R. Andrew Hicks
Associate Professor
Department of Mathematics
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Education

1995-1996	Department of Computer Science, University of Pennsylvania
	Masters degree program
1992-1995	Department of Mathematics, University of Pennsylvania
	Ph.D. in Mathematics
1988-1992	Department of Mathematics, University of Pennsylvania
	M.A. in Mathematics
1984-1988	Queens College of the City University of New York
	B.A. in Mathematics
1980-1984	The Bronx High School of Science

Employment

Sept. 2005 - Present	**Associate Professor** Department of Mathematics, Drexel University.
July 2002 - August 2005	**Assistant Professor** (tenure-track) Department of Mathematics, Drexel University.
1999 -July 2002	**Assistant Professor** (tenure-track) Department of Mathematics and Computer Science, Drexel University.
1996 - 1999	**Postdoctoral Research Assistant** GRASP Laboratory, Department of Computer and Information Sciences, University of Pennsylvania.
1996 - 1997	**Lecturer** Department of Mathematics, Bryn Mawr College.
1988 - 1992	**Teaching Assistant** Department of Mathematics, University of Pennsylvania.
1984	**Computer Programmer** Department of Psychology, New York University, N.Y., N.Y.
1984	**Computer Programmer** Cosmos Typesetters, N.Y., N.Y.

Advisors

Graduate	Wolfgang Ziller, Department of Mathematics, University of Pennsylvania.
Postdoctoral	Ruzena Bajcsy, Department of EECS, University of California at Berkeley.

Ph.D. Thesis

Subject Area	Differential Geometry
Title	Groups Actions and the Topology of Nonnegatively Curved 4-manifolds.

Funding

1. Organization: National Science Foundation
   Award: NSF IIS-0413012
   Program: IIS Robotics
   Title: Micromirror Arrays for Imaging
   PI: R. Andrew Hicks
   CO-PI: Timothy Kurzweg
   Award amount: $340,000
   Proposed duration: 36 months
   Requested starting date: 7/01/04
2. Organization: DARPA/NSF
   Program: Photonics Technology Access Program
   Title: Digital Micromirror Arrays for Catadioptric Sensors
   PI: R. Andrew Hicks
   CO-PI: Timothy Kurzweg
   Award: 4 1-DOF Micromirror arrays
   Award date: 1/12/04
3. Organization: National Science Foundation
   Program: DMS, Interdisciplinary Grants in the Mathematical Sciences
   Award: DMS-0211283
   Title: Digital Lenses
   PI: R. Andrew Hicks

CO-PI: Donna Murasko

Award amount: $ 99,999

Proposed duration: 12 months

Requested starting date: 10/1/03

Awards and Honor Societies

1993-1995	Department of Education Graduate Fellowship
1992	Good Teaching Award
	Department of Mathematics, University of Pennsylvania
1991	Good Teaching Award
	Department of Mathematics, University of Pennsylvania
1990	Good Teaching Award
	Department of Mathematics, University of Pennsylvania
1988	Phi Beta Kappa, Queens College
1988	Magna Cum Laude, Queens College
1988	Arthur Sard Award in Mathematics, Queens College
1984	New York State Regents Scholar
1984	Westinghouse Science Talent Search Semi-finalist

Teaching Experience

1. tDEC 110 - The Mathematical Foundations of Engineering, Fall 2005, Drexel University.
2. Math 680 The Mathematics of Images, Spring 2005, Drexel University.
3. Math 221 Discrete Mathematics, Winter 2005, Drexel University.
4. Math 480 The Mathematics of Medical Imaging, Winter 2005, Drexel University.
5. Math 200 Multivariable Calculus, Fall 2004, Spring 2005 Drexel University.
6. Math 680 The Mathematics of Computer Vision, Spring 2003, Drexel University.
7. Math 201 Linear Algebra, Drexel University, Spring 2003, Drexel University.
8. Math 290 Linear Modeling for Engineers, Fall 2002, Drexel University.

9. CS 260 Data Structures, Fall 1999, Winter 2000, Spring 2000, Winter 2001, Fall 2001, Spring 2002, Drexel University.
10. CS 743 Cryptography and Network Security, Spring 2001, Winter 2002, Drexel University.
11. CS 559 Formal Language Theory, Summer 2000, Fall 2000, Drexel University.
12. Robotics for High School Teachers, Summer 1998, Institute for Research in Cognitive Science, University of Pennsylvania.
13. CIS 680 Topics in Machine Vision, Spring 1997, University of Pennsylvania.
14. Math 102 Calculus II, Spring 1997, Bryn Mawr College.
15. Math 101 Calculus I, Fall 1996, Bryn Mawr College.
16. Math 241 Calculus IV, Summer 1992, 1995, University of Pennsylvania.
17. Math 420 Differential Equations, Summer 1994, University of Pennsylvania.
18. Penn Summer Science Academy, Summer 1993, University of Pennsylvania.
19. Math 130 Calculus I, Summer 1993, University of Pennsylvania.
20. Pennlincs Science Mentoring Program, 1991, 1996-99.
21. Math 370 Abstract Algebra, Summer 1992 University of Pennsylvania.
22. Math 260 Mathematical Analysis, Summer 1990, 1991, University of Pennsylvania.

