar VA, Fletcher MA, Klimas NG, de Vries G, Broderick G. A Study of Multiple Homeostatic Regimes in a Discrete Logic Model of Immune Signaling. *PLoS Comp Biol*, 2013. In preparation.
42. Smylie AL, Broderick G, Fernandes H, Razdan S, Barnes Z, Collado F, Sol C, Fletcher MA, Klimas NG. A Comparison of Sex-specific Immune Signatures in Gulf War Illness and Chronic Fatigue Syndrome. *BMC Immunology*.2013, **14**:29.
43. Fernandes H, Smylie AL, Jo YS, Razdan S, Barnes Z, Fletcher MA, Klimas NG, Rae I, Broderick G. Cytokine Expression Profiles of Chronic Fatigue Syndrome in Women: Addressing Illness Progression and a Shifting Immune Baseline. *J Transl Med.* 2013. In preparation.
44. Craddock TJA, Nathanson L, Klimas NG, Fletcher MA, Broderick G. Correlation of Gene Functional Modules Between Gulf War Illness and Select Human Diseases Reveals Novel Treatment Strategies. *PLoS One* 2013, In preparation.

Invited Reviews and Editorials:

45. Broderick G, Rubin E. The Realistic Modelling of Biological Systems: A Workshop Synopsis. *ComplexUs*, 2006; **3**: 217–230.
46. Ridgway D, Broderick G, Ellison MJ. Accommodating space, time and randomness in network simulation. Invited paper. *Curr Opin Biotechnol*, 2006; **17**: 1-6.
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48. Broderick G. Observations on Rituximab's Early Success. *Research 1st*, The CFIDS Association of America. <http://www.research1st.com/2011/10/21/broderick/>
49. Klimas NG, Broderick G, Fletcher MA. Biomarkers for chronic fatigue. *Brain Behav Immun.* 2012; **26(8)**: 1202-10.
50. Broderick G, corresponding author with International Consensus Panel. Response to 'A controversial consensus'; By the International Consensus Panel. *J Intern Med.* 2012 Feb; **271(2)**: 213-7.
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53. Vashishtha S, Broderick G. Recovering Biological regulatory from Experimental Data: A Comparative Review. *Syst. Biomed.* 2012. Invited Review. In Preparation.

Book Chapters:

1. Broderick G, Fletcher MA, Gallgher M, Barnes Z, Vernon SD, Klimas NG. Exploring the Diagnostic Potential of Immune Biomarker Coexpression in Gulf War Illness. In: Yan Q. (Ed.), *Psychoneuroimmunology: Methods and Protocols (Methods in Molecular Biology)*, Springer, New York, NY, Part II, Chap. 8: 145-164.
2. Fletcher MA, Barnes Z, Broderick G, Klimas NG. Psychoneuroimmunology and Natural Killer Cells: The Chromium Release Whole Blood Assay. In: Yan Q. (Ed.), *Psychoneuroimmunology: Methods and Protocols (Methods in Molecular Biology)*, Springer, New York, NY, Part III, Chap. 16: 313-324.

Abstracts/ Proceedings:

Broderick G, Valade JL, Paris J. Identifying Dominant Process Factors in High Yield Sulphite Pulp Using a Plackett-Burman Design. Proc.41st Canadian Chemical Engineering Conf., Vancouver, Oct. 6-9, 1991: 19-5.
Presented: Oral Podium Presentation.

Broderick G, Paris J, Valade JL. The Impact of Processing Conditions on Spent Sulphite Liquor Toxicity. Proc.43rd Canadian Chemical Engineering Conf., Ottawa, Ont., Oct. 3-6, 1993: 206.
Presented: Oral Podium Presentation.

Broderick G, Tessier P. On-line Fibre Quality Sensors: What They Should Measure and Why. Pulp Expert User Seminar, Pulp Expert Oy, Montreal, September 30, 1996.
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Broderick G. PLS and Latent Vector Modelling: A Decision Support Tool. Technical Session, CPPA Process Control Committee, Vancouver, September 23, 1996.
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Tessier P, Broderick G, Desrochers C, Bussiere S. Motor Load and Freeness Control of Chemimechanical Pulp Refining: Industrial Results. European Control Conference, Brussels, Belgium, July 1-4, 1997.
Presented: Oral Podium Presentation.

