Prashant Athavale

Assistant Professor, Mathematics

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Education

2004–2009	**Doctor of Philosophy in Applied Mathematics and Scientific Computation** *University of Maryland,* College Park, MD
Thesis	"Novel integro-differential schemes for multiscale image representations"
Advisor	Prof. Eitan Tadmor
2004–2007	**Master of Science in Applied Mathematics and Scientific Computation** *University of Maryland,* College Park, MD
2002–2003	**Master of Science in Applied Mathematics** *University of Toledo,* Toledo, OH
2000–2001	**Master of Science in Electrical Engineering** *University of Toledo,* Toledo, OH
1995–1999	**Bachelor of Engineering in Electrical Engineering** *Veermata Jijabai Technological Institute, University of Mumbai,* MH, India.

Professional Employment

2018–present **Assistant Professor** *Clarkson University,* Potsdam, NY, U.S.A.
- Research on image processing and data science
- Teaching undergraduate and graduate level mathematics courses

2015–2018 **Lecturer** *Johns Hopkins University,* Baltimore, MD, U.S.A.
- Taught various courses including Biostatistics, Scientific computing with Python, Real Analysis, and Dynamical Systems & Chaos
- Mentored more than 20 students as an academic advisor
- Created a new course on Real Analysis for incoming PhD students

2011–2015 **Fields Ontario Postdoctoral Fellow** *University of Toronto, & Schulich Heart Research,* Toronto, ON, Canada
- Invented a fast image quality enhancement algorithm based on fast multiscale decomposition
- Developed a new multiscale image registration method based on total variation flow
- Worked on numerical simulations of problems involving superfluidity
- Currently working on image inpainting problems with multiscale TV flow

2009–2011 **Postdoctoral Scholar** *University of California, & Placental Analytics,* Los Angeles, CA, U.S.A.
- Blood vessel segmentation from placental images
- Developed C++ interface for analysis of H&E (hematoxylin and eosin) stained images
- Developed algorithms for blood-tissue segmentation from H&E images
- Worked on a novel fetal stem tree extraction algorithm using global/local image registration and Chan-Vese segmentation

Awards & Honors

2017	**Professor Joel Dean Award for Excellence in Teaching** in the Department of Mathematics and Statistics, Johns Hopkins University, *Baltimore,* MD, U.S.A.

2014	**The Frederick V. Atkinson Teaching Award**, for outstanding performance as an instructor and significant contribution to undergraduate teaching in the Department of Mathematics, University of Toronto, *Toronto,* ON, Canada.
2011	**Fields Ontario Postdoctoral Fellowship** *Toronto,* ON, Canada.
2010	**NIH New Investigator Travel Award** *for research on human placenta in IFPA meeting,* Santiago, Chile.
2007–2008	**Student Representative** on Graduate Student Government *(elected twice) University of Maryland,* College Park, MD, U.S.A.

Research Interests

Numerical analysis, calculus of variations, partial differential equations, image processing, biomedical imaging, statistics, machine learning

Patents & Inventions

2014	International patent application: *"Fast Image Quality Enhancement by Weighted Total Variation Flow"*

Technical Reviewing Services

Associate Editor	*'Signal, Images and Video Processing Journal' by Springer*
Reviewer	*'Current Medical Imaging Reviews*
Reviewer	*Oxford University Press*

Management & Engineering Experience

1999–2000	**Officer** *Bharat Petroleum Corporation Limited,* Mumbai, MH, India.

- Led a team of technicians to ensure proper operation of induction motors and other electrical equipment in the petroleum refinery
- Effectively managed the inventory of the electrical workshop
- Supervised testing of electrical equipment at various contractor locations
- Studied major electrical faults in the refinery during 1990 to 1999 and compiled a reference manual

Publications

1. Prashant Athavale, Robert Jerrard, Matteo Novaga, Giandomenico Orlandi, *Weighted TV minimization and applications to vortex density models*, Journal of Convex Analysis, 24(2), 1051–1084, 2017.

2. Zhang Li, Prashant Athavale, Mihaela Pop, Graham Wright *Multicontrast reconstruction using compressed sensing with low rank and spatially varying edge preserving constraints for high resolution MR characterization of myocardial infarction.* Magnetic Resonance in Medicine. 78(2): 598–610, August 2017.