Professional Societies

• Member of the Society for Industrial and Applied Mathematics

Program Committees/Reviewer

• Organizer, SIAM Minisymposium on the Mathematics of Panoramic Vision Sensors, Portland Oregon, July 12, 2004.

• National Science Foundation CISE Panel Member, June 2-3 2005.

• IEEE Transactions on Pattern Analysis and Machine Intelligence

• IEEE Transactions on Robotics and Automation

• IEEE Special Issue on Omnidirectional Vision in Robotics

• Journal of Mathematical Imaging and Vision

• Journal of the Optical Society of America

- SPIE Journal of Electronic Imaging
- Hybrid Systems 1998
- OMNIVIS 2000, 2003, 2004, 2006
- Computer Vision and Pattern Recognition 2004, 2005, 2006
- Vision Interface 01
- Computer Vision and Image Understanding
- Optics Communications
- Optics Express
- European Conference on Computer Vision 2006

Invited Talks

1. The blindspot problem and panoramic vision. Department of Computer Science, Drexel University, October 13th, 2005.
2. Sideview mirrors and panoramic cameras. Department of Mathematics, Haverford College, March 28th, 2005.
3. Designing a mirror to realize a given projection. Department of Physics, Drexel University, January 27th 2005.
4. Catadioptric sensor design. SIAM minisymposium on the mathematics of panoramic vision sensors, Portland Oregon, July 12, 2004.
5. The hodge theorem for panoramic camera design. Department of Mathematics, The City University of New York Graduate Center, May 12, 2004.
6. The hodge theorem for panoramic camera design. Department of Mathematics, St. Joseph's University, April 30, 2004.
7. The hodge theorem for panoramic camera design. Department of Mathematics, University of Pennsylvania, March 30, 2004.
8. The hodge theorem for panoramic camera design. Department of Mathematics, University of Georgia, March 23, 2004.
9. Micromirror arrays, imaging, and simulation. Lucent Technologies, November 3rd, 2003.
10. Catadioptric sensor design. Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, October 3, 2003.

11. The differential approach to panoramic and omnidirectional sensor design. Department of Mathematics, Lehigh University, June 14, 2003.

12. Differential methods in catadioptric sensor design. Department of Computer Science, Columbia University, April 25, 2003.

13. The differential approach to panoramic and omnidirectional sensor design. Department of Mathematics, St. Joseph's University, April 14, 2003.

14. The mathematics of panoramic and omnidirectional sensors. Department of Mathematics, Department of Mathematics, Millersville University, March 13, 2003.

15. The mathematics of panoramic and omnidirectional sensors. Department of Mathematics, Department of Mathematics, Oregon State University, February 18, 2003.

16. The mathematics of panoramic and omnidirectional sensors. Department of Mathematics, Drexel University, November 20, 2002.

17. Mathematics and mirrors. Drexel Open House, Department of Mathematics, Drexel University, November 10, 2002.

18. The mathematics of panoramic and omnidirectional sensors. **Keynote speaker**, Eastern Pennsylvania and Delaware Valley Chapter of the MAA Meeting, University of Pennsylvania, November 9, 2002.

19. Catadioptric sensors. Department of Computer and Information Sciences, University of Pennsylvania, October 25, 2001.

20. Catadioptric sensors. Agere Systems, August 21, 2001.

21. The mathematics of omnidirectional vision. Department of Mathematics, University of Pennsylvania, March 24, 2001.

22. Passenger side mirrors without blindspots. Delta Industries, November 11, 2001.

23. Flatmaps and geometry. Department of Radiology, University of Pennsylvania, November 2, 2000.

24. Catadioptric sensors: how to take really wide-angle pictures. Department of Mathematics, Swarthmore College, October 26, 2000.

25. Catadioptric sensors that approximate wide-angle perspective projections. Colloquium, Department of Mathematics and Computer Science, Drexel University, January 13, 2000.

26. Wide-angle sensors. Freshman seminar, Drexel University, October 26, 1999.

27. Computational topology. National Science Foundation Workshop on Computational Topology, Miami, June 11, 1999.

28. Omnidirectional vision. Department of Mathematics, University of Pennsylvania, March 1999.

29. Panoramic sensors for robotics and computer vision. Department of Mathematics and Computer Science, Drexel University, February 10, 1999.