Bolduc JS, Broderick G, Therien. From stability to tracking: Robustness of cellular automata based controllers. Proc. ICIPS '97, 1997 IEEE International Conference on Intelligent Processing Systems. Beijing, China, Oct. 28-31, 1997, vol. 1: 619 - 624.
Presented: Oral Podium Presentation.

Tessier P, Broderick G. Example Applications of Multivariate Statistical Analysis in the Pulp and Paper Industry. Proc. PAPTAC Conf., Montreal, January 31-Feb 4, 2000.

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Graff S, Broderick G, Tessier P, Leger R. Predictive Models of Effluent Treatment at Fraser Paper in Edmundston. Proc. Tappi 2000 Environmental Conf., Denver, CO, May 7-10, 2000.

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Pudlas M, Broderick G, Tessier P. Assessing Competitive Position Using Multivariate Statistical Analysis of Pulp Quality. Proc. PACWEST Conference 2000, Pulp and Paper Technical Assoc. of Canada, Jasper, A.B., June 1-4, 2000.

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Life science works

Ellison MJ, Broderick, G, Ru'aini M, Bottorff D, Weiner J. A massively Parallel Arithmetic Approach to Whole-cell Modelling in 4-D. First Int. E.coli. Alliance (IECA) Conference on Systems Biology, Tsuroka, Japan, June 23-25, 2003. Program and Abstracts: 24.

Presented: Oral Podium Presentation.

Broderick G, Ru'aini M, Ellison MJ. A Parallel Particle-based Approach to Whole-cell Modelling. Int. E.coli. Alliance (IECA) Conference on Systems Biology, Banff, Alberta, Canada, June 18-22, 2004; Program and Abstracts: 13.

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Lopez-Campistrous A, Semchuk P, Burke L, Palmer-Stone T, Garen G, Brox S, Broderick G, Bottorff D, Locke T, Weiner J. Localisation and Annotation of the Escherichia coli K-12 Proteome in the Presence and Absence of Amino Acids. Int. E.coli. Alliance (IECA) Conference on Systems Biology, Banff, Alberta, Canada, June 18-22, 2004.

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Douglas DN, Lewis J, Broderick G, Bond D, Kneteman NM. Transcriptional profiling of HCV infection and treatment with interferon alpha in the chimeric mouse model for HCV infection. Proc. 3rd Int Dominique Dormont Conference: Viral Escape to Therapy in Chronic Infections, Ancienne Faculté de Médecine et de Pharmacie - Place de la Victoire, Bordeaux, France, Dec.7-9, 2006. Abstract O15: 38.

Presented: Oral Podium Presentation

Einecke G, Reeve J, Sis B, Broderick G, Halloran PF. The Alloimmune Response Induces Allospecific Changes of the Transcriptome within 24 Hours in Mouse Kidney Transplants. American Society of Nephrology, Renal Week 2006, San Diego, CA, Nov. 14-19, 2006.

Presented: Poster Presentation.

Broderick G, Einecke G, Famulski KS, Halloran PF. Dysregulation of Epithelial Repair Dynamics in Rejecting Mouse Kidney Transplants. American Society of Nephrology, Renal Week 2007, San Francisco, CA, October 31- November 5, 2007.

Presented: Poster Presentation.

Broderick, G. Delaying the Data: Revealing Rejection in Human Kidney Transplants by isolating Gene Set Co-expression. Using the "Omic" technologies to Phenotype Disease: A Satellite Symposium of the 9th Banff Conference on Allograft Pathology. Edmonton, AB, June 18-19, 2007.

Presented: Oral Podium Presentation

Broderick G, Einecke G, Mueller TF, Sis B, Halloran PF. Delaying the Data: Revealing Rejection in Human Kidney Transplants by Isolating Gene Set Co-Expression Patterns. American Transplant Congress, San Francisco, USA, May 5-9, 2007. Abstract 484: 273-274.

