

Irina Mazilu

Washington and Lee University ♦ Department of Physics and Engineering ♦ Lexington, VA 24450

(540) 458-8171 ♦ mazilui@wlu.edu

EDUCATION

Doctor of Philosophy, Physics, 2002

Virginia Polytechnic Institute and State University, Blacksburg, VA

Master of Science, Physics, 1998

Virginia Polytechnic Institute and State University, Blacksburg, VA

Bachelor of Science, Physics, 1996

Alexandru Ioan Cuza University, Iasi, Romania

ACADEMIC APPOINTMENTS

Professor, Department of Physics and Engineering, Washington and Lee University, Lexington, VA, 2016 – present

Associate Professor, Department of Physics and Engineering, Washington and Lee University, Lexington, VA, 2010 – 2016

Assistant Professor, Department of Physics and Engineering, Washington and Lee University, Lexington, VA, 2004 – 2010

Assistant Professor, Department of Physics and Astronomy, Hanover College, Hanover, IN, 2003 – 2004

Visiting Assistant Professor, Department of Physics and Engineering, Washington and Lee University, Lexington, VA, 2002 – 2003

COURSES TAUGHT AT W&L

- PHYS 111/112 – General Physics I & II
- PHYS 113/114 – General Physics Laboratory I & II
- PHYS 125 – Supervised Study Abroad: Particle Physics at CERN
- PHYS 180 – Introduction to Nanoscience
- PHYS 265 – Modeling of Physical Systems
- PHYS 270 – Physics of Complex Systems
- PHYS/ENGN 225 – Mathematical Methods for Physics and Engineering
- PHYS/ENGN 255 – C++ for Engineering and Physics
- PHYS 315 – Nuclear Physics
- PHYS 345 – Statistical Physics
- PHYS 401 – Directed Individual Study
- PHYS 421/422/423 – Directed Individual Research
- PHYS 493 – Honors Thesis

SERVICE

- Advisory Committee (2017 – 2020)
- Science Advisory Board (2017 – 2020)
- Courses and Degrees Committee (2012 – 2016)
- International Education Committee (2014 – 2016)
- Writing Cohort (2015 – 2016)
- Society of Physics Students Faculty Advisor (2009 – 2019)
- Chair of the Departmental Search Committee for two visiting positions in physics (2015)
- Public Functions Committee (2012 – 2013)
- Johnson Scholarship Competition (2010 – 2012, 2016)
- HHMI Advisory Committee (2010 – 2011)

RESEARCH GRANTS AND SUPPORT

Summer Lenfest Grant, 2009 – 2015; 2018 – 2019

Kavli Institute for Theoretical Physics (KITP) Scholar, 2008 – 2010

Jeffress Memorial Trust (grant J-763) with renewals, “A study of some non-equilibrium driven models and their contribution to the understanding of molecular motors”, \$50,000 January 2005 - December 2007

BOOK

D. A. Mazilu, I. Mazilu, H. T. Williams, “From Complex to Simple: Interdisciplinary Stochastic Models”, IOP Science, Morgan & Claypool Publishers (2018), online ISBN 978-1-64327-120-0, print ISBN 978-1-64327-117-0



PEER-REVIEWED PUBLICATIONS

*Undergraduate students

I. Mazilu, D. A. Mazilu, R. E. Melkerson*, E. Hall-Mejia*, G. J. Beck*, S. Nshimyumukiza*, C. M. da Fonseca, “Class of cooperative stochastic models: exact and approximate solutions, simulations, and experiments using ionic self-assembly of nanoparticles”, Physical Review E 93, 032803 (2016)

C. M. da Fonseca, S. Kouachi, D. A. Mazilu, I. Mazilu, “A multi-temperature kinetic Ising model and the eigenvalues of some perturbed Jacobi matrices”, Applied Mathematics and Computation 259 (2015) 205-211

E. M. Schwen*, I. Mazilu, D. A. Mazilu, “A two-state stochastic model for nanoparticle self-assembly: theory, computer simulations and applications”, European Journal of Physics 36 (2015) 025003

L. J. Cook, D. A. Mazilu, I. Mazilu, B. M. Simpson*, E. M. Schwen*, V. O. Kim*, A. M. Seredinski*, “Cooperative sequential-adsorption model in two dimensions with experimental applications for ionic self-assembly of nanoparticles”, Physical Review E 89, 062411 (2014)

C. M. da Fonseca, D. Mazilu, I. Mazilu, H.T. Williams, “The eigenpairs of a Sylvester-Kac type matrix associated with a simple model for one-dimensional deposition and evaporation”, *Applied Mathematics Letters* 26 (2013) 1206-1211

