CURRICULUM VITAE

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Education

Certificat en français écrit, Université du Québec à Montréal, 2010
PhD in condensed matter physics, May 1996, University of Minnesota, Twin Cities
B.A. in Biology, 1990, University of Minnesota, Twin Cities
Postdoc II: The California Institute of Technology, 1997-2000, experimental biophysics
Postdoc I: The Scripps Research Institute, 1996-1997, theoretical biophysics

Employment

Visiting Professor, Deep Springs College, January-May 2024
Professor, Physics, Portland State University, 2021-present
Associate professor, Physics, Portland State University, 2017-2021
Adjunct professor, McGill University, 2015-2017
Research professor, Medical Engineering, California Institute of Technology, 2015-2017
Visiting scholar, University of Southern California, 2011-2012
Adjunct member, The Jackson Laboratory, Bar Harbor, Maine, 2004-2012
Adjunct professor, Department of Physics, University of Maine, Orono, ME, 2004-2012
Associate professor, Department of Biomedical Engineering, McGill University, 2009-2015
Assistant professor, Department of Biomedical Engineering, McGill University, 2004-2009
Visiting Associate, California Institute of Technology, 2002-2004, astrobiology
Engineer, Jet Propulsion Laboratory, NASA, 2000-2004, astrobiology

Dissertation

Correlated Density Matrices in Finite-Temperature Quantum Field Theory, 04/1996, advisor Joseph I. Kapusta

Honors, Grants, and Fellowships

Current Grants

1. "Novel preservatives for preservation of bioactive skin care ingredients and probiotic microorganisms," Marie-Veronique Advanced (Industrial), Role: PI, unique investigator (2018-2026)
2. "Microfluidic Chip and Pump System for Remote Volumetric Microscopy," Astrobi Foundation, Role: PI, unique investigator (2023-2026)
3. "Benchtop Confocal Microscope," NIH S10 award, 2025

Past Grants

4. "Extant Life Volumetric Imaging System (ELVIS)," NSF Major Research Instruments (MRI), Role: PI (2018-2021)
5. "THOR (Thermal High-voltage Ocean-penetrator Research platform)," NASA PSTAR, Role: Co-I (2018-2021)
6. "Multi-Mode Microscope," JPL Ocean Worlds Life program (OWL), Role: PI, unique investigator (2018-2021)
7. "Agnostic Biosignatures for Extant Life," NASA Astrobiology Institute, Role: Co-I (2018-2021)
8. "Microbial Residue and Compounds of Life from Enceladus (MIRACLE)," NASA Exobiology, June 2016-May 2019, Role: PI (2018-2019)
9. "Submersible Holographic Astrobiology Microscope with Ultraresolution (SHAMU)," Moore Foundation, $1.2M, January 2014-December 2018, Role: PI (2018-2019)
10. "Medical Physics Research Training Network," NSERC CREATE, 09/2013-09/2019
11. "Nanoparticle-aided radiation therapy with scintillating high Z materials," CIHR operating grant, April 2014-2017 (Grant supported Canadian trainees through 2017)
12. "Quantitative Photophysics of Photoluminescent and Scintillating Nanoparticles," NSERC Individual Discovery grant, 04/13-04/18 (terminated 05/15 upon departure from Canada)
13. "Targeted Au Nanoparticles for Synergistic Melanoma Therapy," Townshend-Lamarre, 09/2012-09/2013
14. "Scintillating Nanoparticles for Radiosensitization of Cancer Cells," USC Ming Hsieh award, August 2012-2013
15. "Les points quantiques non-toxiques pour la thérapie photodynamique," MDEIE, Quebec, May 2011-2012
16. "Canadian Astrobiology Training Program," NSERC CREATE, 06/2009-06/2015
17. Canada Research Chair, Tier II, 06/2009-06/2014
18. "Self-illuminating quantum dots for melanoma treatment," Collaborative Health Research Projects (CHRP), 06/2010-06/2013
19. "Energy and electron transfer between quantum dots and biomolecules," NSERC Individual Discovery grant, 04/08-04/13
20. "Autonomous Microscopy for Real-Time Bacterial Imaging in Bodies of Water," Canadian Space Agency, 04/2009-04/2010 (Role: PI, unique investigator)
21. "Bioavailability and Fates of CdSe and TiO2 Nanoparticles in Eukaryotes and Bacteria," United States Environmental Protection Agency, 12/07-12/10 (Role: institutional PI; primary PI: Patricia Holden, UCSB)
22. "Nanoparticle Toxicity in Zebrafish," United States Environmental Protection Agency 12/07-12/10 (role: institutional PI; primary PI: Greg Mayer, University of Maine)
23. "Enhanced Optical Multianalyte Detection Lab on Chip for Point-of-Care Diagnostic," National Science and Engineering Research Council of Canada Strategic Award, 01/07-01/10 (Role: Co-Investigator; PI: Yves-Alain Peter, Université de Montréal)
24. "Functionalized nanostructures to develop new therapeutic and diagnostic strategies: A translational approach from nanotechnology to regenerative medicine," CIHR-New initiative in

