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## **Professor Andrew David Rutenberg**

Correspondence language: English

Sex: Male

Date of Birth: 11/25

Canadian Residency Status: Canadian Citizen

Country of Citizenship: Canada

## **Contact Information**

The primary information is denoted by (\*)

### **Address**

#### Primary Affiliation (\*)

Department of Physics and Atmospheric Science  
Dalhousie University  
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Protected when completed

## Professor Andrew Rutenberg

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### Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes
French	Yes	Yes	Yes	Yes	Yes

### Degrees

1997/10 - 1999/2	Research Associate, Physics, Non-equilibrium Materials Physics, McGill University Degree Status: Completed Supervisors: Grant, Martin, 1997/10 - 1999/12
1995/10 - 1997/10	Post-doctorate, Physics, Non-equilibrium Statistic Mechanics, University of Oxford Degree Status: Completed Supervisors: Cardy, John, 1995/10 - 1997/8
1992/10 - 1995/10	Post-doctorate, Physics, Non-equilibrium Dynamics, University of Manchester Degree Status: Completed Supervisors: Bray, Alan, 1992/10 - 1995/9
1987/9 - 1993/1	Doctorate, Physics, Theoretical Physics, Princeton University Degree Status: Completed Thesis Title: Phase Transitions in a Ginzburg-Landau Model and a Kagome Antiferromagnet Supervisors: Huse, David (AT&T Bell Labs, Murray Hill), 1989/9 - 1992/8
1983/9 - 1987/6	Bachelor's Honours, BSc, Math and Physics, University of Toronto Degree Status: Completed Supervisors: Harrison, Jim (Queen's), 1985/5 - 1985/8; Julian, Stephen (in lab of Jim Daniels, UofToronto), 1984/5 - 1984/8

### Recognitions

2016/4	Dr. G. Forbes Langstroth Memorial Award Dalhousie University Prize / Award Departmental Teaching Award selected annually by the undergraduate students
2015/12	AC Fales Professor in Theoretical Physics Dalhousie University Distinction Endowed research chair in Dept of Physics and Atmospheric Science

## User Profile

Researcher Status: Researcher

Engaged in Clinical Research?: No

Fields of Application: Foundations and Knowledge Acquisition

Disciplines Trained In: Physics

Areas of Research: Modelization and Simulation, Stochastic Processes, Cell, Physiology, Biomaterials

Research Specialization Keywords: Statistical Physics, Soft-matter physics, Computational and Theoretical Physics, Biological Physics, Non-equilibrium dynamics, Data-science, Machine-learning, Geroscience

Research Disciplines: Physics, Biology and Related Sciences

## Employment

2014/7	AC Fales Professor of Theoretical Physics Physics and Atmospheric Science, Faculty of Science, Dalhousie University Full-time, Professor Tenure Status: Tenure
2005/7 - 2014/6	Associate Professor Physics and Atmospheric Science, Faculty of Science, Dalhousie University Full-time, Associate Professor Tenure Status: Tenure
2000/7 - 2005/6	Assistant Professor Physics, Science, Dalhousie University Full-time, Assistant Professor Tenure Status: Tenure Track
2000/1 - 2000/6	Visiting Researcher Physics, Science, Simon Fraser University Full-time, Term Tenure Status: Non Tenure Track Biophysics research under the CIFAR program in Soft Surfaces and Membranes

## Affiliations

The primary affiliation is denoted by (\*)

(*) 2000/7	AC Fales Professor of Theoretical Physics, Physics and Atmospheric Science, Dalhousie University
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## Research Funding History

### Awarded [n=8]

2024/3 - 2026/6 Co-applicant	Identifying key resilience factors to combat the harms of social inequality among older adults, Grant
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#### Funding Sources:

New Frontiers in Research Fund  
Exploration  
Total Funding - 250,000  
Portion of Funding Received - 30,000  
Funding Competitive?: Yes

Co-applicant : Lemoine, M; Levasseur, M; Nangia, P; Olstad, D;

Principal Applicant : Verschoor, C

2024/3 - 2025/8  
Co-applicant

Exploring the breakdown of biological systems in older adults using high-dimensional metabolomic data, Grant

**Funding Sources:**

Canadian Institutes of Health Research (CIHR)  
Catalyst Grant  
Total Funding - 70,000  
Portion of Funding Received - 0  
Funding Competitive?: Yes

Co-applicant : Cohen, A;

Principal Applicant : Vershoor, C

2019/4 - 2024/3  
Principal Applicant

Soft- and statistical-physics models of coarse-grained biological structure and dynamics, Grant, Operating

Clinical Research Project?: No

Project Description: Living creatures have length- and time-scales ranging from the molecular to the organismal. We will develop coarse-grained models to bridge between these scales. Collagen plays essential roles from tendons to the cornea. We will develop a combined structural and mechanical model of fibrillar collagen. Periodic structure along the fibril length will be included with methods developed for coarse-grained studies of metallic crystals, while the mechanical contributions of cross-linking will be treated with methods developed for liquid-crystalline rubbers. Living organisms age and die. We will further develop a network-based model for organismal aging and mortality. We will explore why it works, how we can better test it with observational data, and how we can use it to improve individual predictions of aging and mortality. The result will be a deeper understanding of how aging, damage, and mortality intertwine; and how much they can be adjusted.

Research Uptake: Publication, seminars, collaborative engagement, student training.

**Funding Sources:**

Natural Sciences and Engineering Research Council of Canada (NSERC)  
Discovery Grant  
Total Funding - 205,000 (Canadian dollar)  
Portion of Funding Received - 205,000 (Canadian dollar)  
Funding Competitive?: Yes

2014/4 - 2019/3  
Principal Applicant

Patterns of biological damage: managing subsystem failure in cellular systems, Grant, Operating

**Funding Sources:**

2014/4 - 2019/3      Natural Sciences and Engineering Research Council of Canada (NSERC)  
Discovery Grant  
Total Funding - 125,000 (Canadian dollar)  
Portion of Funding Received - 125,000  
Funding Competitive?: Yes

2013/9 - 2015/8  
Co-applicant

Systems level analysis of virulence in a model gastrointestinal pathogen, Fellowship

**Funding by Year:**

2014/9 - 2015/8      Total Funding - 10,000  
Portion of Funding Received - 3,333  
Time Commitment: 5

2013/9 - 2014/8      Total Funding - 10,000  
 Portion of Funding Received - 3,333  
 Time Commitment: 5

**Funding Sources:**

2013/9 - 2015/8      France-Canada Research Fund  
 New Scientific Collaboration Support Program  
 Total Funding - 20,000 (Canadian dollar)  
 Portion of Funding Received - 6,666  
 Funding Competitive?: Yes

Co-applicant : Enninga, Jost; Rohde, John

2009/4 - 2014/3      Self-organized subcellular structure: length and time scale control within bacteria, Grant,  
 Principal Applicant      Operating

**Funding by Year:**

2013/4 - 2014/3      Total Funding - 29,000  
 Portion of Funding Received - 29,000  
 Time Commitment: 40

2012/4 - 2013/3      Total Funding - 29,000  
 Portion of Funding Received - 29,000  
 Time Commitment: 40

2011/4 - 2012/3      Total Funding - 29,000  
 Portion of Funding Received - 29,000  
 Time Commitment: 40

2010/4 - 2011/3      Total Funding - 29,000  
 Portion of Funding Received - 29,000  
 Time Commitment: 40

2009/4 - 2010/3      Total Funding - 29,000  
 Portion of Funding Received - 29,000 (Canadian dollar)  
 Time Commitment: 40

**Funding Sources:**

2010/4 - 2014/3      Natural Sciences and Engineering Research Council of Canada  
 (NSERC)  
 Discovery Grant  
 Total Funding - 116,000 (Canadian dollar)  
 Portion of Funding Received - 116,000  
 Funding Competitive?: Yes

2013/9 - 2014/2      Computational models and data analysis of host-pathogen interactions using a novel  
 Principal Applicant      mutant collection (Shigella), Fellowship

**Funding by Year:**

2013/9 - 2014/2      Total Funding - 24,472  
 Portion of Funding Received - 24,472  
 Time Commitment: 40

**Funding Sources:**

2013/9 - 2014/2 Mairie de Paris (France)  
 Research in Paris  
 Total Funding - 24,472 (Euro)  
 Portion of Funding Received - 24,472  
 Funding Competitive?: Yes

2013/8 - 2013/9 Systems level analysis of virulence in a model gastrointestinal pathogen, Fellowship

Principal Applicant

**Funding by Year:**

2013/8 - 2013/9 Total Funding - 1,868  
 Portion of Funding Received - 1,868  
 Time Commitment: 40

**Funding Sources:**

2013/8 - 2013/9 Embassy of France In Canada (Ottawa, ON)  
 Scientific stay in France for tenured researchers  
 Total Funding - 1,868 (Euro)  
 Portion of Funding Received - 1,868  
 Funding Competitive?: Yes

**Completed [n=11]**

2010/9 - 2012/8 Stochastic modelling of heterocyst differentiation in cyanobacterial filaments, Fellowship

Principal Applicant

**Funding by Year:**

2011/9 - 2012/8 Total Funding - 6,000  
 Portion of Funding Received - 6,000  
 Time Commitment: 5

2010/9 - 2011/8 Total Funding - 6,000  
 Portion of Funding Received - 6,000  
 Time Commitment: 5

**Funding Sources:**

2010/9 - 2012/8 Atlantic Computational Excellence Network (ACEnet) (Canada)  
 Graduate Fellowship  
 Total Funding - 12,000 (Canadian dollar)  
 Portion of Funding Received - 12,000  
 Funding Competitive?: Yes

2009/11 - 2011/8 Stochastic modelling of polydispersity control of inner membrane cluster sizes in the  
 general secretory pathway, Fellowship

Principal Applicant

**Funding by Year:**

2010/12 - 2011/8 Total Funding - 15,000  
 Portion of Funding Received - 15,000  
 Time Commitment: 5

2009/11 - 2010/10 Total Funding - 20,000  
 Portion of Funding Received - 20,000  
 Time Commitment: 5

**Funding Sources:**

2009/11 - 2011/8 Atlantic Computational Excellence Network (ACEnet) (Canada)  
 ACEnet/Sun microsystems research fellowship  
 Total Funding - 35,000 (Canadian dollar)  
 Portion of Funding Received - 35,000  
 Funding Competitive?: Yes

