

MADISON SKI KRIEGER

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POSITIONS HELD

Harvard University

August 2016 - Present

Postdoctoral Fellow, Program for Evolutionary Dynamics

Director: Martin A. Nowak

Supervisor: Alison Hill

Brown University

August 2011 - August 2016

Doctoral Student

Simon Ostrach Fellow 2014-2015

Postdoctoral Fellow June/July 2016

Dissertation: Tunable Instabilities in Soft Matter

Advisor: Thomas R. Powers

Dissertation readers: Robert Pelcovits, Petia Vlahovska

EDUCATION

University of Chicago

May 2009

B.A. Physics

B.A. Classics, Thesis: *The Reception of Epicureanism by the Middle Platonists*

Member of the Oriental Institute's Persepolis Fortification Archive Project, 2007-2009

Brown University

May 2013

M.Sc. Applied Mathematics

Brown University

May 2016

Ph.D, Engineering

RESEARCH INTERESTS

Prebiotic evolution; Cultural evolution; Linguistic evolution, particularly social dynamics of phonological change; Role of fluid dynamics in theoretical biology; Eusociality and gene transfer in unicellular life; Theory of cooperation and eusociality; Viral dynamics; Theoretical soft condensed matter; Viscous hydrodynamics; Bacterial locomotion and collective dynamics; Complex fluids; Liquid crystals and their coupling to structure; Geometry of elastic continua and soft materials; Pattern formation; Singularity theory; Mechanics of structured materials.

LIST OF PUBLICATIONS

2014

1. Locomotion and transport in hexatic liquid crystals

M. Ski Krieger, S. Spagnolie and T.R. Powers, *Phys. Rev. E* **90**, 052503

2015

2. Transient swimming in hexatic liquid crystals

M. Ski Krieger, M. Dias and T.R. Powers, *Eur. Phys. J. E.* **38** 94.

3. Microscale locomotion in a nematic liquid crystal

M. Ski Krieger, S. Spagnolie and T.R. Powers, *Soft Matter* **11**, 9115-9125

2016

4. Microorganism billiards in closed plane curves

M. Ski Krieger, Eur. Phys. J. E. **39** 122.

2017

5. Interfacial fluid instabilities and Kapitza pendula

M. Ski Krieger, Eur. Phys. J. E. **40** 67.

6. Effects of motion in structured populations

M. Ski Krieger, A. McAvoy and M. A. Nowak, (submitted, **32** pages)

7. Spatial correlation of drug treatment promotes resistance

M. Ski Krieger and A. L. Hill, (in preparation)

8. Swimming in confined liquid crystals

M. Ski Krieger, S. Spagnolie and T.R. Powers, (in preparation)

9. Tunable wrinkling in thin nematic elastomers

M. Ski Krieger, M. Dias and T.R. Powers, (in preparation)

TALKS AND POSTERS

1. November 19, 2012, APS DFD — Modeling the swimming of microbes in anisotropic fluids
 2. March 18-22, 2013, APS March Meeting, Poster — Swimming in anisotropic fluids
 3. March 6, 2015, APS March Meeting — Wrinkling in thin nematic elastomers
 4. November 23, 2015, APS DFD — Interfacial instabilities and Kapitza pendula
 5. February 18, 2016, Brandeis MRSEC Seminar Series — Locomotion in liquid crystals
 6. March 6, 2016, APS March Meeting — Microorganism billiards in closed plane curves
 7. April 4, 2017, MIT Physical Mathematics Seminar — Evolution in Motion
- Regular sound byte contributor, New England Complex Fluids Workgroup

CONFERENCES AND WORKSHOPS

University of Massachusetts, Amherst Summer School 2011
University of Massachusetts, Amherst Summer School 2012
Brandeis Microfluidics Summer Program 2012
ICERM IdeaLab Program for Early Career Researchers 2014
ICERM Semester Program: Pattern Formation in Soft Matter, Spring 2015
ICERM Workshop: Integrability in Mechanics and Geometry, Summer 2015

TEACHING EXPERIENCE

Teaching Assistantship, Brown University *2011 - present*

1. Engineering 1370, Spring 2013, Advanced Mechanics
2. Engineering 2010, Fall 2013, Mathematical Methods for Physicists and Engineers I
3. Engineering 2020, Spring 2014, Mathematical Methods for Physicists and Engineers II
4. Engineering/Physics 2010, Fall 2014, Mathematical Methods for Physicists and Engineers I
5. Engineering 1210, Spring 2015, Biomechanics
6. Physics 2470/Engineering 2912F, Fall 2015, Advanced Statistical Mechanics / Soft Matter
7. Engineering 1210, Spring 2016, Biomechanics

Peace Corps Volunteer, Crimea, Ukraine *2009 - 2010*

1. English and Physics, School No. 1, Kerch, Crimea, Ukraine