Presented: Oral Podium Presentation

Einecke G, Broderick G, Sis B, Halloran PF. Early Loss of Renal Transcripts in Kidney Allografts: Epithelial Response to Injury and the Relationship to Morphologic Changes. American Transplant Congress, San Francisco, USA, May 5-9, 2007. Abstract 683: 325.

Presented: Oral Podium Presentation

Broderick G, Schaefer C, Einecke G, Halloran PF. Identifying Changes in Gene Regulatory Motifs in Rejection of Human Kidney Transplants. Systems Biology: Global Regulation of Gene Expression, Cold Spring Harbor Laboratory, Long Island, N.Y., March 29 - April 1, 2007.

Abstract 35.

Presented: Poster Presentation.

Fuite J, Vernon SD, Broderick G. Neuro-endocrine and Immune Network Re-modeling in Chronic Fatigue Syndrome: An Exploratory Analysis. 7th Int. Conf. for the Critical Assessment of Microarray Data Analysis (CAMDA), Valencia, Spain, December 13-14, 2007. Abstract 32.

Presented: Oral Podium Presentation.

Fuite J, Vernon SD, Broderick G. 2008. Understanding chronic fatigue using comparative cross-scale analysis of information networks. Systems Biology: Global Regulation of Gene Expression, Cold Spring Harbor Laboratory, Long Island, NY, March 27-30, 2008. Abstract 47.

Presented: Poster Presentation.

Fuite J, Vernon SD, Broderick G. Re-modelling of neuroendocrine-immune interaction in Chronic Fatigue Syndrome. Department of Medicine Research Day, University of Alberta, Edmonton AB, May 29, 2008. Abstract 67.

Presented: Poster Presentation.

Yang C, Vernon SD, Broderick G. Cognitive Performance in a Population-based Cohort of CFS Patients. 95th Annual Clinical Congress, American College of Surgeons, Chicago, IL, Oct. 11-15, 2009.

Presented: Poster Presentation

Mueller T, Chen S, Broderick G, Luyckx V. Prediction Of The Ideal Post-Transplant Kidney Function For Living And Deceased Donor Organs. 2009 Organ Donation Congress, Berlin, Germany, Oct. 4-7, 2009; Abstract #88.

Presented: Oral Podium Presentation.

Yang C, Vernon SD, Broderick G. Cognitive Performance in a Population-based Cohort of CFS Patients. 42nd Annual Summer Students Research Day, Faculty of Medicine and Dentistry, University of Alberta, Oct. 17, 2009. Poster 154.

Presented: Poster Presentation

Benz-Zvi A, Lee JM, Broderick G. An MPC-based Approach to Robust Control of a Hypothalamic-Pituitary-Adrenal Axis Model. 6th IFAC Symposium on Robust Control Design, Haifa, Israel, June 16-18, 2009: paper TuM1.1.

Presented: Oral Podium Presentation.

Broderick G, Fletcher MA, Vernon SD, Klimas N. Isolating Characteristic Immune Signals under Challenge in Gulf War Illness. Latest Research in Immunology, Int Assoc CFS/ME, Reno, NV, March 12-15, 2009. Abstract #3.

Presented: Oral Podium Presentation.

Broderick G, Fuite J, Fletcher MA, Vernon SD, Klimas N. Remodeling of Lymphocyte-cytokine networks in Gulf War Illness under Challenge. Latest Research in Immunology, Int Assoc CFS/ME, Reno, NV, March 12-15, 2009. Poster Abstract #1.

Presented: Poster Presentation.

Katz B, Fletcher MA, Taylor R, Vernon SD, Broderick G. Cytokine Expression as a Potential Prognostic Indicator in Post-infectious Fatigue. Special Symposium 11, Cytokines and Infectious Diseases, Joint Meeting of the International Cytokine Society (ICS) and International Society for Interferon and Cytokine Research (ISICR), Chicago, IL, Oct. 3-7, 2010. Abstract #1682.

Presented: Oral Podium Presentation.

Fletcher MA, Broderick G, Klimas N. Biomarkers for CFS/ME. International Science Symposium on ME/CFS. Bond University, Queensland, Australia. Dec. 3-4, 2010: 3-9.

Presented: Oral Podium Presentation.