2011/4 - 2011/7 Research associate: stochastic data analysis (co-op funding), Fellowship

Principal Applicant

**Funding by Year:**

2011/4 - 2011/7 Total Funding - 3,412  
 Portion of Funding Received - 3,412  
 Time Commitment: 5

**Funding Sources:**

2011/4 - 2011/7 Nova Scotia Economic Development  
 Strategic Cooperative Education Incentive  
 Total Funding - 3,412 (Canadian dollar)  
 Portion of Funding Received - 3,412  
 Funding Competitive?: Yes

2011/1 - 2011/4 Research associate: image processing (co-op funding), Fellowship

Principal Applicant

**Funding by Year:**

2011/1 - 2011/4 Total Funding - 3,577  
 Portion of Funding Received - 3,577  
 Time Commitment: 5

**Funding Sources:**

2011/1 - 2011/4 Nova Scotia Economic Development  
 Cooperative Employment Program  
 Total Funding - 3,577 (Canadian dollar)  
 Portion of Funding Received - 3,577  
 Funding Competitive?: Yes

2004/9 - 2010/3 Micromanipulation of bacterial division, Grant, Operating

Principal Applicant

**Funding by Year:**

2005/9 - 2006/8 Total Funding - 88,346  
 Portion of Funding Received - 40,000 (Canadian dollar)  
 Time Commitment: 20

2004/9 - 2005/8 Total Funding - 198,350  
 Portion of Funding Received - 40,000 (Canadian dollar)  
 Time Commitment: 20

**Funding Sources:**

2004/9 - 2010/3 Canadian Institutes of Health Research (CIHR)  
 Novel Technology Applications in Health Research  
 Total Funding - 308,354 (Canadian dollar)  
 Portion of Funding Received - 80,000 (Canadian dollar)  
 Funding Renewable?: No  
 Funding Competitive?: Yes

Co-applicant : Dillon, Jo-anne;

Co-investigator : Jericho, Manfred

2007/12 - 2009/11 All protein modelling of subcellular Min oscillations in the bacterium Escherichia coli: MinD  
Principal Applicant dimerization and oligomerization effects, Fellowship

**Funding by Year:**

2008/12 - 2009/11 Total Funding - 20,000  
Portion of Funding Received - 20,000  
Time Commitment: 5

**Funding Sources:**

2007/12 - 2009/11 Atlantic Computational Excellence Network (ACEnet) (Canada)  
ACEnet/Sun microsystems research fellowship  
Total Funding - 40,000 (Canadian dollar)  
Portion of Funding Received - 40,000  
Funding Competitive?: Yes

2004/4 - 2009/3 Ordering Dynamics and Bacterial Biophysics, Grant, Operating  
Principal Applicant

**Funding by Year:**

2008/4 - 2009/3 Total Funding - 41,680  
Portion of Funding Received - 41,680 (Canadian dollar)  
Time Commitment: 40

2007/4 - 2008/3 Total Funding - 41,680  
Portion of Funding Received - 41,680 (Canadian dollar)  
Time Commitment: 40

2006/4 - 2007/3 Total Funding - 41,680  
Portion of Funding Received - 41,680 (Canadian dollar)  
Time Commitment: 40

2005/4 - 2006/3 Total Funding - 41,680  
Portion of Funding Received - 41,680 (Canadian dollar)  
Time Commitment: 40

2004/4 - 2005/3 Total Funding - 41,680  
Portion of Funding Received - 41,680 (Canadian dollar)  
Time Commitment: 40

**Funding Sources:**

2004/4 - 2009/3 Natural Sciences and Engineering Research Council of Canada  
(NSERC)  
Discovery Grant  
Total Funding - 253,400 (Canadian dollar)  
Portion of Funding Received - 253,400 (Canadian dollar)  
Funding Renewable?: No  
Funding Competitive?: Yes

2001/4 - 2004/3 Non-equilibrium structures in soft-condensed matter and bacterial systems, Grant,  
Principal Applicant Operating

**Funding by Year:**

2003/4 - 2004/3 Total Funding - 34,220  
Portion of Funding Received - 34,220 (Canadian dollar)  
Time Commitment: 40

2002/4 - 2003/3 Total Funding - 34,220  
Portion of Funding Received - 34,220 (Canadian dollar)  
Time Commitment: 40



2001/4 - 2002/3      Total Funding - 34,220  
 Portion of Funding Received - 34,220 (Canadian dollar)  
 Time Commitment: 40

**Funding Sources:**

2001/4 - 2004/3      Natural Sciences and Engineering Research Council of Canada (NSERC)  
 Discovery Grant  
 Total Funding - 102,660 (Canadian dollar)  
 Portion of Funding Received - 102,660 (Canadian dollar)  
 Funding Renewable?: No  
 Funding Competitive?: Yes

2002/4 - 2003/3      Beowulf computer cluster for modelling non-equilibrium materials in physics and biology,  
 Principal Investigator      Grant, Infrastructure

**Funding by Year:**

2002/4 - 2003/3      Total Funding - 228,380  
 Portion of Funding Received - 228,380 (Canadian dollar)  
 Time Commitment: 5

**Funding Sources:**

2002/4 - 2003/3      Nova Scotia  
 provincial matching  
 Total Funding - 88,520  
 Portion of Funding Received - 88,520 (Canadian dollar)  
 Funding Renewable?: No  
 Funding Competitive?: Yes

2002/4 - 2003/3      Canada Foundation for Innovation (CFI)  
 New Opportunities Fund  
 Total Funding - 88,520 (Canadian dollar)  
 Portion of Funding Received - 88,520 (Canadian dollar)  
 Funding Renewable?: No  
 Funding Competitive?: No

2002/4 - 2003/3      IBM Canada Ltd  
 in-kind contribution  
 Total Funding - 51,340  
 Portion of Funding Received - 51,340 (Canadian dollar)  
 Funding Renewable?: No  
 Funding Competitive?: No

2002/4 - 2003/3      Microrheology of complex fluids, Grant, Operating  
 Principal Applicant

**Funding by Year:**

2002/4 - 2003/3      Total Funding - 25,000  
 Portion of Funding Received - 25,000 (Canadian dollar)  
 Time Commitment: 10

**Funding Sources:**

2002/4 - 2003/3      Petro Canada Inc  
 Young Innovator Award  
 Total Funding - 25,000 (Canadian dollar)  
 Portion of Funding Received - 25,000 (Canadian dollar)  
 Funding Renewable?: No  
 Funding Competitive?: Yes

2001/4 - 2002/3      Computer workstation cluster, Grant, Equipment  
 Principal Applicant

**Funding by Year:**

2001/4 - 2002/3      Total Funding - 15,586  
 Portion of Funding Received - 15,586 (Canadian dollar)  
 Time Commitment: 5

**Funding Sources:**

2001/4 - 2002/3      Natural Sciences and Engineering Research Council of Canada (NSERC)  
 Equipment grant  
 Total Funding - 15,586 (Canadian dollar)  
 Portion of Funding Received - 15,586 (Canadian dollar)  
 Funding Renewable?: No  
 Funding Competitive?: Yes

**Student/Postdoctoral Supervision****Bachelor's [n=6]**

2024/5 - 2024/8 Principal Supervisor	Kaleb Kerr (In Progress) , Dalhousie University Student Degree Expected Date: 2026/6 Thesis/Project Title: Simulating summary health of continuous stochastic models of aging Present Position: BSc student, Dalhousie University
2024/5 - 2024/8 Principal Supervisor	Angélica Melgarejo (In Progress) , Universidad Nacional de Colombia Thesis/Project Title: Stochastic simulation of aging health Present Position: BSc student
2024/5 - 2024/8 Principal Supervisor	Ana Mastnak (In Progress) , Dalhousie University Student Degree Expected Date: 2027/6 Thesis/Project Title: Hydration and mechanics of fibrous biomaterials Present Position: BSc student, Dalhousie University
2021/5 - 2021/8 Principal Supervisor	Saamil Agarwal (Completed) , Birla Institute of Technology and Science Thesis/Project Title: Trajectory clustering in worm aging Present Position: member of technical staff, Nutanix
2020/5 - 2020/8 Principal Supervisor	Ian George (Completed) , Dalhousie University Thesis/Project Title: Evidence for Single-file Diffusion in Microtubule Acetylation Present Position: PhD student in mathematics, University of Waterloo

2007/9 - 2008/5  
Principal Supervisor Jason Hopper (Completed) , Dalhousie University  
Student Degree Start Date: 2005/9  
Student Degree Received Date: 2009/5  
Thesis/Project Title: All molecules modelling of Min oscillation within bacteria  
Present Position: Research staff, Atmospheric Forensics lab (Dalhousie University, Halifax, Canada)

### Bachelor's Honours [n=49]

2023/9 - 2024/4  
Principal Supervisor Zoe Sacuta (In Progress) , Dalhousie University  
Student Degree Expected Date: 2027/5  
Thesis/Project Title: Bridging Age and Health Through Frailty in Relation to Damage and Repair Rates  
Present Position: BSc student, Dalhousie University

2023/6 - 2023/8  
Principal Supervisor Rafael Rojas (In Progress) , Universidad de Los Andes, Colombia  
Student Degree Expected Date: 2024/8  
Thesis/Project Title: Modelling the effects of disease  
Present Position: BSc student

2022/9 - 2023/5  
Principal Supervisor Xander Gouws (Completed) , Dalhousie University  
Thesis/Project Title: Modelling Anisotropic Hydration in Liquid Crystal Elastomers  
Present Position: PhD student, Waterloo University

2022/9 - 2023/5  
Principal Supervisor Esha Sawant (Completed) , Dalhousie University  
Thesis/Project Title: Modelling Effects of Medicine Using a Generic Computational Model of Aging  
Present Position: Medical School

2022/6 - 2022/8  
Principal Supervisor Raman Jha (Completed) , IIT Madras (India)  
Thesis/Project Title: How do organismal scales interact during aging?  
Present Position: MSc in Computer Engineering, New York University

2022/6 - 2022/8  
Principal Supervisor Atishay Jain (Completed) , BITS Pilani (India)  
Thesis/Project Title: How do organismal scales interact during aging?  
Present Position: software engineer, Microsoft (Hyderabad, India)

2020/5 - 2021/8  
Principal Supervisor Rebecca Tobin (Completed) , Dalhousie University  
Thesis/Project Title: Modeling diseases in a Generic Network Model of organismal aging and mortality  
Present Position: PhD in Medical Statistics, Carleton University

