Mark Francis Demers

Curriculum Vitae

Associate Professor of Mathematics
Department of Mathematics and Computer Science
Fairfield University
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Education

Courant Institute, New York University, Ph.D. in Mathematics.   1998-2003
Awarded M.S. in Mathematics, May 2001.

Amherst College, B.A. *Magna Cum Laude* in Mathematics and English.   1990-1994

Research Interests

Statistical properties of dynamical systems; ergodic theory; open systems and escape rates; models from mathematical physics.
Doctoral Thesis Advisor: Dr. Lai-Sang Young
Thesis Title: *Markov Extensions and Conditionally Invariant Measures for Dynamical Systems with Holes.*

Academic Appointments

Associate Professor, Department of Mathematics and Computer Science   2011 – present
Fairfield University, Connecticut.

Assistant Professor, Department of Mathematics and Computer Science   2006 – 2011
Fairfield University, Connecticut.

Visiting Scholar, Courant Institute, New York University   January – May 2009

Postdoctoral Fellow, Mathematical Sciences Research Institute   January – May 2007
Berkeley, California.

Visiting Assistant Professor, School of Mathematics   2003 – 2006
Georgia Institute of Technology, Georgia.

Grants, Honors, Fellowships

National Science Foundation Research Grant   2011 – 2014
Sole PI: Awarded $130,000 over 3 years. Proposal title: *RUI: Open, coupled and extended dynamical systems with nonuniform hyperbolicity.*

National Science Foundation Research Grant   2008 – 2011
Sole PI: Awarded $108,086 over 3 years. Proposal title: *Topics in Dynamical Systems: Open systems, coupled systems and discretization.*

Visiting Professor, Semester in "Hyperbolic dynamics, large deviations   May – June 2013
and fluctuations," Centre Interfacultaire Bernoulli, EPFL, Lausanne, Switzerland.

London Mathematical Society Research Grant   May – June 2011
Awarded Scheme 2 grant of £2,000 to visit 3 universities in the UK to foster potential
collaborations.

Faculty Research Award, Fairfield University   Spring 2010

Science Institute Grant, Fairfield University   2009
Co-wrote grant to sponsor a general audience mathematics lecture at Fairfield.

Visiting Researcher, Semester in Hyperbolic Dynamics   May - June 2008
Erwin Schrödinger Institute for Mathematical Physics, Vienna, Austria.

Visiting Researcher, Centro Ennio de Giorgi,   May - July 2006
Collegio Puteano, Scuola Normale Superiore, Pisa, Italy.

Visiting Researcher, Trimester "Time at Work,"   May - June 2005
Institut Henri Poincaré, Paris, France.

Research Grant, University of Rome, Tor Vergata, Rome, Italy.   June 2004

<u>**Journal Publications**</u> (See *http://cs.fairfield.edu/~demers/research/pub.html*)
All publications are peer-reviewed.

1. M. Demers, *Escape rates and physical measures for the infinite horizon Lorentz gas with holes*, to appear in Dynamical Systems: An International Journal.

2. M. Demers, *Dispersing billiards with small holes*, to appear in *Ergodic theory, open dynamics and coherent structures*, Springer Proceedings in Mathematics.

3. M. Demers and H.-K. Zhang, *A functional analytic approach to perturbations of the Lorentz gas*, to appear in Communications in Mathematical Physics.

4. M. Demers and P. Wright, *Behavior of the escape rate function in hyperbolic dynamical systems*, Nonlinearity **25** (2012), 2133-2150.

5. M. Demers and H.-K. Zhang, *Spectral analysis of the transfer operator for the Lorentz gas*, Journal of Modern Dynamics **5**:4 (2011), 665-709.

6. M. Demers, P. Wright and L.-S. Young, *Entropy, Lyapunov exponents and escape rates in open systems*, Ergodic Theory and Dynamical Systems **32**:4 (2012), 1270-1301.

7. M. Demers, *Functional Norms for Young Towers*, Ergodic Theory and Dynamical Systems **30**:5 (2010), 1371-1398..

8. M. Demers, P. Wright and L.-S. Young, *Escape rates and physically relevant measures for billiards with small holes*, Communications in Mathematical Physics **294** (2010), 353-388.

9. H. Bruin, M. Demers and I. Melbourne, *Existence and convergence properties of physical measures for certain dynamical systems with holes,* Ergodic Theory and Dynamical Systems **30** (2010), 687-728.

10. M. Demers and M.P. Wojtkowski, *A family of pseudo-Anosov maps,* Nonlinearity, **22** (2009), 1743-1760.

11. M. Demers and C. Liverani, *Stability of statistical properties in two-dimensional piecewise hyperbolic maps,* Transactions of the American Mathematical Society **360**:9 (2008), 4777-4814.

12. M. Demers and L.-S. Young, *Escape rates and conditionally invariant measures,* Nonlinearity, **19** (2006), 377-397.

13. L.A. Bunimovich and M. Demers, *Deterministic models of the simplest chemical reactions,* Journal of Statistical Physics **120** (2005), 239-252.

14. M. Demers, *Markov extensions and conditionally invariant measures for certain logistic maps with small holes*, Ergodic Theory and Dynamical Systems **25**:4 (2005), 1139-1171.

15. M. Demers, *Markov extensions for dynamical systems with holes: an application to expanding maps of the interval*, Israel Journal of Mathematics **146** (2005), 189-221.

Scientific Visits

1. University of Rome, Tor Vergata, Italy, June 2004 (Prof. Liverani)

2. University of Surrey, Guildford, England, May 2005 (Profs. Melbourne and Bruin)

3. Institut Henri Poincaré, Paris, France, May-June 2005 (Program in ergodic theory)

4. Centro Ennio di Giorgi, Scuola Normale Superiore, Pisa, Italy, May-July 2006 (Prof. Marmi)

5. Schrödinger Institute, Vienna, Austria, May-June 2008 (Program in hyperbolic dynamics)

6. University of Rome, Tor Vergata, Italy, May 2009 (Prof. Liverani)

7. University of Porto, Porto, Portugal, May-June 2009 (Prof. Alves)

8. University of Massachusetts at Amherst, August 2010 (Prof. Zhang)

9. Loughborough University, England, May 2011 (Prof. Bahsoun)

10. University of Surrey, England, May 2011 (Prof. Melbourne)

11. University of Bristol, England, June 2011 (Prof. Dettman)

12. University of Brest, France, May 2012 (Profs. Penne and Saussol)

13. University of Rome, Tor Vergata, Italy, May 2012 (Prof. Liverani)

14. University of Vienna, Austria, May 2013, May 2013 (Prof. Bruin)

15. École Polytechnique Fédérale de Lausanne, Switzerland, May-June 2013 (Program in hyperbolic dynamics, large deviations and fluctuations)