3. Yves Gennip, Prashant Athavale, Jérôme Gilles, Rustum Choksi, *A Regularization Approach to Blind Deblurring and Denoising of QR Barcodes,* IEEE Transactions on Image Processing, Vol 24, No. 9, pp. 2864–2873, September 2015.

4. Prashant Athavale, Robert Xu, Perry Radau, Adrian Nachman, Graham Wright, *Multiscale Properties of Weighted Total Variation Flow with Applications to Denoising and Registration,* Medical Image Analysis, 23(1), 28–42, April 2015.

5. Robert Xu, Prashant Athavale, Adrian Nachman, and Graham Wright, *Multiscale Registration of Realtime and Prior MRI Data for Image Guided Cardiac Interventions* IEEE Transactions for Biomedical Engineering, vol 61, issue 10, pp. 2621–2632, October 2014.

6. Robert Xu, Prashant Athavale, Yingli Lu, Perry Radau, Graham Wright. *Myocardial segmentation in late enhancement MR images via registration and propagation of cine contours,* IEEE International Symposium on Biomedical Imaging: From Nano to Macro, San Francisco, CA, 2013.

7. Prashant Athavale, Robert Xu, Perry Radau, Adrian Nachman, and Graham Wright, *Multiscale TV flow with applications to fast denoising and registration*, SPIE Medical Imaging: image processing (Lake Buena Vista, Florida, USA), February 2013.

8. Prashant Athavale, and Luminita Vese, *Placental fetal stem segmentation in a sequence of histology images*, SPIE, Medical Imaging 2012: Image Processing, Proceedings of the SPIE, Volume 8314, pp. 83143A-83143A-6, 2012.

9. Prashant Athavale, and Eitan Tadmor, *Integro-differential equations based on (BV, L^1) minimization*, SIAM Journal on Imaging Science, 2011.

10. Eitan Tadmor, and Prashant Athavale, *Multiscale image representation using novel integro-differential equations*, Inverse problems in imaging 2009.

11. Prashant Athavale, *Energy methods with edge enhancement, academic communication for creation, purple ocean conference*, (Seoul), vol. 2, Kyung-hee University, September 2008, pp. 53-63.

12. Ezzatollah Salari and Prashant Athavale, *Acceleration in iterative image restoration by manipulation of the gain parameter*, Image Processing: Algorithms and Systems II (Santa Clara), vol. 5014, SPIE, January 2003, pp. 213–220.

Abstracts in Medical Journals

13. Robert Xu, Prashant Athavale, Philippa Krahn, Kevan Anderson, Jennifer Barry, Labonny Biswas, Venkat Ramanan, Nicolas Yak, Mihaela Pop, Graham Wright, *Respiratory motion model based correction for improving the targeting accuracy of MRI-guided intracardiac electrophysiology procedures*, accepted to SCMR/EuroCMR Joint Scientific Sessions, Abstract #2083559, 2015.

14. Li Zhang, Prashant Athavale, Venkat Ramanan, Jennifer Barry, Garry Liu, Nilesh Ghugre, Mihaela Pop, Graham Wright, *Improved Characterization of Infarct Heterogeneity using Compressed Sensing and temporal PCA with Weighted Total Variation* accepted to SCMR/EuroCMR Joint Scientific Sessions, Abstract # 2092919, 2015.

15. Prashant Athavale, Luminita Vese, Carolyn Salafia, *Automated tracking of fetal stems from inaccurate initial guess*, Abstracts for International Federation of Placenta Associations Meeting 2011, 32, no. 9, Abstract # P1.19

16. Prashant Athavale, Carolyn Salafia, Luminita Vese, *Villous structural study based on multilevel registration*, Abstracts for International Federation of Placenta Associations Meeting 2010, **31**, no. 9, Abstract # P3.10

17. Prashant Athavale, Pascal Getreuer, Carolyn Salafia, *Analysis of inflammation in regards to distance of neutrophil migration in histopathology images: a marker of infection severity/duration?*, Abstracts for International Federation of Placenta Associations Meeting 2010, **31**, no. 9, Abstract # P3.11.