2018/5 - 2018/8  
Principal Supervisor Nicholas Islow (Completed) , Dalhousie University  
Student Degree Received Date: 2019/8  
Thesis/Project Title: Single-file diffusion of acetylation enzymes within the micro-tubule lumen  
Present Position: graduate student (University of Ottawa), Dalhousie University

2018/5 - 2018/8  
Principal Supervisor Garrett Stubbings (Completed) , Dalhousie University  
Student Degree Received Date: 2019/8  
Thesis/Project Title: Maximally-informative cutpoints and non-cutpoint methods of analyzing laboratory data for mortality prediction  
Present Position: data analyst, Nova Scotia Power (Emera)

2018/5 - 2018/8  
Principal Supervisor Matthew Leighton (Completed) , Dalhousie University  
Student Degree Received Date: 2020/8  
Thesis/Project Title: Stochastic modelling of Cooperative Invasion of Pathogenic Bacteria into a Host Cell  
Present Position: Postdoc, Yale University

2017/5 - 2017/8 Principal Supervisor	Jon Garry (Completed) , Dalhousie University Thesis/Project Title: Bayesian Estimation of Photobleaching Steps with Physical Priors Present Position: medical physics MSc student, Dalhousie University
2017/5 - 2017/8 Principal Supervisor	Cyrus Robertson-Orkish (Completed) , Dalhousie University Thesis/Project Title: Stochastic models of invasion of pathogenic bacteria into host cells, Dalhousie University
2017/5 - 2017/8 Principal Supervisor	Sam Cameron (Completed) , Dalhousie University Thesis/Project Title: Self-consistent density inhomogeneities in double-twist collagen fibrils Present Position: physics MSc student, Dalhousie University
2017/5 - 2017/8 Principal Supervisor	Mason Maxwell (Completed) , Dalhousie University Thesis/Project Title: Universality of Gompertz-law in Heterogeneous Network models of aging and mortality, Dalhousie University
2016/9 - 2017/4 Co-Supervisor	Sam Cameron (Completed) , Dalhousie University Thesis/Project Title: Modelling the effects of radial packing on the equilibrium structure of collagen fibrils Present Position: physics MSc student, Dalhousie University
2016/8 - 2017/5 Principal Supervisor	Jon Garry (Completed) , Dalhousie University Student Degree Start Date: 2012/9 Thesis/Project Title: Fluorophore Quantification from Photobleaching using Bayesian Inference and Markov Chain Monte Carlo Project Description: Bayesian analysis of photobleach decay traces Present Position: physics MSc student, Dalhousie University
2016/5 - 2016/8 Principal Supervisor	Jon Garry (Completed) , Dalhousie University Thesis/Project Title: Testing and modelling photobleaching quantification approaches Present Position: medical physics MSc student, Dalhousie University
2016/5 - 2016/8 Principal Supervisor	Spencer Farell (Completed) , Dalhousie University Thesis/Project Title: Bimodal radius distribution of collagen fibrils Present Position: physics PhD student, Dalhousie University
2016/5 - 2016/8 Co-Supervisor	Sam Cameron (Completed) , Dalhousie University Thesis/Project Title: Modelling the structure of collagen fibrils using mathematical and computational techniques Present Position: physics MSc student, Dalhousie University
2016/5 - 2016/8 Principal Supervisor	Hong yi Shi yang (Completed) , Dalhousie University Thesis/Project Title: Image segmentation and tracking of infection from initial image: bacterial counts and transmission Present Position: Officer Training, Canadian Armed Forces
2016/1 - 2016/4 Principal Supervisor	Spencer Farrell (Completed) , Dalhousie University Thesis/Project Title: Optimizing the cut-point of continuous valued health measures to maximize the predictive capacity in a frailty index of human aging Present Position: physics PhD student, Dalhousie University
2015/9 - 2015/12 Principal Supervisor	Spencer Farrell (Completed) , Dalhousie University Thesis/Project Title: The growth of collagen fibrils using a coarsening model Present Position: physics PhD student, Dalhousie University
2015/9 - 2016/4 Principal Supervisor	Hong yi Shi Yang (Completed) , Dalhousie University Thesis/Project Title: Modelling Listeria invasion in the face of innate immunity Present Position: Officer Training, Canadian Armed Forces

2015/5 - 2015/8 Principal Supervisor	Jon Garry (Completed) , Dalhousie University Thesis/Project Title: Using MCMC to solve the Bayesian likelihood of steps from intensity traces during photobleaching Present Position: medical physics MSc student, Dalhousie University
2015/5 - 2015/8 Principal Supervisor	Spencer Farrell (Completed) , Dalhousie University Thesis/Project Title: Interacting network models of frailty and mortality Present Position: physics PhD student, Dalhousie University
2014/9 - 2014/12 Principal Supervisor	William Musgrave (Completed) , Dalhousie University Thesis/Project Title: Photobleaching of randomly rotating fluorescent hoops Present Position: freelance educational contracts, Atlantic Fleet School (CFB Stadacona)
2014/5 - 2014/8 Principal Supervisor	Spencer Farrell (Completed) , Dalhousie University Thesis/Project Title: Single-file diffusion in microtubule lumens Present Position: physics PhD student, Dalhousie University
2014/5 - 2014/8 Principal Supervisor	William Musgrave (Completed) , Dalhousie University Student Degree Start Date: 2010/9 Student Degree Received Date: 2015/5 Thesis/Project Title: Probing fluorescent particle size and local viscosity with fluctuations due to photobleaching Present Position: Freelance Education Contracts, Atlantic Fleet School (CFB Stadacona)
2013/5 - 2013/8 Co-Supervisor	Andrew Quigley (Completed) , Dalhousie University Student Degree Start Date: 2010/9 Student Degree Received Date: 2014/5 Thesis/Project Title: Stochastic models of collagen damage Present Position: BA (Education, teacher training), Mount Saint Vincent University
2013/5 - 2013/8 Co-Supervisor	Chieh-Ting Hsu (Completed) , Dalhousie University Student Degree Start Date: 2008/9 Student Degree Received Date: 2013/5 Thesis/Project Title: Modelling the damage mechanism of type-I collagen fibrils Project Description: Honours and summer research. Bayesian approaches to fitting discrete photobleach decay curves. Present Position: PhD in biological physics, McGill University
2012/9 - 2013/4 Principal Supervisor	Chieh-ting Hsu (Completed) , Dalhousie University Thesis/Project Title: Quantification of photophysics and copy number of fluorophores in a single cell using photobleaching and Bayesian Monte Carlo fitting Present Position: physics PhD student, McGill University
2012/5 - 2012/8 Principal Supervisor	Elias Zoghaib (Completed) , Dalhousie University Thesis/Project Title: Pattern formation of Cyanobacterial Heterocysts Present Position: Data Scientist, Outshine Marketing (outshine.com)
2011/5 - 2011/8 Principal Supervisor	Ben Levitan (Completed) , Dalhousie University Student Degree Start Date: 2009/9 Student Degree Received Date: 2013/5 Thesis/Project Title: Anisotropic elastic model of peptidoglycan patch with a gap Present Position: PhD programme in physics at McGill (Montreal, QC)
2010/5 - 2010/8 Principal Supervisor	Adam Alcolado (Completed) , Dalhousie University Student Degree Start Date: 2007/9 Student Degree Received Date: 2011/5 Thesis/Project Title: Secondary nucleation dynamics in supersaturated bacterial membranes Present Position: MSc student in Mathematics at the University of Montreal

2008/5 - 2008/8 Principal Supervisor	Charles Eyrich (Completed) , Dalhousie University Student Degree Start Date: 2006/9 Student Degree Received Date: 2010/5 Thesis/Project Title: Diffusive molecular dynamics model of peptidoglycan growth Present Position: Obtained MSc at Simon Fraser University, in gap year before PhD studies.
2007/5 - 2007/8 Principal Supervisor	Patrick McKelvey (Completed) , Queen's University Student Degree Start Date: 2005/9 Thesis/Project Title: Regulation of dynamic pseudopilus lengths in bacteria Present Position: economist, Bank of Canada
2006/5 - 2006/8 Principal Supervisor	Sam King (Completed) , McGill University Student Degree Start Date: 2004/9 Thesis/Project Title: Heterocyst pattern formation in cyanobacterial filaments Present Position: physics PhD programme at UBC
2005/5 - 2005/8 Principal Supervisor	Alison Hill (Completed) , University of Western Ontario Student Degree Start Date: 2003/9 Student Degree Received Date: 2007/5 Thesis/Project Title: Heterocyst patterns without patterning proteins Present Position: postdoc in Biophysics
2004/5 - 2004/8 Principal Supervisor	Jun Allard (Completed) , Queen's University Thesis/Project Title: Heterocyst pattern formation in cyanobacterial filaments Present Position: assistant professor at UC Irvine
2004/5 - 2004/8 Principal Supervisor	Benjamin Downing (Completed) , Dalhousie University Student Degree Start Date: 2003/9 Student Degree Received Date: 2007/5 Thesis/Project Title: Partitioning of Min proteins during bacterial septation Project Description: Models of subcellular Min oscillation Present Position: paramedic
2004/5 - 2004/8 Principal Supervisor	Andrea Weirathmuller (Completed) , Queen's University Student Degree Start Date: 2002/9 Thesis/Project Title: Phage induced lysis of E. coli
2003/5 - 2003/8 Principal Supervisor	Deric Panet-Raymond (Completed) , Dalhousie University Thesis/Project Title: Particle Tracking Algorithms Present Position: Software Developer at Crank Software
2003/5 - 2003/8 Principal Supervisor	Brendan Osberg (Completed) , Dalhousie University Student Degree Start Date: 2005/9 Thesis/Project Title: Heterocyst patterns in cyanobacterial filaments Present Position: PhD programme in Biophysics in Munich, Germany
2003/5 - 2003/8 Principal Supervisor	Micah McCurdy (Completed) , Dalhousie University Student Degree Start Date: 2003/9 Thesis/Project Title: Soap Froth Coarsening Simulations Present Position: postdoctoral researcher, Quantum theory, Dalhousie University
2001/5 - 2002/4 Principal Supervisor	Simon de Vet (Completed) , Dalhousie University Thesis/Project Title: Quantitative Model of Bacterial Division Present Position: Senior physics instructor, Dalhousie University
2001/5 - 2001/8 Principal Supervisor	Shoan Kale (Completed) , Dalhousie University Student Degree Start Date: 1999/9 Thesis/Project Title: Tree-code for particle dynamics with long-range interactions Present Position: medical school