Klimas N, Fletcher MA, Broderick G. A Systems Biology Approach to ME/CFS. International Science Symposium on ME/CFS. Bond University, Queensland, Australia. Dec. 3-4, 2010: 1.

Presented: Oral Podium Presentation.

Broderick G, Ben Hamo R, Efroni S, Katz BZ, O’Gorman MRG, Nathanson L, Fletcher MA, Vernon SD, Taylor R. Linking Lymphocyte Metabolites with Clinical Course in Post-Infectious Fatigue. 10th Int IACFS/ME Conf for Physicians and Healthcare Professionals, Ottawa, ON, September 22-25, 2011.

Presented: Oral Podium Presentation.

Broderick G, Ben Hamo R, Efroni S, Nathanson L, Fletcher MA, Vernon SD, Klimas N. Preferential Pathway Activation in Gulf War Veterans with Unexplained Neuroendocrine-immune Imbalances. 10th Int IACFS/ME Conf for Physicians and Healthcare Professionals, Ottawa, ON, September 22-25, 2011: Session #9, paper 77.

Presented: Poster Presentation.

Vashishtha S, Barnes ZM, Broderick G, Zeng XR, Klimas NG, Fletcher MA. Lymphocyte population dynamics in Gulf War Illness during exercise challenge: a network analysis. ICCS 2013, the 28th International Clinical Cytometry Meeting, Fort Lauderdale, FL, October 11-15, 2013: Poster session II, poster #18.

Presented: Poster Presentation.

Harvey JM, Barnes ZM, Plitnik T, Broderick G, Zeng XR, Klimas NG, Fletcher MA. Mixed lymphocyte response to exogenous IL-15 in Gulf War Illness and Myalgic Encephalomyelitis/Chronic Fatigue Syndrome. ICCS 2013, the 28th International Clinical Cytometry Meeting, Fort Lauderdale, FL, October 11-15, 2013: Poster session II, poster #20.

Presented: Poster Presentation.

Invited International Scientific Presentations.

Broderick G. A Parallel Particle-based Approach to Whole-cell Modelling. Invited Speaker, Banbury Centre Conference on Integrating Disparate Data to Simulate Lymphocyte Function, Cold Spring Harbor Laboratory, Long Island, N.Y., Sept. 19-22, 2004; Closed session.

Broderick G. CFS: From Constructs to Mechanisms”, Invited Speaker, CDC Computational Challenge, Banbury Centre Workshop, From Markers to Models: Integrating Data to Make Sense of Biologic Systems, Cold Spring Harbor Laboratory, Long Island, N.Y., Sept. 18-21, 2005; Closed session.

Broderick G. The Virtual Cell Model: Exploring Emergent Behaviour in Nature’s Inherent Integration Milieu, Invited Speaker, Realistic Modelling of Biological Systems: A First International Workshop, Weizmann Inst. of Science, Rehovot, Israel, May 2-4, 2005.

Broderick G. Integrating a Model Biological Membrane and Virtual Cytoplasm. Invited Speaker, Realistic Modelling of Biological Systems: A First International Workshop, Weizmann Inst. of Science, Rehovot, Israel, May 2-4, 2005.

Broderick G. Building a Large-scale Functional Model of a Biological Membrane. Invited Speaker, Faculty Talk, Center for Complexity Science, Weizmann Inst. of Science, Rehovot, Israel, May 1, 2005.

Broderick G. Composite Features of Fatigue. Invited Speaker, Computational Challenge, US Centers for Disease Control and Prevention (CDC), Atlanta, GA, March 15, 2006.

Broderick G, Ben-Zvi A, Aslakson E, Klimas N, Vernon SD. An MPC-guided Approach for the Regulation of Cortisol in a Hypothalamic-pituitary-adrenal Axis Model. Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, Aug. 29, 2007.

Broderick G, Bolshin C, Aspler AL. Evidence of Lymphocyte Imbalance in Wichita Study of CFS sufferers. US Centers for Disease Control and Prevention (CDC), Atlanta, GA, August 27, 2007.

Klimas N, Fletcher MA, Broderick G. Gulf War Syndrome: A Systems Biology Approach. **Keynote address**, Acad. Behavioral Medicine Ann. Meeting, Lake Louise, AB, June 14-16, 2008.