Presentations

- Department of Mathematics, Indian Institutes of Science Education and Research, India, 2016.
- Department of Mathematics, U.S. Naval Academy, Annapolis, Maryland, 2014.
- Department of Mathematics, Tata Institute of Fundamental Research, Bangalore, India, December, 2013.
- Department of Mathematics, McGill University, Montreal, Canada, September, 2013.
- Center for Scientific Computation and Mathematical Modeling, University of Maryland, College Park, MD, USA, February, 2013.
- National Institute of Standards and Technology, Gaithersburg, MD, USA, February 2013.
- Department of Mathematics, Central Michigan University, Mount Pleasant, MI, USA, January, 2013.
- Sunnybrook Research Institute, Toronto, Canada, June 2012.
- Department of Mathematics, University of Toronto, Toronto, Canada, May 2012.
- Department of Mathematics, University of California, San Diego, California, USA, January 2011.
- Analytic and Geometric Methods in Medical Imaging, Cambridge, United Kingdom, August, 2011.
- 7th International Congress on Industrial and Applied Mathematics, Vancouver, Canada, July 2011.
- Opera Solutions, San Diego, California, USA, February 2011.
- Department of Mathematics, California State University, Northridge, California, USA, November 2010.
- Conference on mathematics of medical imaging, Fields Institute, Canada, June 2010.
- Department of Mathematics, California State University, Northridge, California, USA, April 2010.
- SIAM Imaging Science 2010, Chicago, USA, April 2010.
- Department of Radiology, Loma Linda University, California, USA, March 2010.
- Department of Mathematics, University of California, Los Angeles, USA, November 2009.
- Academic communication for creation, purple ocean conference, Kyung-hee University, September 2008.

Teaching Experience

2018 Advanced Engineering Mathematics, *Clarkson University*

2018 Probability & Statistics for the Life Sciences, *Johns Hopkins University*

2018 Probability & Statistics for Engineers, *Johns Hopkins University*

2018 Scientific Computation with Python *Johns Hopkins University*

2017 Real Analysis, *Johns Hopkins University*

2017 Probability & Statistics for the Life Sciences, *Johns Hopkins University*

2017 Scientific Computing with Python, *Johns Hopkins University*

2016	Probability & Statistics for Engineering, *Johns Hopkins University*
2016	Probability & Statistics for the Life Sciences, *Johns Hopkins University*
2016	Scientific Computing with Python, *Johns Hopkins University*
2015	Probability & Statistics for Engineering, *Johns Hopkins University*
2015	Dynamical Systems & Chaos, *Johns Hopkins University*
2015	Linear Algebra and Differential Equations, *Johns Hopkins University*
2015	Calculus II: single & multivariate , *University of Toronto*
2014	Calculus III: Multivariate calculus, *University of Toronto*
2014	Calculus II: single & multivariate , *University of Toronto*
2013	Multivariate calculus, *University of Toronto*
2013	Calculus II: single & multivariate , *University of Toronto*
2012	Single variable calculus, *University of Toronto*
2012	Calculus: early transcendentals, *University of Toronto*
2011	Advanced numerical methods, *University of California, Los Angeles*
2009	Multivariate calculus, *University of Maryland, College Park*
2008	Single variable calculus, *University of Maryland, College Park*
2007	Single variable calculus, *University of Maryland, College Park*
2006	Single variable calculus, *University of Maryland, College Park*
2005	Single variable calculus, *University of Maryland, College Park*
2005	Mathematics for life sciences, calculus & statistics *University of Toledo*
2005	Mathematics for life sciences, calculus & statistics *University of Toledo*
2004	College algebra, *University of Toledo*
2004	College algebra, *University of Toledo*
2003	College algebra, *University of Toledo*
2003	College algebra, *University of Toledo*
2002	Elementary algebra II, *University of Toledo*
2002	Elementary algebra I, *University of Toledo*

Teaching assistant

2006	Multivariate calculus, *University of Maryland, College Park*
2006	Linear algebra, *University of Maryland, College Park*
2005	Differential equations, *University of Maryland, College Park*

Tutoring experience

2005 – 2007	Mathematics & statistics *Mathlab, University of Maryland, College Park*
2002 – 2005	Mathematics, statistics, & physics *Learning Enhancement Center, University of Toledo, Toledo*

Mentoring experience

2011	While at UCLA I mentored Research in Industrial Projects for Students (RIPS) 2011 summer students.
2012	I was given the opportunity to supervise research conducted by Fields institute's Summer Research School on the Mathematics of Medical Imaging

Computer Skills

Advanced   Matlab, C/C++, Python, R

Scripts   HTML, LaTeX, Word

Other   Mathematica, Maple, Excel

Unix, OS X, Microsoft Windows