2001/5 - 2003/4 Principal Supervisor	Michael Greenwood (Completed) , Dalhousie University Student Degree Start Date: 1997/9 Thesis/Project Title: Microrheology of soap froths Present Position: Research Scientist at NRCan
2001/4 - 2001/8 Principal Supervisor	Claire Montgomery (Completed) , Dalhousie University Student Degree Start Date: 1999/9 Thesis/Project Title: Diffusion of asymmetric swimmers Present Position: Technical writer at NexStreaming, Seoul, Korea
2000/5 - 2001/4 Principal Supervisor	Peter Cordes (Completed) , Dalhousie University Student Degree Start Date: 1998/9 Thesis/Project Title: Spatio-temporal chaos in soap froth dynamics

**Master's Equivalent [n=1]**

2009/12 - 2010/6 Principal Supervisor	Slaven Radic (Withdrawn) , Dalhousie University Student Degree Start Date: 2009/12 Thesis/Project Title: Quantifying protein number from photobleaching fluctuations Present Position: PhD program in Biophysics at Clemson University (Clemson, South Carolina USA)
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**Master's Thesis [n=10]**

2022/1 - 2023/12 Principal Supervisor	Emre Dil (Completed) , Dalhousie University Thesis/Project Title: Using deep-learning to obtain calibrated individual disease and ADL damage transition probabilities between successive ELSA waves Present Position: research scientist, SES & technologies
2019/9 - 2021/9 Principal Supervisor	Garrett Stubbings (Completed) , Dalhousie University Thesis/Project Title: Laboratory health measures and optimal structures for aging Present Position: data analyst, Nova Scotia Power (Emera)
2017/9 - 2019/8 Co-Supervisor	Sam Cameron (Completed) , Dalhousie University Student Degree Start Date: 2017/9 Student Degree Received Date: 2019/8 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: Equilibrium and Non-equilibrium coarse-grained models of collagen fibril structure Project Description: Collagen fibril sub-structure models Present Position: Postdoc, Open University (UK)
2016/9 - 2017/8 Principal Supervisor	Hong yi Shi yang (Withdrawn) , Dalhousie University Student Degree Start Date: 2016/9 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: Growth-suppression and shape-fluctuations of infection foci after inoculation of cell-culture by pathogenic bacteria Project Description: Image segmentation and computational models of host-pathogen dynamics Present Position: Officer Training, Canadian Armed Forces

2014/9 - 2016/8 Principal Supervisor	Taylor Dunn (Completed) , Dalhousie University Student Degree Start Date: 2014/9 Student Degree Received Date: 2016/8 Thesis/Project Title: Image analysis and stochastic models of Salmonella host-pathogen dynamics Project Description: Host-pathogen dynamics (of bacterial infection in host cells): visual segmentation of microscopy images confronted by mathematical models of infection Present Position: Data analyst and Developer, DGI Clinical Inc
2010/9 - 2012/8 Principal Supervisor	Aidan Brown (Completed) , Dalhousie University Student Degree Start Date: 2010/9 Student Degree Received Date: 2012/8 Thesis/Project Title: Fixed nitrogen dynamics and heterocyst patterning in filamentous heterocystous cyanobacteria Present Position: postdoc, University of California, Davis
2005/9 - 2007/8 Principal Supervisor	Jun Allard (Completed) , Dalhousie University Student Degree Start Date: 2005/9 Student Degree Received Date: 2007/8 Thesis/Project Title: Models of the actin-like MreB in prokaryotes Present Position: assistant professor at UC Irvine
2004/9 - 2006/8 Principal Supervisor	Gillian Ryan (Completed) , Dalhousie University Student Degree Start Date: 2004/9 Student Degree Received Date: 2006/8 Thesis/Project Title: MODELING PROTEIN CLOCKS IN PHAGE INDUCED LYSIS OF E. COLI Present Position: assistant professor at Kettering University
2002/9 - 2004/8 Principal Supervisor	Andrew Richardson (Completed) , Dalhousie University Student Degree Start Date: 2002/9 Student Degree Received Date: 2004/8 Thesis/Project Title: Reaction-diffusion systems with long-range interactions in 2-dimensions Present Position: medical physics technician
2002/9 - 2004/8 Principal Supervisor	Simon de Vet (Completed) , Dalhousie University Student Degree Start Date: 2002/9 Student Degree Received Date: 2004/8 Thesis/Project Title: Modeling E. coli protein oscillations using robustness and evolutionary pressures Present Position: Senior Physics Instructor, Dalhousie University

**Doctorate [n=6]**

2024/1 - 2027/12 Principal Supervisor	Amir Pilehvarian (In Progress) , Dalhousie University Student Degree Expected Date: 2027/12 Thesis/Project Title: Modelling disease dynamics during aging Present Position: PhD student, Dalhousie University
2020/9 - 2024/8 Principal Supervisor	Glen Pridham (Completed) , Dalhousie University Student Degree Start Date: 2020/9 Thesis/Project Title: Dynamical network analysis of aging Present Position: Postdoctoral Researcher with Uri Alon, Weizmann Institute



2016/9 - 2021/8 Principal Supervisor	Spencer Farrell (Completed) , Dalhousie University Student Degree Start Date: 2016/9 Student Degree Received Date: 2021/8 Thesis/Project Title: Stochastic Network Model of Aging Dynamics Project Description: Network models and information measures of human aging Present Position: postdoc at University of Toronto, Dalhousie University
2012/9 - 2015/8 Principal Supervisor	Aidan Brown (Completed) , Dalhousie University Student Degree Start Date: 2012/9 Student Degree Received Date: 2015/8 Thesis/Project Title: Mammalian peroxisome dynamics: ubiquitination, autophagy, and number control Present Position: Faculty member at Toronto Metropolitan University, University of California Davis
2006/9 - 2009/8 Principal Supervisor	Gillian Ryan (Completed) , Dalhousie University Student Degree Start Date: 2006/9 Student Degree Received Date: 2009/8 Thesis/Project Title: Modeling holin function during Lambda phage infection of E. coli Present Position: Assistant Professor at Kettering University (Flint, MI)
2002/9 - 2005/8 Principal Supervisor	Mowei Cheng (Completed) , Dalhousie University Student Degree Start Date: 2002/9 Student Degree Received Date: 2005/8 Thesis/Project Title: Accelerated algorithms and universality in coarsening systems Present Position: Analyst, Risk Measurement and Analytics Assessment Services, Toronto
<b>Post-doctorate [n=4]</b>	
2011/9 - 2013/8 Principal Supervisor	Swadhin Taneja (Completed) , Dalhousie University Student Degree Start Date: 2011/9 Student Degree Received Date: 2013/8 Thesis/Project Title: Circumferential gap propagation in an anisotropic elastic bacterial sacculus Present Position: Lecturer, NSCC
2009/11 - 2011/11 Principal Supervisor	Chitra Nayak (Completed) , Dalhousie University Student Degree Start Date: 2009/11 Student Degree Received Date: 2011/11 Thesis/Project Title: Analysis of photobleach statistics, and modelling of quality control in the Tat translocon Present Position: Assistant Professor at Tuskegee University, USA
2007/12 - 2009/3 Principal Supervisor	Julien Derr (Completed) , Dalhousie University Student Degree Start Date: 2007/12 Student Degree Received Date: 2009/3 Thesis/Project Title: Stochastic models of MinD filaments, and of Type-II secretion pilus lengths Present Position: Maitre de conferences (Assistant Professor) at Universite Paris-Diderot (Paris, France)

2005/9 - 2007/8      Supratim Sengupta (Completed) , Dalhousie University  
Principal Supervisor      Student Degree Start Date: 2005/9  
Student Degree Received Date: 2007/2  
Thesis/Project Title: Min oscillations in E. coli during septation  
Project Description: Models of subcellular Min oscillation within E. coli bacteria  
Present Position: professor, Kolkata India

## Event Administration

2008/9      administrator, qbio.org website administration and promotion, Association  
2024/4 - 2024/4      co-organizer, Ninth collagen cafe, Seminar, 2024/4 - 2024/4  
2023/11 - 2023/11      co-organizer, Eighth collagen cafe, Seminar, 2023/11 - 2023/11  
2023/3 - 2023/3      co-organizer, Seventh Collagen Cafe, Seminar, 2023/3 - 2023/3  
2022/10 - 2022/10      co-organizer, Sixth collagen cafe, Seminar, 2022/10 - 2022/10  
2022/6 - 2022/6      co-organizer, Fifth Collagen Cafe, Seminar, 2022/6 - 2022/6  
2021/11 - 2021/11      co-organizer, Fourth Collagen Cafe, Seminar, 2021/11 - 2021/11  
2021/1 - 2021/10      Coordinator, QBIOC (quantitative biology in canada), Conference, me, 2021/1 - 2021/10  
I run a Zoom-based national biological physics seminar series. We have two talks every month. So far the invited speakers are Canadian researchers.  
2021/5 - 2021/5      co-organizer, Third Collagen Cafe, Seminar, 2021/5 - 2021/5  
2020/11 - 2020/11      co-organizer, Second Collagen Cafe, Seminar, 2020/11 - 2020/11  
2020/7 - 2020/7      Co-organizer, First Collagen Café, see collagencafe.org, Seminar, me, 2020/7 - 2020/7  
Together with Laurent Kreplak, we run a collagen-themed Zoom-based research seminar twice a year. We invite two researchers (one CDN and one International) as well as two trainees (student talks). The flavour is biological physics, but the speakers are also from engineering and biology.  
2018/1 - 2018/6      Co-organizer, Soft Matter Canada 2018, Conference, 2018/6 - 2018/6

## Editorial Activities

2012/7      Referee, Europhysics Letters, Journal  
2012/2      Referee, Proceedings of the National Academy of Sciences (PNAS), Journal  
2011/12      Referee, Virology Journal, Journal  
2011/11      Referee, Bulletin of Mathematical Biology, Journal  
2011/10      Referee, Nature Methods, Journal  
2010/3      Referee, Current Biology, Journal  
2010/2      Referee, Computers & Mathematics with Applications, Journal  
2008/5      Referee, Journal of Theoretical Biology, Journal  
2007/9      Referee, Journal of Bacteriology, Journal  
2007/5      Referee, Canadian Journal of Physics, Journal  
2007/1      referee, Langmuir, Journal  
2005/1      Referee, Physical Biology, Journal

2002/1	Referee, Biophysical Journal, Journal
1999/8	Referee, Physical Review Letters, Journal
1997/8	Referee, Physical Review E, Journal

## Mentoring Activities

2007/9	Mentoring coordinator, Dalhousie University Number of Mentorees: 6 Small group mentoring with 4-6 students paired with a faculty mentor. They meet monthly through the year to talk about professional and research questions related to physics. I coordinate this within my department, and also lead one of the groups.
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## Organizational Review Activities

2016/2 - 2016/2	External Departmental Review (Dept Physics and Physical Oceanography), Memorial University of Newfoundland Read review materials, site visit, write and present report.
2013/3 - 2013/3	Chair of External Departmental Review (Dept Physics), Simon Fraser University Read review materials, lead site visit, coordinate write and edit report.
2012/3 - 2012/3	External Departmental Review (Dept Physics), Mount Allison University Read review materials, site visit, write report.