D. A. Mazilu, I. Mazilu, A. M. Seredinski*, V. O. Kim*, B. M. Simpson*, W. E. Banks*, “Cooperative sequential adsorption models on a Cayley tree: analytical results and applications”, *Journal of Statistical Mechanics: Theory and Experiment*, 1742-5468, P09002 (2012)

D. A. Mazilu, G. Zamora*, I. Mazilu, “From complex to simple: interdisciplinary stochastic models”, *European Journal of Physics* 33, pp. 793-803 (2012)

I. Mazilu, D. A. Mazilu, H. T. Williams, “Applications of tridiagonal matrices in non-equilibrium statistical physics”, *Electronic Journal of Linear Algebra*, Volume 24, pp. 7-17 (2012)

H. T. Williams, I. Mazilu, D. A. Mazilu, “Stochastic epidemic-type model with enhanced connectivity: exact solution”, *Journal of Statistical Mechanics: Theory and Experiment*, 1742-5468, P01017, (2012)

I. Mazilu, G. Zamora*, J. Gonzalez*, “A stochastic model for microtubule length dynamics”, *Physica A* 389 (2010) 419-427

PEER-REVIEWED CONFERENCE PROCEEDINGS

*Undergraduate students

D. A. Mazilu, M. O. Withers*, W. Hanstedt*, S. Gibbs*, A. P. Lorson*, I. Mazilu, “A Monte Carlo study of a cooperative three-state model with adsorption and evaporation and its applications”, accepted for publication in the *Journal of Physics: Conference Series* (2019)

E. Baker*, M. O. Withers*, E. Aldrich*, I. Shaffrey*, J. Pusztay*, D. A. Mazilu, I. Mazilu, “Computational model for the ionic self-assembly of nanoparticles under the influence of external electric fields”, accepted for publication in the *Journal of Physics: Conference Series* (2019)

M. O. Withers*, E. Baker*, D. A. Mazilu, I. Mazilu, “Modeling directed self-assembly of nanoparticles under parallel electric fields”, accepted for publication in the *Journal of Physics: Conference Series* (2019)

I. Mazilu, A. P. Lorson*, S. Gibbs*, W. Hanstedt*, D. A. Mazilu, “A multi-temperature kinetic Ising model and its applications to partisanship dynamics in the US Senate”, accepted for publication in the *Journal of Physics: Conference Series* (2019)

I. Mazilu, E. M. Schwen*, W. E. Banks*, B. K. Pope*, D. A. Mazilu, “A stochastic model of nanoparticle self-assembly on Cayley trees”, *Journal of Physics: Conference Series* 574 (2015) 012086

E. M. Schwen*, I. Mazilu, D. A. Mazilu, “A stochastic model of particle deposition and evaporation for ionic self-assembly of thin films”, *Journal of Physics: Conference Series* 574 (2015) 012043

D. A. Mazilu, E. M. Schwen*, I. Mazilu, “An analytical and computational study of a stochastic adsorption model with variable attachment and detachment rates”, *Journal of Physics: Conference Series* 574 (2015) 012087

D. A. Mazilu, I. Mazilu, H. T. Williams, “Exact analytical solutions of charged monomer and dimer deposition models in one and two dimensions”, *Journal of Physics: Conference Series* 417 (2013) 012070

SELECTED CONFERENCE PRESENTATIONS

*Undergraduate students

†Presenter

D. A. Mazilu†, M. O. Withers*, W. Hanstedt*, S. Gibbs*, A. P. Lorson*, I. Mazilu, “A Monte Carlo study of a cooperative three-state model with adsorption and evaporation and its applications”, poster presentation at the 8th International Conference on Mathematical Modeling in Physical Sciences, Bratislava, Slovakia, August 2019

E. Baker†*, M. O. Withers*, E. Aldrich*, I. Shaffrey*, J. Pusztay*, D. A. Mazilu, I. Mazilu, “Computational model for the ionic self-assembly of nanoparticles under the influence of external electric fields”, poster presentation at the 8th International Conference on Mathematical Modeling in Physical Sciences, Bratislava, Slovakia, August 2019

M. O. Withers†*, E. Baker*, D. A. Mazilu, I. Mazilu, “Modeling directed self-assembly of nanoparticles under parallel electric fields”, poster presentation at the 8th International Conference on Mathematical Modeling in Physical Sciences, Bratislava, Slovakia, August 2019

I. Mazilu†, A. P. Lorson*, S. Gibbs*, W. Hanstedt*, D. A. Mazilu, “A multi-temperature kinetic Ising model and its applications to partisanship dynamics in the US Senate”, poster presentation at the 8th International Conference on Mathematical Modeling in Physical Sciences, Bratislava, Slovakia, August 2019