regenerative medicine Group grant, 01/05-01/10 (Role: Co-Investigator; PI: Maryam Tabrizian, McGill)

25. "Label-free, high-sensitivity detection of bacteria by phages using functionalized optical microcavities," National Science and Engineering Research Council of Canada Strategic Projects Grant, 09/2008-09/2011 (Role: Co-I)
26. "Photodynamic therapy of melanoma using quantum dot conjugates," Townshend-Lamarre, 04/2008-04/2009 (Role: PI)
27. "Fluorescence cameras for multispectral, single-molecule imaging," NSERC Research Tools and Instruments (RTI grant Category 1) (Role: PI, unique investigator)
28. "Rotors for centrifuges," NSERC Research Tools and Instruments (RTI grant Category 1), 04/2008-04/2009 (Role: Co-I)
29. "Selected targeting and destruction of malignant cells using redox-sensitive quantum dots," Canadian Institutes of Health Research (CIHR) Regenerative Medicine and Nanomedicine program, 01/07-01/09 (Role: PI; unique investigator)
30. "Fluorescent and Holographic Microscopy for Real-Time Bacterial Imaging," Canadian Space Agency, 04/2008-04/2009 (Role: PI, unique investigator)
31. "GEOMIC: miniaturized epifluorescence imaging system for in situ microbiology." Canadian Space Agency, 04/2006-05/2007 (Role: PI, unique investigator) (RENEWAL APPROVED through 04/2008)
32. "Interactions between semiconductor nanoparticles and biomembranes and DNA," National Science and Engineering Research Council of Canada, NanoInnovation Program, 06/2005-06/2007 (Role: PI, unique investigator) (COMPETITIVE EXTENSION APPROVED through 06/2008)
33. "Astrobiology and Life Detection Institute for Informal Educators," ASTID Education and Public Outreach (E/PO) proposal, 07/06-07/08 (Role: PI, unique investigator)
34. "Biologically-conjugated quantum dots with unique geometries," National Science and Engineering Research Council of Canada, Individual Discovery Grant, 04/2005-04/2007, (Role: PI, unique investigator)
35. "Transformations of Biologically-Conjugated CdSe Quantum Dots Released into Water and Biofilms," United States Environmental Protection Agency, 01/2005-01/2008 (Role: Institutional PI; primary PI: Patricia Holden, UCSB)
36. "Semiconductor quantum dots as ion- and voltage-selective fluorescent probes," Canadian Institutes of Health Research (CIHR) Proof of Principle, 10/2004-06/2006 (Role: PI, unique investigator)
37. Canadian Foundation for Innovation Infrastructure Funds for Canada Research Chairs, 09/2004-09/2005 (Role: PI, unique investigator)
38. "CHemistry and Imaging fo for Martian and Earth Soils (CHIMES)," NASA ASTEP, at The Jackson Laboratory, 09/04-09/06 (Role: PI; Co-Is at Jet Propulsion Laboratory paid directly from NASA)
39. "Development of voltage-sensitive probes for live cells," Banting Foundation, 07/2004-02/2006 (Role: PI, unique investigator)
40. "Miniature Electronic Dynamic Ion Channel Sensor (MEDICS)," Biomolecular Systems Research Program, NASA Code U, 07/2001-07/2004 (Role: PI, 2 coinvestigators)
41. "Researching Extraterrestrial Life with Ion Channel Sensors ("RELICS"), ASTID proposal, NASA Code S, 2002-2005 (Role: PI; 2 co-investigators)
42. "Quantum dots for in situ life detection technology," BioNanoTech, NASA Code R, 2003-2004 (Role: PI, unique investigator)
43. "Biofunctionalization of Nanoscale Cantilevers for Sensor Development," Director's Research and Development Fund (DRDF), 2003-2004 (Role: PI, unique investigator)

