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## Appointments & Education

- 2012 **Visiting Assistant Professor**, Department of Physics, Haverford College.
- 2010-2012 **Interim Professor**, Department of Physics, Bryn Mawr College.
- 2010 **Ph.D. Physics**, Drexel University.  
Adviser: Dr. Robert Gilmore. Thesis: *Representation Theory of Dynamical Systems*.
- 2005 **M.S. Physics**, Drexel University.
- 2002 **B.S. Mathematics & B.A. Physics**, Cedarville University.  
Minors: Philosophy, Bible, & Honors.
- Member AAAS, ASA, &  $\Sigma\Pi\Sigma$ .
- Referee Physics Letters A, Journal of Discrete and Continuous Dynamical Systems B, & CRC Press.

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## Research Interests

- Understanding the structure of low dimensional chaos.  
Applying topology and group theory to physics.

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## Teaching Experience

### Haverford College

- 2012 PHYS 101, *Classical & Modern Physics I*.  
2012 PHYS 213, *Waves and Optics*.

### Bryn Mawr College

- 2012 PHYS 302, *Advanced Quantum Mechanics*.  
2012 PHYS 122, *Classical Mechanics*.  
2010-2011 PHYS 101, 102, 121, & 122 Laboratory Instructor.  
2010-2011 PHYS 101, *Introductory Physics I*.  
2011 PHYS 102, *Introductory Physics II*.

### Drexel University

- 2008-2010 Graduate student advanced topics independent study group leader.  
2009 PHYS 405, *Advanced Computational Physics*, Teaching Assistant.  
2005-2007 TDEC 201, *Energy I*, Teaching Assistant.  
2003-2005 TDEC 111, 113, & 115, *Physical Foundations of Engineering I-III*, Teaching Assistant.  
2003-2005 TDEC 140-142, *Physics Practicum I-III*, Teaching Assistant.  
2002-2003 PHYS 101, *Fundamental of Physics I*, Teaching Assistant.

### Cedarville University

- 2001-2002 PHYS 2110, 2120, & 2130, *General Physics I-III*, Grader.  
2001-2002 PHYS 3110, *Intermediate Physics Lab*, Grader.  
1998-2002 Cedar Cliff Middle / High School, Mathematics Tutor.

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## Other Experience

- 2011 **Introductory Labs**, Bryn Mawr College  
Rewrote lab assignments (Chaos, Magnetism; Forced, Damped Harmonic Oscillator; Springs).
- 2008-2010 **Thesis Template**, Drexel University  
Improved and maintained a L<sup>A</sup>T<sub>E</sub>X class file conforming to University guidelines.
- 2006-2010 **Linux Wiki**, Drexel University (<http://www.physics.drexel.edu/liki>).  
Co-founder and major contributor.
- 2007-2009 **Webmaster**, Physics Department, Drexel University.  
Designed and maintained department and research group webpages.
- 2005-2007 **Sysadmin**, Astrophysics Group, Drexel University.  
Maintained 15 mixed OS machines (Linux, Mac).  
Maintained 48 node (96 core) Beowulf cluster.

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## Refereed Publications

- Complete Set of Representations for Dissipative Chaotic Three-Dimensional Dynamical Systems*,  
**Daniel J. Cross** and R. Gilmore, Phys. Rev. E., **82**, 056211 (2010).
- A Schwinger Disentangling Theorem*,  
**Daniel J. Cross** and R. Gilmore, J. Math. Phys., **51**, 103515 (2010).
- Equivariant Differential Embeddings*,  
**Daniel J. Cross** and R. Gilmore, J. Math. Phys., **51**, 092706 (2010).
- Differential Embedding of the Lorenz Attractor*,  
**Daniel J. Cross** and R. Gilmore, Phys. Rev. E., **81**, 066220 (2010).
- A Biological Algorithm for Data Reconstruction*,  
**Daniel J. Cross**, Ryan Michaluk, and R. Gilmore, Phys. Rev. E., **81**, 036217 (2010).
- Representation Theory for Strange Attractors*,  
**Daniel J. Cross** and R. Gilmore, Phys. Rev. E., **80**, 056207 (2009).

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## Non-Refereed Publications

- Resolution of the Mansuripur Paradox*, arXiv:1205.5451 (2012).
- Solution to the Charge-Curvature Problem in Two Dimensions* (2011).
- Comment on "CPT symmetry and antimatter gravity in general relativity,"* arXiv:1108.5117 (2011).
- From Force to Torque: A Simple Model of a Rigid Body* (2011).
- Linking Integral Projection*, arXiv:0907.3446 (2010).
- On the Flux Rule* (2009).
- On the Relation between Real and Complex Jacobian Determinants* (2008).
- Comments on the Cooperstock-Tieu Galaxy Model*, arXiv:astro-ph/0701019 (2005).
- Anisotropy of Inertia from the CMB Anisotropy* (2004).

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## Presentations & Conferences

### Talks

- 2011 **Representation Theory of Dynamical Systems**,  
*From Lasers to Topology Workshop*, Rouen, France.
- 2010 **A Biological Algorithm for Data Reconstruction**,  
*Eleventh Experimental Chaos and Complexity Conference*, Lille, France.

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## Presentations & Conferences (continued)

- 2010 **Why Spinors?**,  
*Physics Graduate Students Association*, Drexel University.
- 2009 **Solving the Schrödinger Equation with Lie Algebras**,  
*Analysis Seminar*, Drexel University.
- 2009 **From Quantum Mechanics to Maxwell's Equations**,  
*Physics Graduate Students Association*, Drexel University.
- 2008 **Paradoxical Twins: Beyond an Introduction**,  
*Physics Graduate Students Association*, Drexel University.

### Posters

- 2010 **Differential Embeddings of The Lorenz Attractor**,  
*Eleventh Experimental Chaos and Complexity Conference*, Lille, France  
*University Research Day & CoAS Research Day*, Drexel University.
- 2009 **Representation Theory for Strange Attractors**,  
*Topology and Physics Seminar*, Drexel University,  
*University Research Day & CoAS Research Day*, Drexel University.
- 2008 **A Biological Algorithm for Data Reconstruction**,  
*University Research Day & CoAS Research Day*, Drexel University.

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## Awards & Honors

- 2002-2010 Full Fellowship and Teaching Assistantship, Drexel University.
- 2009 Erdős Number: Three.
- 2009 Nominated for University Research Award, Drexel University.
- 2004-2007 Four-time TA Excellence Award recipient, Drexel University.
- 2002 Science Award in Physics, Cedarville University.

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## Computer Skills

- Languages C, Perl, Python, HTML/CSS, Javascript, PHP,  $\LaTeX$ , Maple.
- Systems Linux (Gentoo, RedHat, Fedora, Ubuntu), Windows.
- Parallel MPI, MPE, CUDA.
- Experience HTML5 applet illustrating Zeeman's Catastrophe Machine (originally in Flash).  
Java applet illustrating Arnold's "cat" map.  
Various short programs and scripts for manipulation time series data from dynamical systems.  
Wrote a script for batch processing Metapost files through  $\LaTeX$ .

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## Graduate Course Work

- Physics Nonlinear Dynamics, Group Theory, General Relativity, Cosmology, Nuclear & Particle Physics, Classical Mechanics, Statistical Mechanics, Quantum Mechanics, Electromagnetics, Mathematical Physics.
- Mathematics Bifurcations and Chaos, Algebraic Topology, Differential Topology, Abstract Algebra.