M. O. Withers†*, M. Roberts, D. A. Mazilu, I. Mazilu, “Directed Self-Assembly of Nanoparticles under Electric Fields”, poster presentation at the American Physical Society Meeting, Boston, MA, March 2019

A. P. Lorson†*, S. Gibbs*, J. Pusztay*, W. Hanstedt*, I. Mazilu, “Modeling Senate Behavior”, poster presentation at the American Physical Society Meeting, Boston, MA, March 2019

D. A. Mazilu†, I. Mazilu, G. J. Beck*, M. Abudayyeh*, R. E. Melkerson*, “Time Dependence of Ionic Nanoparticle Self-Assembly: An Experimental and Theoretical Study”, poster presentation at the 5th International Conference on Mathematical Modeling in Physical Sciences, Athens, Greece, May 2016

I. Mazilu†, D. A. Mazilu, R. E. Melkerson*, G. J. Beck*, C. M. da Fonseca, “Analysis of Two-State Systems using Matrix Theory”, poster presentation at the 5th International Conference on Mathematical Modeling in Physical Sciences, Athens, Greece, May 2016

X. Yang†*, D. R. Segura, I. Mazilu, F. Lin, “An Agent Based Model for Social Class Emergence”, oral presentation at the American Physical Society Meeting, Baltimore, MD, March 2016

G. J. Beck†*, S. Nshimyumukiza*, M. Abudayyeh*, R. E. Melkerson*, E. Hall-Mejia*, I. Mazilu, D. A. Mazilu, “Experimental Investigations of Ionic Self-Assembly of Silica Nanoparticles”, oral presentation at the American Physical Society Meeting, Baltimore, MD, March 2016

R. E. Melkerson†*, G. J. Beck*, E. Hall-Mejia*, S. Nshimyumukiza*, C. M. da Fonseca, D. A. Mazilu, I. Mazilu, “Exact and Approximate Solutions for a Class of Cooperative Stochastic Models”, poster presentation at the American Physical Society Meeting, Baltimore, MD, March 2016

C. M. da Fonseca†, S. Kouachi, D. A. Mazilu, I. Mazilu, “A Kinetic Ising Model and the Spectra of Some Jacobi Matrices” oral presentation at the SIAM Conference on Applied Linear Algebra, Atlanta, GA, October 2015

I. Mazilu†, D. A. Mazilu, G. J. Beck*, E. Hall-Mejia*, R. E. Melkerson*, S. Nshimyumukiza*, “Ionic Self-Assembly of Nanoparticles: Theory, Simulations, and Experiments”, oral presentation at TUI-3 at KITP, Santa Barbara, CA, July 2015

Xiaoxiang Yang†*, Conan Zhao*, Irina Mazilu, “Modeling Long-Term Behavior of Stock Market Prices Using Differential Equations”, oral presentation at the American Physical Society Meeting, San Antonio, TX, March 2015

Dan Mazilu†, Eric Schwen*, Irina Mazilu, William Banks*, “An Analytical and Computational Study of a Stochastic Adsorption Model with Variable Attachment and Detachment Rates”, poster presentation at the 3rd International Conference on Mathematical Modeling in Physical Sciences, Madrid, Spain, August 2014

Irina Mazilu†, William Banks*, Eric Schwen*, Brenton Pope*, Dan Mazilu, “A Stochastic Model of Nanoparticle Self-Assembly on Cayley Trees”, poster presentation at the 3rd International Conference on Mathematical Modeling in Physical Sciences, Madrid, Spain, August 2014

Eric Schwen†*, Irina Mazilu, Dan Mazilu, “A Stochastic Model of Particle Deposition and Evaporation for Ionic Self-Assembly of Thin Films”, poster presentation at the 3rd International Conference on Mathematical Modeling in Physical Sciences, Madrid, Spain, August 2014

Eric Schwen†*, Irina Mazilu, Dan Mazilu, “Experimental Analysis and Stochastic Modeling of Particle Deposition and Evaporation for Ionic Self-Assembly of Thin Films”, poster presentation at CMD 25–JMC 14: Condensed Matter in Paris, France, August 2014

William Banks†*, Eric Schwen*, Andrew Seredinski*, Brian Simpson*, Vincent Kim*, Conan Zhao*, “Cooperative Sequential Adsorption Model with Evaporation on Cayley Trees”, poster presentation at the American Physical Society Meeting, Denver, CO, March 2014

Vincent Kim†*, Brian Simpson*, Andrew Seredinski*, Eric Schwen*, Dan Mazilu, Irina Mazilu, “Concentration Dependence of Nanoparticle Surface Coverage for Ionic Self-Assembled Monolayers”, poster presentation at the American Physical Society Meeting, Denver, CO, March 2014