Vernon SD, Fuite J, Broderick G. Genetic Variation and Altered Immune Activity in Chronic Fatigue Syndrome. 6th Int Conf HHV-6 Foundation, Int Symp on Viruses in Chronic Fatigue Syndrome and Post-viral fatigue, Baltimore, MD, June 22-23, 2008.

Vernon SD, Fuite J, Broderick G. Neuroendocrine and Immune Network Re-modeling in Chronic Fatigue Syndrome. Integrative Neural Immune Interest Group (INIIG) Lecture Series, National Institute of Mental Health, Bethesda, MD, March 4, 2008.

Broderick G. Agent-based Models in Medicine: the Promise and the Challenges. **Keynote** speaker. SwarmFest 2008, Northwestern University Feinberg School of Medicine, Chicago IL, May 12-13, 2008.

Broderick G. Subtle Immune Signatures in Chronic Fatigue Syndrome and Gulf War Illness. From Infection to Neurometabolism: A Nexus for CFS. The Banbury Centre, Cold Spring Harbor Laboratory, Long Island, NY, Sept. 13-16, 2009; Closed session.

Broderick G, Klimas N. Immune Network Dysfunction in Gulf War Illness. Research Advisory Committee, U.S. Department of Veterans Affairs, Boston, MA, June 29-30, 2009.

Broderick G. Chronic Fatiguing Illnesses: Immune Signatures and Beyond. Research Roundtable Guest Speaker. The CFIDS Association of America, Chicago, IL, May 3, 2009.

Broderick, G. Molecular Profiling of Post-infectious fatigue. Expanding Research: Building on your Investment. CFIDS Association Outreach Webinar, Oct. 5, 2010.

Broderick, G. Networked Regulatory Systems in Complex Illness. Developmental Center for AIDS Research. University of Miami, Miami, FL, February 16, 2010.

Broderick, G. A Systems Biology Approach to Understanding Homeostasis Reset - the CFS/GWI Experience. John P. Hussman Institute for Human Genomics, University of Miami, Miami, FL, February 16, 2010.

Broderick, G. Shifting Immune Conversations: A Systems Biology Approach to Gulf War Illness and CFS/ME. US Veterans Affairs, Miami Veterans Affairs Medical Center, Miami, FL, March 26, 2011.

Broderick, G. Immune System Dynamics in CFS/ME. State of Knowledge Workshop on Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) Research. US National Institutes of Health (NIH), Bethesda, MD, April 7-8, 2011.

Broderick, G. From Cytokines to Cells to Gene Expression: An Integrative Approach to the Study of Gulf War illness. Research Advisory Committee, U.S. Department of Veterans Affairs, Washington, DC, June 27-28, 2011.

Broderick, G. A System Biology Perspective of CFS. Meeting of the Scientific Advisory Board of the CFIDS Association of America, The Banbury Centre, Cold Spring Harbor Laboratory, Long Island, NY, Sept. 26-27, 2011; Closed session.

Broderick, G. Circuit Analysis for Intervention Design. Meeting of the Scientific Advisory Board of the CFIDS Association of America, The Banbury Centre, Cold Spring Harbor Laboratory, Long Island, NY, Sept. 30-Oct. 3, 2012; Closed session.

Broderick, G. Mapping Complex Endocrine-immune Imbalance: Applications in Cancer Survivors. Meeting on Mechanisms of Accelerated Aging in Cancer Survivors. US National Cancer Institute (NCI), Rockville, MD, Sept. 25-27, 2013.

Invited National/Regional/Local Presentations

Broderick G, Ru'aini M, Winters P, Chan E, Ellison MJ. Towards a Life-like Virtual Cell Using Discrete Automata. Departmental Seminars in Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada, December 2, 2004.

Broderick G. The Virtual Cytoplasm: Exploring Complex Intra-cellular Kinetics. Department of Mathematical & Statistical Sciences, University of Alberta, Edmonton, Alberta, Canada, Feb. 27, 2006.

Broderick G, Schaefer CF, Einecke G, Halloran PF. Identifying Changes in Gene Regulatory Motifs in Rejection of Human Kidney Transplants, Department of Biochemistry, University of Alberta, Edmonton, Alberta, Canada, Jan. 25, 2008.