## International Collaboration Activities

2018/8 - 2022/8	Co-investigator, Switzerland Developing mathematical models of Salmonella infection in host cell layers, using data acquired in the Hardt lab. Together with Wolf Dietrich-Hardt (ETH Zurich).
2014/1 - 2020/12	Co-investigator, France To develop quantitative dynamical models of post-translational microtubule acetylation, together with Dr. Guillaume Montagnac (Université Paris-Saclay).

## Committee Memberships

2024/7	Committee Member, Departmental planning committee, Dalhousie University Senior faculty advising the departmental chair, and shaping strategic initiatives at the department level.
2024/7	Committee Member, EDI (equity diversity and inclusion) departmental committee, Dalhousie University
2018/7	Chair, Physics Curriculum committee, Dalhousie University
2006/8	Chair, Undergraduate small-group physics mentoring committee, Dalhousie University Organize and participate in departmental mentoring programme to engage and retain undergraduate physics students.
2021/7 - 2022/6	Committee Member, Faculty of Science Tenure and Promotion, Dalhousie University
2019/7 - 2022/1	Chair, QAG (quantitative aging group) seminar series, Dalhousie University Monthly seminar series for interdisciplinary (but quantitative) aging researchers

2019/7 - 2020/6	Chair, Departmental Graduate Seminars Committee, Dalhousie University
2009/8 - 2016/7	Committee Member, Review Committee for Neutron Beam Research Proposals in the subject area of Soft Materials, for the Canadian Neutron Beam Centre (CNBC), National Research Council Canada
2007/5 - 2009/4	Committee Member, Physics and Astronomy Scholarships and Fellowships Selection Committee, Natural Sciences and Engineering Research Council of Canada (NSERC)

## Other Memberships

2008/9 - 2030/8	adminstrator, qbio.ca maintained the qbio.ca website and mailing list, to support collaboration, student and postdoc recruitment, and seminar invitations to biological physicists in Canada
2014/10 - 2020/10	Principal Investigator (PI), ACENET Represent users of ACENET (Atlantic regional consortium of Compute Canada) to the management and to the board of directors. Run meetings of the research directorate (RD).
2011/10 - 2018/7	Associate Faculty Member, Faculty of 1000 Faculty of 1000 is a primarily biological sciences metajournal, which collects reviews and tips of notable papers in the literature. Participation is by invitation.
2010/2 - 2016/2	Research Directorate Member, ACENET The Research Directorate meets every two weeks and advises the director on direction and implementation in order to meet the needs of researchers in high-performance computing in Atlantic Canada.
2008/4 - 2015/4	Local Users Group Chair, ACENET Convene regular meetings with the Dalhousie HPC (high-performance computing) community to discuss unmet needs and implementation issues, to liase between the user community and the research-directorate.
2002/9 - 2004/8	chair chair of the DMBP (Division of Medical and Biological Physics)

## Presentations

- (2025). Dynamics of Aging Biomarkers. Gerophysics Conference, Singapore  
Main Audience: Researcher  
Invited?: Yes
- (2025). The Physics of Aging. Departmental Physics Colloquium at the University of Toronto, Toronto, Canada  
Main Audience: Researcher  
Invited?: Yes
- (2025). The Physics of Aging. Departmental Physics seminar at Toronto Metropolitan University (TMU), Toronto, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
- with Sabrina Leslie and Eldon Emberly. (2024). Biophysics and Medical Physics panel discussion. CUPC (Canadian Undergraduate Physics Conference), Vancouver, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No

5. (2024). The physics of aging: stability, singular transitions, and power-laws. Simon Fraser University Physics Seminar, Burnaby, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No
6. (2024). Coarse-grained models of fibrous biomaterials (collagen fibrils). Gordon Research Conference on Multiscale Mechanochemistry and Mechanobiology, Lewiston, United States of America  
Main Audience: Researcher  
Invited?: No, Keynote?: No
7. (2024). The Physics of Human Aging. University of Guelph Physics Seminar, Guelph, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
8. (2024). Modelling Aging Dynamics. Gordon Research Conference on Systems Aging, Barcelona, Spain  
Main Audience: Researcher  
Invited?: No, Keynote?: No
9. (2024). The dynamics of aging health. 11th Aging Research and Drug Discovery (ARDD) Meeting, in the Physics of Aging Biology special session, Copenhagen, Denmark  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
10. (2023). Models of organismal aging. UBC BioMathematics seminar, Vancouver, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
11. (2023). Natural variables for aging. Biology of Aging meeting, Montreal, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
12. (2023). Discrete resilience and robustness during aging. LLFS (Long Life Family Study) seminar, online seminar, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
13. (2023). Modelling collagen fibrils. Physics Departmental Seminar Simon Fraser University, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
14. (2022). The physics of human aging: natural variables and dynamics. Departmental Seminar at SMU (Saint Mary's University) Dept of Physics, Halifax, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
15. (2022). The physics of aging: embracing complexity. CAP (Canadian Association of Physicists) annual congress, Hamilton, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
16. (2022). Interpretable High-dimensional Dynamical Models of Organismal Aging Trained with Longitudinal Data. JSM (Joint Statistical Meeting), Washington DC, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
17. (2021). Single-file diffusion is interesting. Metzler group seminar, Potsdam, Germany  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No

18. (2021). Double-twist elastomers: untwisting and chiral buckling. American Physical Society March Meeting, United States of America  
Invited?: No, Keynote?: No  
Description / Contribution Value: Zoom
19. (2021). Embracing the complexity of aging with computational models. Physiological Society Scientific Theme Webinar, 'Extreme Longevity: The Blurry Journey Through Hallmarks and Mechanisms', Italy  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No  
Description / Contribution Value: Zoom
20. (2021). Embracing the complexity of aging with computational models. Lamming Aging Science talk, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No  
Description / Contribution Value: virtual (Zoom) talk
21. (2021). Double-twist elastomers: untwisting and chiral buckling. Multiscale Mechanochemistry & Mechanobiology Virtual Seminar, Germany  
Main Audience: Researcher  
Invited?: No, Keynote?: No  
Description / Contribution Value: Zoom
22. (2021). The Physics of Aging and Death. Canadian Association of Physicists national lecture tour, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No  
Description / Contribution Value: Zoom (Virtual)
23. (2020). Network models of aging with binarized variables. LLFS R&D seminar (Long life frailty study, research and development), Zoom, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No  
Description / Contribution Value: This was a presentation to a collaborative network of interdisciplinary researchers based out of WUSTL (Washington University of St Louis), but reaching across the USA.
24. (2020). Collagen fibrils: structure and function. Soft Matter Canada (SMC) Symposium 2020, Zoom, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
25. (2019). Modelling collagen fibrils. Departmental Seminar, Queen's University, Physics Department, Kingston ON, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
26. (2019). Collagen fibrils: liquid-crystals, crystals, and rubber bands. Biophysical Society of Canada (BSC) Annual Congress, Mississauga ON, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
27. (2019). The physics of human aging: network models and more. Departmental Seminar, Dalhousie University, Dept of Math and Statistics, Halifax NS, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
28. (2019). Anomalous Single-file transport in pores. American Physical Society (APS) March Meeting, Boston, United States of America  
Main Audience: Researcher  
Invited?: No, Keynote?: No

29. (2019). Network modelling of organismal aging and mortality. NIA (National Institute of Aging, part of the NIH -- National Institute of Health) workshop: mechanisms of variation in lifespan and healthspan, Bethesda MD, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
30. (2019). Collagen fibrils: liquid-crystals, Ising models, and rubber bands. Departmental seminar, St Francis Xavier University, Antigonish NS, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
31. (2018). Network structure in aging: spherical cows and people. Physics seminar (McGill), Canada  
Invited?: Yes, Keynote?: No
32. (2018). The Science of Aging. Hal-con 2018 (a regional sci-fi, fantasy, and gaming conference), Halifax, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: No
33. (2018). Anomalously slow transport due to slow binding in single-file diffusion. Theory Canada 13 conference, Antigonish, Canada  
Invited?: Yes, Keynote?: No
34. (2018). Bayesian estimation of photobleaching steps with physical priors. Canadian Association of Physicists (CAP) annual meeting, Halifax, Canada  
Invited?: No, Keynote?: No
35. (2018). Network structure in aging: spherical cows and people. Physics seminar (Bucknell University), United States of America  
Invited?: Yes, Keynote?: No
36. (2018). Watching spherical cows age. Nerd Night (beer and science public event), Halifax, Canada  
Main Audience: General Public  
Invited?: Yes, Keynote?: No
37. (2018). Network structure in ageing model and human populations. Healthy Ageing: from molecules to organisms, Hinxton, United Kingdom  
Main Audience: Researcher  
Invited?: No, Keynote?: No
38. (2017). Watching spherical cows die: the physics of aging. Population Division of the United Nations seminar, New York, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
39. (2017). Anomalously slow transport due to slow binding in single-file diffusion. Soft Matter Canada (SMC2017) symposium, Kingston, Canada  
Invited?: Yes, Keynote?: No
40. (2017). Network structure in aging: spherical cows and people. Physics seminar (University of Ottawa), Canada  
Invited?: Yes, Keynote?: No
41. (2017). Anomalously slow transport due to slow binding in single-file diffusion. Canadian Association of Industrial and Applied Mathematics (CAIMS) annual meeting, Halifax, Canada  
Invited?: Yes, Keynote?: No