30. Panoramic vision in robotics. Department of Chemistry, New York University, January 15, 1999.

31. Inverse problems in computer vision. First Annual Undergraduate Summer Workshop in Cognitive Science, Institute for Research in Cognitive Science, University of Pennsylvania, June 10, 1998.

32. Robotics and computer vision. The Dining Philosophers, University of Pennsylvania, November 24, 1997.

33. Models of computation. Department of Mathematics, University of Pennsylvania, November 10, 1997.

34. Robot motion planning and 2-manifolds. Department of Mathematics, Haverford College, January 24, 1997.

35. Group actions and the topology of nonnegatively curved 4-manifolds. Department of Mathematics, University of Pennsylvania, April 20, 1995.

36. Group actions and the topology of nonnegatively curved 4-manifolds. Geometry and Topology Conference, Lehigh University, June 11, 1994.

Patents

[1] R. A. Hicks, Rectifying Mirror. United States Patent 6,412,961, July 2, 2002.

Journal Articles

[1] R. A. Hicks, R. Perline. Equiresolution catadioptric sensors. *Applied Optics*, Volume 44, Issue 29, October 2005, pages 6108-6114.

[2] R. A. Hicks, R. Perline. The blindspot problem for motor vehicles. *Applied Optics*, Volume 44, Issue 19, July 2005, pages 3893-3897.

[3] R. A. Hicks Designing a mirror to realize a given projection. *Journal of the Optical Society of America* A, Volume 22, Issue 2, February 2005, pages 323-330.

[4] R. A. Hicks, R. Bajcsy. Reflective surfaces as computational sensors. *Image and Vision Computing*, Volume 19, Issue 11, September 2001, pages 773-777.

[5] R. A. Hicks, D. Pettey, K. Daniilidis and R. Bajcsy. Closed form solutions for reconstruction via complex analysis. *Journal of Mathematical Imaging and Vision*, Volume 13, Issue 1, August 2000, pages 57-70.

[6] R. A. Hicks. Group actions and the topology of non-negatively curved 4-manifolds. *Illinois Journal of Mathematics*, Volume 41, Number 3, Fall 1997, pages 421-437.

Book Chapters

[1] R. A. Hicks, D. Pettey, K. Daniilidis and R. Bajcsy. Global signatures for robot control and reconstruction. "Robust Vision for Vision-Based Control of Motion" , edited by Marcus Vincze and Greg Hager, SPIE/IEEE Series on Imaging Science & Engineering, February 1999, pages 127-135.

Refereed Conference Papers

[1] V. T. Nasis, R. A. Hicks, T. Kurzweg. Digital Photographic Imaging Accepted for oral presentation and publication in Proceedings of IEEE Photonics West 2006.

[2] R. A. Hicks, T. Kurzweg. Micromirror array theory for imaging sensors Proceedings of SPIE Volume 5721 MOEMS Display and Imaging Systems III, Hakan Urey, David L. Dickensheets, Editors, January 2005, pages 182-189.

[3] R. A. Hicks, R. Perline. The method of vector fields for catadioptric sensor design with applications to panoramic imaging *Proc. of CVPR 2004*, Washington D.C., June 2004, pages 584-589.

[4] R. A. Hicks, R. Perline. Equi-areal catadioptric sensors *Proc. of Omnivis 2002*, Copenhagen, Denmark, June 2002, pages 13-18.

[5] R. A. Hicks, R. Perline. Geometric distributions for catadioptric sensor design. *Proc. of IEEE Conference on Computer Vision and Pattern Recognition*, Kauai, Hawaii, December 2001, pages 584-589.

[6] R. A. Hicks, R. Perline and M. Coletta. Catadioptric sensors for panoramic viewing. *Proc. of International Conference on Computing and Information Technology*, Montclair New Jersey, October 12, 2001, pages 465-470.

[7] R. A. Hicks, R. Bajcsy. Catadioptric sensors that approximate wide-angle perspective projections. *Proc. of IEEE Conference on Computer Vision and Pattern Recognition*, Hilton Head, South Carolina, 2000, pages 545-551.

[8] R. A. Hicks, R. Bajcsy. Reflective surfaces as computational sensors. *Proc. of the IEEE Workshop on Perception for Mobile Agents*, Fort Collins, Colorado, June 26, 1999, pages 82-86.

[9] R. A. Hicks, D. Pettey, K. Daniilidis and R. Bajcsy. Complex analysis for reconstruction from controlled motion. *Proc. of the 9th International Conference on Computer Analysis of Images and Patterns*, Ljubljana, 1999, Springer Lecture Notes in Computer Science Volume 1689, pages 301-310.