Broderick G. Discovery Learning: A Preceptor's Impressions. Academic Half-day, Geriatric Division, Glenrose Rehabilitation Hospital, Edmonton, AB, June 16, 2009.

Broderick G. CFS/ME Lifting the Veil on a Complex Illness. Guest Speaker, M.E. Awareness Day, M.E. Society of Edmonton, Edmonton, AB, May 11, 2009.

Broderick G. Shifting Immune Conversations in Complex Chronic Illness: An Information Network Perspective. Dept. of Epidemiology and Community Health, University of Ottawa, Dec. 6, 2010.

Broderick G. CFS/ME Out of the Shadows. Guest Speaker, M.E. Awareness Day, M.E. Society of Edmonton, Edmonton, AB, May 12, 2010.

Patents.

Broderick G, Lanouette R, Valade JL, 1995. Optimal Energy Refining Method for the Mechanical Treatment of Wood Fibres. Canadian patent 2,150,647 (November 30, 95), U.S. patent 5,540,392 (July 30, 1996).

Ellison MJ, Broderick G, Ru'aini M, Bottorff D, Wishart D, 2004. System and Method for Simulating Living Cell Processes. Patent Cooperation Treaty PCT/CA2004/000369 (May 5, 2004), U.S. provisional patent appl. #60/453,257 (March 10, 2003).

Broderick G, Ru'aini M, Ellison MJ, 2004. System and Method for Simulating Biological Cell Membrane Processes. Patent Cooperation Treaty PCT/CA2005/000795 (May 25, 2005), U.S. provisional patent appl. #60/575,089 (May 28, 2004).

Media Coverage.

Interview with scientific visualisation results used by Hapgood F. A Microbe Enters the Matrix: How model bacteria will transform biology. Wired Magazine. Issue 11.09 | September 2003.

Interviewed and quoted by Constans A. Pharma companies turn to computer simulations to complement experimentation and trial design. Regarding massively parallel computer model of whole cell molecular mechanics - Project CyberCell. Desktop Drug Discovery. The Scientist 2004, 18(4): 33. (<http://www.the-scientist.com/article/display/14482/#ixzz1K5sjuFJU>)

Press release announcing award of CFIDS Association grant to PI Broderick for the study of post-infectious fatigue. Picked up by 75 news outlets including Reuters, AOL Money News, Forbes, the Los Angeles Times and Houston Chronicle among others. December 3, 2008.

Interview with Mr. Kirk Fernandes, Medical Unit Producer, The Dr. Oz Show, as part of background research for segment on XMRV and viral triggers of chronic fatigue syndrome. November 2, 2009. (Aired December 3, 2009).

Interviewed and quoted by Zdeb C, Waking up to the reality of chronic fatigue. Describing his new study of EBV-induced metabolic and immune dysfunction. Canwest News Service, Published: Saturday, April 18, 2009 in Edmonton Journal and affiliated CanWest newspapers.

Correspondence regarding research into post-infectious fatigue with Diane R. Bean, Senior Coordinator, International Programs Division, Office of Policy and Public Affairs, Bureau of Consular Affairs, U.S. Department of State. February 5, 2009.

Press release by Public Library of Science (PLoS), via EurekAlert! Newswire, a service of AAAS. Reported by several subscribing news outlets such as the Washington Post: Tweaking Hormones Might Ease Chronic Stress. January 27, 2009.

Interviewed live on the air as invited guest on Peter Brown show RadioActive CBC Radio, regarding his new US award to study of post-infectious fatigue syndrome, CBC Studios, Edmonton, January 8, 2009.

Interview with Amy Dockser Marcus (Pulitzer Prize 2005, Beat Reporting), Wall Street Journal, January 13, 2011, regarding the latest discoveries in chronic fatigue research and the promise of a systems biology approach to diagnosis and treatment.

Interview with Ryan Prior (writer/ film-maker USA Today), ME/CFS documentary “The Blue Ribbon”, October TBD, 2013, regarding the new Institute for Neuro-immune Medicine and the Clinical Systems Biology group in energizing discovery in chronic fatigue research.