42. (2017). Anomalous slow transport due to slow binding in single-file diffusion. American Physical Society (APS) March meeting, New Orleans, United States of America  
Invited?: No, Keynote?: No
43. (2017). Watching spherical cows die: the physics of aging. Physics seminar (Yeshiva University), New York, United States of America  
Invited?: Yes, Keynote?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
44. (2017). Anomalous slow transport due to slow binding in single-file diffusion. Physics seminar (UofT), Toronto, Canada  
Invited?: Yes, Keynote?: No
45. (2017). Watching spherical cows die: the physics of aging. CAP annual meeting, Kingston, Canada  
Invited?: No, Keynote?: No
46. (2016). A network model of human aging: frailty limits and information measures. "Biology of Aging: paving the way for healthy aging" conference, Montreal, Canada  
Invited?: No, Keynote?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
47. (2016). Watching spherical cows age. Geriatric Academic Grand Rounds, Centre for Health Care of the Elderly, Veteran's Memorial Hospital, NSHEALTH, Halifax, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
48. (2016). Models of microtubule acetylation. "Spatially distributed stochastic dynamical systems in biology" workshop (Isaac Newton Institute), Cambridge, United Kingdom  
Invited?: Yes, Keynote?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
49. (2016). Autophagy selectivity through receptor clustering. APS March meeting, Baltimore, United States of America  
Invited?: No, Keynote?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
50. (2016). Network models of aging. Physics seminar (UofT Mississauga), Canada  
Invited?: Yes, Keynote?: No
51. (2016). Anomalous slow transport due to slow binding in single-file diffusion. "Nonequilibrium Statistical Mechanics" symposium (McGill), Canada  
Invited?: Yes, Keynote?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
52. (2016). What can we learn from watching spherical cows die?. Canadian Undergraduate Physics Conference (CUPC), Halifax, Canada  
Invited?: Yes, Keynote?: Yes  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245



53. (2015). Human aging: frailty, mortality, and information. Physics seminar (StFx), Antigonish, Canada  
Invited?: Yes, Keynote?: No
54. (2015). Single-file diffusion inside microtubules. Chemical Biophysics Conference (CBP), Toronto, Canada  
Invited?: Yes, Keynote?: No
55. (2015). Single file diffusion in microtubules. APS March meeting, San Antonio, United States of America  
Invited?: No, Keynote?: No
56. (2015). Biological physics: from bacteria to you. Physics seminar (MUN), St John's, Canada  
Invited?: Yes, Keynote?: No
57. (2015). Biological physics: from bacteria to you. DUPS (Dalhousie Undergraduate Physics Society) seminar, Halifax, Canada  
Invited?: Yes, Keynote?: No
58. (2014). Biological cluster size control away from equilibrium. Bio/Physics seminar (Ecole Normale Superior), Paris, France  
Invited?: Yes, Keynote?: No
59. (2014). Ubiquitination feedback during matrix protein import into peroxisomes. Cellular Biology seminar (Institut Pasteur ), Paris, France  
Invited?: Yes, Keynote?: No
60. (2014). Double-twist model of collagen fibrils. Biochemistry seminar (Institut Curie), Paris, France  
Invited?: Yes, Keynote?: No
61. (2013). Ubiquitination feedback during matrix protein import into peroxisomes. Physics seminar (University Diderot), Paris, France  
Invited?: Yes, Keynote?: No
62. (2013). Stochastic development of cyanobacterial filaments. CAP annual meeting, Montreal, Canada  
Invited?: Yes, Keynote?: No, Competitive?: No
63. (2013). Ubiquitination feedback during matrix protein import into peroxisomes. CAIMS annual meeting, Quebec City, Canada  
Invited?: Yes, Keynote?: No, Competitive?: No
64. (2013). How do bacteria grow longer, not wider?. Soft Matter Theory conference, Waterloo, Canada  
Invited?: Yes, Keynote?: No
65. (2012). Living nanotech: how and why cyanobacteria count. AUPAC (Atlantic University Physics and Astronomy Conference), Halifax, Canada  
Invited?: Yes, Keynote?: No, Competitive?: No
66. (2012). Fluctuation judo: what photobleaching can tell us about protein copy numbers. Dept Biochemistry seminar (Dalhousie University), Canada  
Invited?: Yes, Keynote?: No, Competitive?: No
67. (2012). Stochastic development of cyanobacterial filaments: plasticity and robustness. Canadian Mathematics Society (CMS) winter meeting, Montreal, Canada  
Invited?: Yes, Keynote?: No, Competitive?: No
68. (2012). Cluster size-control in bacterial inner membranes: application to type-II secretion. "Protein transport across cell membranes" conference (Gordon research conferences), Galveston, United States of America  
Invited?: No, Keynote?: No, Competitive?: No
69. (2011). Some randomness and statistics for biological physics. IDK-NBT lecture (Internationales Doktorandenkolleg in NanoBioTechnology, TU-Munich), Munich, Germany  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No

70. (2011). Fluctuation judo: random partitioning, photobleaching, and cellular copy number. Dept Physics seminar (Lehigh University), Bethlehem, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
71. (2011). A filamentous model of the Min oscillation inside an E. coli bacterium. APS (American Physical Society) March meeting, Dallas, United States of America  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: No
72. (2011). Fluctuation judo: using photobleaching to quantify cellular copy number. Dept Math Statistics seminar (Dalhousie University), Halifax, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
73. (2011). Quantifying fluorophores in vivo using noise. CeNS seminar (Center for NanoScience, TU-Munich), Munich, Germany  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
74. (2011). Quantifying fluorophores in vivo using noise. Institute of Medical Sciences Seminar (University of Aberdeen), Aberdeen, United Kingdom  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
75. (2011). Quantifying fluorophores in vivo using noise. Chemical BioPhysics conference, Toronto, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: No
76. (2011). Fluctuation judo: random partitioning, photobleaching, and cellular copy number. Dept Physics seminar (Bucknell University), Lewisburg, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
77. (2011). Fluctuation judo: random decay, photobleaching, and cellular copy number. Dept Physics seminar (University of Guelph), Guelph, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
78. (2010). Small group mentoring of physics majors. CAP annual congress, Toronto, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: No
79. (2010). Monodisperse domains by control of coarsening inside bacteria. CAP annual congress, Toronto, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
80. (2010). Making monodisperse domains by proteolytic control of the coarsening instability. Complex Driven Systems conference, Blacksburg, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
81. (2010). Quantifying protein expression within cells. Cellular Decision Making, a CIFAR meeting (Canadian Institute for Advanced Research), Arlington, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No

82. (2009). Pulling helices inside bacteria: imperfect helices and rings. American Physical Society March Meeting, Pittsburgh, United States of America  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: No
83. (2009). Phage lysis timing. Departmental Seminar (McMaster University, Dept of Biochemistry), Hamilton, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
84. (2009). Four (easy) pieces. Departmental seminar at MedILS (Mediterranean Institute for life sciences), Split, Croatia  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
85. (2009). Models and manipulations: Min oscillations inside an E. coli bacterium. Dept Applied Mathematics seminar (UBC), Vancouver, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
86. (2009). Physics of bacteria: models and manipulations of Min oscillations inside E. coli. Dept Physics Seminar (St Fx University), Antigonish, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
87. (2009). Phage lysis timing. Departmental seminar (Split University, Dept of Physics), Split, Croatia  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
88. (2009). Physics of bacteria: models and manipulations of Min oscillations inside E. coli. Dept Physics Seminar (Memorial University), St Johns, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
89. (2009). Physics of bacteria: models and manipulations of Min oscillations inside of E. coli. Aspects of Complexity Meeting, Manchester, United Kingdom  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
90. (2009). Physics of bacteria: models and manipulations of Min oscillations inside E. coli. Dept Biomedical Engineering Seminar (Dalhousie University), Halifax, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
91. (2009). Physics of bacteriophage lysis timing. Physics seminar (Split University [back-to-back seminars]), Split, Croatia  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
92. (2009). Physics of bacteria: models and manipulations of Min oscillations inside E. coli. Departmental Seminar (Czech Academy of Sciences, Institute of Physiology), Prague, Czechia  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
93. (2009). Models and manipulations of Min oscillations inside E. coli. Dept Physics seminar (Split University), Split, Croatia  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No

94. (2009). Models and manipulations: Min oscillations inside an E. coli bacterium. Dept Physics Seminar (Brandeis), Waltham, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
95. (2008). Clocking out: modelling phage induced lysis of bacteria. Departmental seminar (Dept Physics, McGill University), Montreal, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
96. Spencer J, Frappier M. (2008). Whether modern physics is accessing reality. S.H.I.P.S. on Saturday (Speak here in plain sight; a philosophy colloquium at University of Kings College), Halifax, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
97. (2008). Physics of bacteria: models and manipulations of Min oscillations inside E. coli. Dept Biological Sciences Seminar (SUNY Albany), Albany, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
98. (2008). Extracellular cations and Min oscillations in E. coli: manipulating and exploiting the oscillation. Gordon research conference on Bacterial Cell Surfaces, New London, United States of America  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: No
99. (2008). Making decisions automatically: Min oscillations and the E. coli cell cycle. CIFAR workshop on Cellular Decision Making, Toronto, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
100. (2008). Modelling and stochastic effects. MITACS (Mathematics of Information Technology and Complex Systems) workshop on "Systems biology and the new frontiers of food biotechnology", Monterrey, Mexico  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
101. (2008). Clocking out: modelling phage induced lysis of bacteria. GEOPROM (Groupe d'etude des proteines membranaires) seminar, Montreal, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
102. (2008). Physics of bacteria: models and manipulations of Min oscillations inside E. coli. Seminar at MedILS (Mediterranean Institute of Life Sciences), Split, Croatia  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
103. (2008). Clocking out: modelling phage induced lysis of bacteria. Departmental Seminar at the University of Indiana Biocomplexity Institute, Bloomington, United States of America  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No, Competitive?: No
104. (2007). Clocking out: phage induced lysis of E. coli. Dept physics seminar (University of Manchester), Manchester, United Kingdom  
Invited?: Yes
105. (2007). Clocking out: phage induced lysis of E. coli. American Society of Microbiology General Meeting, Toronto, Canada  
Invited?: No