Andrew Seredinski†*, Eric Schwen*, Brian Simpson*, Vincent Kim*, Carlos M. da Fonseca, H. T. Williams, Irina Mazilu, Dan Mazilu, “Random Sequential Adsorption of Monomers with Evaporation: Exact Results and Application to Ionic Self-Assembly”, poster presentation at the American Physical Society Meeting, Denver, CO, March 2014

Eric Schwen†*, Vincent Kim*, Brian Simpson*, Jonathan Cook, Irina Mazilu, Dan Mazilu, “Two-Dimensional Cooperative Sequential Adsorption with Evaporation for Ionic Self-Assembly of Nanoparticles”, poster presentation at the American Physical Society Meeting, Denver, CO, March 2014

Brian Simpson†*, Mohammad Abudayyeh*, Azhar Ali*, Alena Hamrick*, Dan Mazilu, Irina Mazilu, “Experimental Study of the Temperature Dependence of Substrate Coverage in Ionic Self-Assembled Monolayers”, poster presentation at the American Physical Society Meeting, Denver, CO, March 2014

Conan Zhao†*, Eric Schwen*, Andrew Seredinski*, Vincent Kim*, Brian Simpson*, William Banks*, Jonathan Cook, Dan Mazilu, Irina Mazilu, “Monte Carlo Simulation Study of Self-Assembly of Nanoparticles on Cayley Trees”, poster presentation at the American Physical Society Meeting, Denver, CO, March 2014

I. Mazilu†, D. A. Mazilu, A. M. Seredinski*, W. E. Banks*, B. M. Simpson*, V. O. Kim*, “Cooperative Sequential Adsorption and Evaporation Models on a Bethe Lattice: Analytical Results and Applications to Nanoparticle Self-Assembly”, poster presentation at STATPHYS 25, Seoul, South Korea, July 2013

V. O. Kim†*, B. M. Simpson*, A. M. Seredinski*, W. E. Banks*, D. A. Mazilu, I. Mazilu, “Ionic Self-Assembly of Thin Films: Analytical and Experimental Results”, poster presentation at STATPHYS 25, Seoul, South Korea, July 2013

A. M. Seredinski†*, W. E. Banks*, B. M. Simpson*, V. O. Kim*, D. A. Mazilu, I. Mazilu, “Analytical Study of Cooperative Sequential Adsorption Models on Cayley Trees and their Applications to Drug Encapsulation of Nanoparticles”, poster presentation at the American Physical Society Meeting, Baltimore, MD, March 2013

B. M. Simpson†*, W. E. Banks*, V. O. Kim*, A. M. Seredinski*, K. Wilson*, I. Mazilu, D. A. Mazilu, “Experimental and Analytical Study of Ionic Self-Assembly of Silica and Titania Nanoparticles”, oral presentation at the American Physical Society Meeting, Baltimore, MD, March 2013

W. E. Banks†*, A. M. Seredinski*, B. M. Simpson*, V. O. Kim*, I. Mazilu, D. A. Mazilu, “Computational Study of a Class of Cooperative Sequential Adsorption Models on Cayley Trees and Two-Dimensional Lattices”, oral presentation at the American Physical Society Meeting, Baltimore, MD, March 2013

V. O. Kim†*, W. E. Banks*, A. M. Seredinski*, B. M. Simpson*, D. A. Mazilu, I. Mazilu, “Ionic Self-Assembly of Thin Films: Analytical and Experimental Results”, poster presentation at the American Physical Society Meeting, Baltimore, MD, March 2013

D. A. Mazilu†, H. T. Williams, I. Mazilu, “Exact Analytical Solutions and Computational Study of Charged Monomer and Dimer Deposition Models in One and Two Dimensions”, oral presentation at the 15th International Conference on Thin Films in Kyoto, Japan, November 2011

I. Mazilu†, D. A. Mazilu, “Applications of tridiagonal matrices in non-equilibrium statistical physics”, oral presentation at Directions in Matrix Theory, Coimbra, Portugal, July 2011

Dia'a Bisharat†*, Mohamad Amine*, Ali Hamed, Irina Mazilu, “An analytical and computational study of a stochastic susceptible-exposed-infected-recovered (SEIR) epidemic model”, oral presentation at NCUR, Ithaca College, April 2011

Ali Hamed†*, Dia'a Bisharat*, Mohamad Amine*, Irina Mazilu, “A One Dimensional Stochastic Susceptible-Infectious-Recovered Model and its Variations: a Hamiltonian Approach”, oral presentation at the American Physical Society Meeting, Dallas, TX, March 2011