Teaching, Mentoring and Curricular Achievements

Mentoring
Current graduate students: 2
Current undergraduate research students: 6
Past PhD students supervised: 7
Past Master's students supervised: 7

Governance and Other Professionally Related Service

Current
Member, PSU Faculty Senate
Member, PSU Research Committee
Member, Graduate Committee, Department of Physics, PSU
Member, Tenure and Promotion Committee, Department of Physics, PSU
Member, DEI Committee, Department of Physics, PSU
Member, Extreme Environment Cluster, PSU
Faculty Mentor, EXITO Program, PSU
Past
Member, University Tenure & Promotion Committee, McGill University
Member, Biomedical Curriculum Committee, Faculty of Medicine
Member, Strategic Planning Committee "Thinking Dangerously", Faculty of Medicine
Member, Admissions Committee, Faculty of Medicine, 2009-present (2013: evaluator of MD/PhD applicants)
Member, M3I Writing Panel, Faculty of Medicine, 2007-2015
Member, M3I Interviewers, Faculty of Medicine, 2007-2015
Lead, Medical Liaison Committee, department of Biomedical Engineering
Member, Graduate studies committee, department of Biomedical Engineering
Thesis committees: over 20 at McGill

Professionally-related Service

Current
NIH review panel, instrumentation grants, Fall 2025
Editor of special issue, Life (MDPI): "Microbial Life in the Solar System" (2021)
Editor of special issue, Methods (Elsevier): "Quantitative Phase Imaging" (2018)
Founding Editor, Advances in Physics X (Taylor & Francis)
Assistant editor, Sensors
Topical editor, *Applied Optics*, 2019-2024
Member of College of Reviewers, Canadian Institutes of Health Research (CIHR), 2017-

Past
Member, Space Exploration Advisory Committee (SEAC)
Member, Astrobiology Discipline Working Group (funded by Canadian Space Agency)
Panel member: NASA, NIAC Grants, January 2020
Panel Member: CIHR, Project Grants, June 2016 and November 2016

Panel Member: NASA, Exobiology proposals, October 2014 (4 days)
Panel member: FQRNT, January 2014
Panel Member: NASA, Exobiology proposals, February 2011 (5 days)
Panel Member: NIH Nanotoxicology (U19), June 2010 (2 days)
Panel Member: FQRNT Equipe proposals, February 2010 (1 day)
Panel Member: NASA, Mars Scout proposals, September 2006 (3 days)
Panel Member: NASA, Mars Science Lander proposals, September 2004 (3 days)

Memberships in Professional Societies

American Physical Society
American Chemical Society
American Association for the Advancement of Science
SPIE (Senior Member)
American Association of Physics Teachers

Publications

Please see attached document.

Teaching

Please see attached document.