106. (2007). Modeling the MreB helix inside bacteria. American Physical Society March Meeting, Denver, United States of America  
Invited?: No
107. (2007). Clocking out: phage induced lysis of E. coli. Biophysics seminar at Mediterranean Institute of Life Sciences (MedILS), Split, Croatia  
Invited?: Yes
108. (2007). Clocking out: phage induced lysis of E. coli. Dept physics seminar (UWaterloo), Waterloo, Canada  
Invited?: Yes
109. (2007). Clocking out: phage induced lysis of E. coli. Dept Theoretical Physics seminar (Oxford University), Oxford, United Kingdom  
Invited?: Yes
110. (2007). Clocking out: phage induced lysis of E. coli. Dept physics seminar (UWO), London, Canada  
Invited?: Yes
111. (2007). Modeling the MreB helix inside bacteria. Dept Biomathematics seminar (UCLA), Los Angeles, United States of America  
Invited?: Yes
112. (2006). Finding the physics in bacteria: oscillations inside a single cell. Physics seminar (Dalhousie University), Halifax, Canada  
Invited?: Yes
113. (2006). Clocking out: phage induced lysis of E. coli. Dept Physics seminar (McGill), Montreal, Canada  
Invited?: Yes
114. (2006). Running hot and cold: temperature dependence of Min oscillations in E. coli. Department of microbiology seminar, University of Texas Medical School at Houston, Houston, United States of America  
Invited?: Yes
115. (2005). Modelling oscillations within bacteria. Physics seminar (McMaster University), Hamilton, Canada  
Invited?: Yes
116. (2005). Bacterial biophysics. Canadian Society of Microbiologists annual meeting, Halifax, Canada  
Invited?: Yes
117. (2004). Diffusion of asymmetric swimmers. APS March meeting, Montreal, Canada  
Invited?: No
118. (2004). Spatiotemporal oscillations within bacteria. Physics seminar (Guelph University), Guelph, Canada  
Invited?: Yes
119. (2004). Spatiotemporal oscillations within bacteria. Virginia Tech physics seminar, Blacksburg, United States of America  
Invited?: Yes
120. (2003). Stable and accurate coarsening with an infinite time-step. Workshop for the Canadian Network for Computational Materials Science (at McMaster University), Hamilton, Canada  
Invited?: Yes
121. (2003). Accurate division in E. coli. Brookhaven National Lab physics seminar, Upton, United States of America  
Invited?: Yes
122. (2003). Accurate division in E. coli. Canadian Association of Physicists (CAP) annual meeting, Charlottetown, Canada  
Invited?: Yes

123. (2003). Stable and Accurate coarsening with an infinite time-step. Numerical analysis day (at Saint Mary's University), Halifax, Canada  
Invited?: Yes
124. (2003). Accurate division in E. coli. Conference on "Pattern formation in physics and biology" at the Kavli Institute for Theoretical Physics, Santa Barbara, United States of America  
Invited?: Yes
125. (2003). Spatiotemporal oscillations within bacteria. Physics seminar (Acadia University), Wolfville, Canada  
Invited?: Yes
126. (2003). Accurate division in E. coli. Biochemistry seminar (Dalhousie University), Canada  
Invited?: Yes
127. (2002). Dynamic compartmentalization within bacteria. Biology seminar (Dalhousie University), Halifax, Canada  
Invited?: Yes
128. (2002). Accurate division of E. coli. CAP annual meeting, Quebec,  
Invited?: No
129. (2002). Stable and accurate coarsening with an infinite time-step. HPCS 2002 (High performance computing systems conference), Moncton, Canada  
Invited?: Yes
130. (2002). Noisy division in E. coli. ASM (American Society of Microbiology) conference on Prokaryotic development, Quebec, Canada  
Invited?: No
131. (2002). Accurate division in E. coli. Physics seminar (StFx University), Antigonish, Canada  
Invited?: Yes
132. (2002). Accurate division of E. coli. Gordon research conference on Bacterial Cell Surfaces, New London, United States of America  
Invited?: No
133. (2002). Stochastic limits on life: accurate division of E. coli bacteria. Physics seminar (Memorial University of Newfoundland), St John's, Canada  
Invited?: Yes
134. (2001). Microalignment of bacteria on mineral substrates. CAP annual meeting, Victoria, Canada  
Invited?: No
135. (2001). Polymerization-based bacterial mobility. Chemistry seminar (Dalhousie University), Halifax, Canada  
Invited?: Yes
136. (2001). Tails of polymerization-based bacterial motility. Woods Hole Oceanographic Institution seminar, Woods Hole, United States of America  
Invited?: Yes
137. (2000). Tails of polymerization-based bacterial motility. Physics Seminar (UPEI), Charlottetown,  
Invited?: Yes

## Broadcast Interviews

2017/07/20 - Quantum Teleportation, Evening news with Bruce Frisko, CTV Atlantic (television)  
2017/07/20

2017/02/06 - Call-in radio science show, Science Files, with Rick Howe, News95.7  
 2017/03/20 Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245

## Publications

### Journal Articles

1. Gouws, X\*; Mastnak, A\*; Kreplak, L; Rutenberg, A. (2024). Anisotropic swelling due to hydration in fibrous biomaterials. *Journal of the Mechanical Behavior of Biomedical Materials*. 160: 106749.  
Published,  
Refereed?: Yes
2. Pridham, G\*; Tennankore, K; Rockwood, K; Worthen, G; Rutenberg, A. (2024). Systems-level health of patients living with end-stage kidney disease using standard lab values. *Nature Communications*.  
Revision Requested,  
Refereed?: Yes
3. Pridham, G\*; Rutenberg, A. (2024). Dynamical network stability analysis of multiple biological ages provides a framework for understanding the aging process. *Journal of Gerontology: Biological Sciences*. 79(10): glae021.  
Published,  
Refereed?: Yes
4. Foote, I; Flint, J; Fürtjes, A; Mullin, D; Fisk, J; Karakach, T; Rutenberg, A; Martin, N; Lupton, K; Llewellyn, D; Ranson, J; Cox, S; Luciano, M; Rockwood, K; Grotzinger, A. (2024). Uncovering the multivariate genetic architecture of frailty with genomic structural equation modelling. *Nature Genetics*.  
Revision Requested,  
Refereed?: Yes
5. Pridham, G\*; Rockwood, K; Rutenberg, A. (2024). Dynamical modelling of the frailty index indicates that health reaches a tipping point near age75. *Nature Communications*.  
Submitted,  
Refereed?: Yes
6. Dil, E\*; Rutenberg, A. (2024). Using deep-learning to obtain calibrated individual disease and ADL damage transition probabilities between successive ELSA waves. *Geroscience*.  
Submitted,  
Refereed?: Yes
7. Pridham, G\*; Rutenberg, A. (2023). Network dynamical stability analysis of homeostasis reveals "mallostatics": biological equilibria drifting towards worsening health with age. *Scientific Reports*. 13: 22140.  
Published,  
Refereed?: Yes, Open Access?: Yes
8. Leighton, M\*; Kreplak, L; Rutenberg, A. (2023). Torsion and bistability of double-twist elastomers. *Soft Matter*. 19: 6376-6386.  
Published,  
Refereed?: Yes
9. Pridham, G\*; Rockwood, K; Rutenberg, A. (2023). Efficient representations of binarized health deficit data: the frailty index and beyond. *GeroScience*. 45: 1687-1711.  
Published,  
Refereed?: Yes

10. Tobin, R\*; Pridham, G\*; Rutenberg, A. (2023). Modelling disease impact: lifespan reduction is greatest for young adults in an exogenous damage model of disease. *Scientific Reports*. 13: 16304.  
Published,  
Refereed?: Yes, Open Access?: Yes
11. Stubbings, G\*; Rutenberg, A. (2023). Network topologies for maximal organismal health span and lifespan. *Chaos*. 33: 023124.  
Published,  
Refereed?: Yes
12. Pridham, G\*; Rockwood, K; Rutenberg, A. (2022). Strategies for handling missing data that improve Frailty Index estimation and predictive power: lessons from the NHANES dataset. *Geroscience*. 44: 897-923.  
Published,  
Refereed?: Yes, Open Access?: Yes
13. Cohen, A; Ferrucci, L; Fulop, T; Gravel, D; Hao, N, Kriete, A; Levine, M; Lipsitz, L; Rikkert, M; Rutenberg, A; Stroustrup, N; Varadhan, R. (2022). A complex systems approach to aging biology. *Nature Aging*. 2: 580.  
Published,  
Refereed?: Yes, Open Access?: Yes
14. Farrell, S\*; Kane, A; Bissett, E; Howlett, S; Rutenberg, A. (2022). Measurements of damage and repair in aging mice and humans reveals that robustness and resilience decrease with age, operate over broad timescales, and are affected differently by interventions. *ELife*. 11: e77632.  
Published,  
Refereed?: Yes, Open Access?: Yes
15. Farrell, S\*; Stubbings, G\*; Rockwood, K; Mitnitski, A; Rutenberg, A. (2021). The potential for complex computational models of aging. *Mechanisms of Ageing and Development*. 193: 111403.  
Published,  
Refereed?: Yes
16. Farrell, S\*; Rutenberg, A. (2021). Non-Fickian single-file pore transport. *Physical Review E Letters*. 104: L032102.  
Published,  
Refereed?: Yes
17. Stubbings, G\*; Rockwood, K; Mitnitski, A; Rutenberg, A. (2021). A quantile frailty index without dichotomization. *Mechanisms of Aging and Development*. 199: 111570.  
Published,  
Refereed?: Yes
18. Howlett, S; Rutenberg, A; Rockwood, K. (2021). The degree of frailty as a translational measure of health in aging. *Nature Aging*. 1: 651.  
Published,  
Refereed?: Yes, Open Access?: Yes
19. Leighton, M\*; Kreplak, L; Rutenberg, A. (2021). Chiral phase-coexistence in compressed double-twist elastomers. *Soft Matter*. 17: 5018.  
Published,  
Refereed?: Yes
20. Leighton, M\*; Rutenberg, A; Kreplak, L. (2021). D-band strain underestimates collagen fibril strain. *Journal of the Mechanical Behavior of Biomedical Materials*. 124: 104854.  
Published,  
Refereed?: Yes



21. Farrell, S\*; Mitnitski, A; Rockwood, K; Rutenberg, A. (2021). Interpretable machine learning for high-dimensional trajectories of aging health. *PLoS Computational Biology*. 18: e1009746.  
Published,  
Refereed?: Yes, Open Access?: Yes
22. Leighton, M\*, Kreplak, L; Rutenberg, A. (2021). Non-equilibrium growth and twist of cross-linked collagen fibrils. *Soft Matter*. 17: 1415.  
Published,  
Refereed?: Yes
23. Cameron S\*, Kreplak L, Rutenberg A. (2020). Phase-field collagen fibrils: coupling chirality and density modulations. *Physical Review Research*. 2: 012070.  
<http://dx.doi.org/https://doi.org/10.1103/PhysRevResearch.2.012070>  
Published,  
Refereed?: Yes, Open Access?: Yes
24. Garry J\*, Li Y, Shew B, Gradinaru C, Rutenberg A. (2020). Bayesian counting of photobleaching steps with physical priors. *Journal of Chemical Physics*. 152: 024110.  
<http://dx.doi.org/https://doi.org/10.1063/1.5132957>  
Published,  
Refereed?: Yes
25. Farrell S\*, Mitnitski A, Rockwood K, Rutenberg A. (2020). Generating individual aging trajectories with a network model using cross-sectional data. *Science Reports*. 10: 19833.  
Published,  
Refereed?: Yes, Open Access?: Yes
26. Stubbings S\*, Farrell S\*, Mitnitski A, Rockwood K, Rutenberg A. (2020). Informative frailty indices from binarized biomarkers. *Biogerontology*. 21: 345-355.  
<http://dx.doi.org/https://doi.org/10.1007/s10522-020-09863-1>  
Published,  
Refereed?: Yes
27. Rutenberg A, Mitnitski A, Farrell S\*, Rockwood K. (2018). Unifying aging and frailty through complex dynamical networks. *Experimental Gerontology*. 107: 126-129.  
<http://dx.doi.org/https://doi.org/10.1016/j.exger.2017.08.027>  
Published,  
Refereed?: Yes
28. Kreplak L, Rutenberg A. (2018). Unlocking collagen proteolysis with a gentle pull. *Biophysical Journal*. 114: 503.  
<http://dx.doi.org/https://doi.org/10.1016/j.bpj.2017.11.3788>  
Published,  
Refereed?: Yes, Open Access?: Yes
29. Cameron S\*, Kreplak L, Rutenberg A. (2018). Polymorphism of stable collagen fibrils. *Soft Matter*. 14(23): 4772-4783.  
Published,  
Refereed?: Yes
30. Farrell S\*, Rutenberg A. (2018). Anomalously slow transport in single-file diffusion with slow binding kinetics. *Physical Review E*. 98: 022114.  
Published,  
Refereed?: Yes
31. Farrell S\*, Mitnitski A, Theou O, Rockwood K, Rutenberg A. (2018). Probing the network structure of health deficits in human aging. *Physical Review E*. 98: 032302.  
Published,  
Refereed?: Yes

32. Taneja S, Rutenberg A. (2017). Photobleaching of randomly-rotating fluorescently-decorated particles. *Journal of Chemical Physics*. 147: 104105.  
<http://dx.doi.org/https://aip.scitation.org/doi/10.1063/1.4989673>  
Published,  
Refereed?: Yes
33. Mitnitski A, Rutenberg A, Farrell S\*, Rockwood K. (2017). Aging and frailty in complex networks. *Biogerontology*. 18: 433-446.  
Co-Author  
Published,  
Refereed?: Yes  
Number of Contributors: 4  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
34. Rutenberg A, Brown A\*, Kreplak L. (2016). Uniform spatial distribution of collagen fibril radii within tendon implies local activation of pC-collagen at individual fibrils. *Physical Biology*. 13: 046008.  
First Listed Author  
Published,  
Refereed?: Yes  
Number of Contributors: 3  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
35. Farrell S\*, Mitnitski A, Rockwood K, Rutenberg A. (2016). Network model of human aging: frailty limits and information measures. *Physical Review E*. 94: 052409.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 4  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
36. Taneja S\*, Mitnitski A, Rockwood K, Rutenberg A. (2016). A dynamical network model for age-related health deficits and mortality. *Physical Review E*. 93: 022309.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 4  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
37. Ly N, Elkhatib N, Bresteau E, Pietrement O, Khaled M, Magiera M, Janke C, Le Cam E, Rutenberg A, Montagnac G. (2016).  $\alpha$ TAT1 controls longitudinal spreading of acetylation marks from open microtubule extremities. *Scientific Reports*. 6: 35624.  
Co-Author  
Published,  
Refereed?: Yes  
Number of Contributors: 10  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245

38. Brown A\*, Rutenberg A. (2015). Cluster coarsening on drops exhibits strong and sudden size selectivity. *Soft Matter*. 11: 3786-3793.  
 Last Author  
 Published,  
 Refereed?: Yes  
 Number of Contributors: 2  
  
 Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
39. Farrell S\*, Brown A\*, Rutenberg A. (2015). Single file diffusion into a semi-infinite tube. *Physical Biology*. 12: 064001.  
 Last Author  
 Published,  
 Refereed?: Yes  
 Number of Contributors: 3  
  
 Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN-2014-06245
40. Brown A\*, Kim P, Rutenberg A. (2014). PEX5 and ubiquitin dynamics on mammalian peroxisome membranes. *PLoS Computational Biology*. 10(1): e1003426.  
 Last Author  
 Published,  
 Refereed?: Yes  
 Number of Contributors: 3  
  
 Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Canadian Institutes of Health Research (CIHR) - MOP-111164; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
41. Aranovich A, Hua R, Rutenberg A, Kim P. (2014). PEX16 contributes to peroxisome maintenance by constantly trafficking PEX3 via the ER. *Journal of Cell Science*. 127: 3675-3686.  
 Co-Author  
 Published,  
 Refereed?: Yes, Open Access?: Yes  
 Number of Contributors: 4  
  
 Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
42. Kreplak L, Rutenberg A. (2014). Lateral exchange smooths the way for vimentin filaments. *Biophysical Journal*. 107: 2747-2748.  
 Last Author  
 Published,  
 Refereed?: Yes  
 Number of Contributors: 2
43. Nayak C\*, Brown A\*, Rutenberg A. (2014). Protein translocation without specific quality control in a computational model of the Tat system. *Physical Biology*. 11: 056005.  
 Last Author  
 Published,  
 Refereed?: Yes  
 Number of Contributors: 3  
  
 Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009

44. Brown A\*, Kreplak L, Rutenberg A. (2014). An equilibrium double-twist model for the radial structure of collagen fibrils. *Soft Matter*. 10: 8500-8511.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 3  
  
Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Killam Trusts - n/a; Natural Sciences and Engineering Research Council of Canada (NSERC) - 238572-2014
45. Taneja S\*, Levitan B\*, Rutenberg A. (2014). Circumferential gap propagation in an anisotropic elastic bacterial sacculus. *Physical Review E*. 89: 012704.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 3  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
46. Brown A\*, Rutenberg A. (2014). A storage-based model of heterocyst commitment and patterning in cyanobacteria. *Physical Biology*. 11: 016001.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 2  
  
Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
47. Sengupta S\* , Derr J\* , Sain A , Rutenberg A. (2012). Stuttering Min oscillations within E. coli bacteria: a stochastic polymerization model. *Physical Biology*. 9: 056003.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 4  
  
Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
48. Brown A\* , Rutenberg A. (2012). Heterocyst placement strategies to maximize the growth of cyanobacterial filaments. *Physical Biology*. 9: 046002.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 2  
  
Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
49. Brown A\* , Rutenberg A. (2012). Reconciling cyanobacterial fixed-nitrogen distributions and transport experiments with quantitative modelling. *Physical Biology*. 9: 016007.  
Last Author  
Published,  
Refereed?: Yes  
Number of Contributors: 2  
  
Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009

50. Derr J\* , Rutenberg A. (2011). Monodisperse domains by proteolytic control of the coarsening instability. Physical review. E, Statistical, nonlinear, and soft matter physics. 84(1 Pt 1)  
 Last Author  
 Published,  
 Refereed?: Yes  
 Number of Contributors: 2  
  
 Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Canadian Institutes of Health Research (CIHR) - NTA-71854; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
  
51. Nayak C\* , Rutenberg A. (2011). Quantification of fluorophore copy number from intrinsic fluctuations during fluorescence photobleaching. Biophysical journal. 101(9)  
 Last Author  
 Published,  
 Refereed?: Yes  
 Number of Contributors: 2  
  
 Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
  
52. Colville K\* , Tompkins N\* , Rutenberg A , Jericho M. (2010). Effects of poly(L-lysine) substrates on attached Escherichia coli bacteria. Langmuir : the ACS journal of surfaces and colloids. 26(4)  
 Published,  
 Refereed?: Yes  
  
 Funding Sources: Canadian Institutes of Health Research (CIHR) - NTA-71854; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
  
53. Downing BP\* , Rutenberg AD , Touhami A\* , Jericho M. (2009). Subcellular Min oscillations as a single-cell reporter of the action of polycations, protamine, and gentamicin on Escherichia coli. PloS ONE. 4(9)  
 Published,  
 Refereed?: Yes, Open Access?: Yes  
  
 Funding Sources: Canadian Institutes of Health Research (CIHR) - NTA-71854; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
  
54. Allard JF\* , Rutenberg AD. (2009). Pulling helices inside bacteria: imperfect helices and rings. Physical review letters. 102(15)  
 Published,  
 Refereed?: Yes, Open Access?: No  
  
 Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
  
55. Derr J\* , Hopper JT\* , Sain A , Rutenberg AD. (2009). Self-organization of the MinE protein ring in subcellular Min oscillations. Physical review. E, Statistical, nonlinear, and soft matter physics. 80(1 Pt 1)  
 Published,  
 Refereed?: Yes, Open Access?: No  
  
 Funding Sources: Atlantic Computational Excellence Network (ACEnet) (Canada) - 2006-2008; Canadian Institutes of Health Research (CIHR) - NTA-71854; Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009

56. Rutenberg A. (2009). Small group mentoring of physics majors: the Dalhousie experience. *Physics in Canada*. 65: 217-218.  
First Listed Author  
Published,  
Refereed?: No, Open Access?: Yes  
Number of Contributors: 1  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC) - RGPIN/238572-2009
57. Rutenberg A. (2008). So you want to be a grad student?. *Canadian Undergraduate Physics Journal*. 6(2): 21.  
Published,  
Refereed?: No, Open Access?: No  
  
Funding Sources: Natural Sciences and Engineering Research Council of Canada (NSERC)
58. Rutenberg A. (2008). Biological Physics of Bacteria. *Canadian Undergraduate Physics Journal*. 6(3): 7.  
Published,  
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