

CURRICULUM VITAE

WEI ZHU

**DEPARTMENT OF MATHEMATICS
UNIVERSITY OF ALABAMA**

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Employment:

08/2008 – present

Assistant Professor (tenure-track)
Department of Mathematics
University of Alabama, Tuscaloosa

09/2004 – 08/2008

Postdoctoral Researcher (Courant Instructor)
Courant Institute of Mathematical Sciences
New York University
Mentors: Prof. Michael J. Shelley
Prof. Robert M. Shapley

Education:

06/2004

Ph.D. in Mathematics
University of California, Los Angeles
Advisor: Prof. Tony F. Chan
Thesis Title: Variational Models for Illusory Contours and Shape Prior Segmentation

07/1999

M.S. in Mathematics
Peking University, P.R. China
Advisor: Prof. Kung-Ching Chang
Thesis Title: The Realization and Comparison of Three Typical Image Segmentation Models

07/1994

B.S. in Mathematics
Tsinghua University, P.R. China

Areas of Research Interest:

- Image processing and computer graphics
- Computational neuroscience
- Mathematical modeling and simulation on active materials
- Partial differential equations and variational methods

13. Wei Zhu and Tony F. Chan, **A variational model for capturing illusory contours using curvature.** *Journal of Mathematical Imaging and Vision*, 27(2007), pp. 29-40.
14. Wei Zhu, Tony F. Chan, and Selim Esedoglu, **Segmentation with depth: A level set approach.** *SIAM Journal on Scientific Computing*, 28 (2006), pp. 1957-1973
15. Tony F. Chan and Wei Zhu, **Level set based shape prior segmentation.** *Proc. IEEE Conf. on Computer Vision and Pattern Recognition, CVPR (2)* pp. 1164-1170, San Diego, June 2005.

Presentations:

- *Image denoising using mean curvature of image surface*, Institute of Natural Sciences, Shang Hai Jiao Tong University, P.R. China, Jun.18, 2013.
- *Simulation on liquid crystal elastomers using spectral methods with a new preconditioner*, SIAM Conference on Mathematical Aspects of Materials Science (MS13), Jun. 9-12, 2013, Philadelphia, Pennsylvania.
- *A geodesic active contour based model for short axis cardiac-MR image segmentation*, SIAM Conference on Imaging Science (IS12), May.20-22, 2012, Philadelphia, Pennsylvania.
- *Image denoising using mean curvature of image surface*, International Conference on Scientific Computing, Jan. 4-7, 2012, Hong Kong.
- *Modeling and simulation of nematic liquid crystal elastomers*, Mathematics and Statistics, Auburn University, Oct. 28, 2011.
- *Modeling and simulation of nematic liquid crystal elastomers*, SIAM Conference on Mathematical Aspects of Material Science (MS10), May.23-26, 2010, Philadelphia, Pennsylvania.
- *Mean curvature based image denoising*, SIAM Conference on Imaging Science (IS10), Apr.12-14, 2010, Chicago, Illinois.
- *Modeling and simulation of nematic liquid crystal elastomers*, Twenty-Second Annual University of Alabama System Applied Mathematics Meeting, Nov. 2009.
- *A fast and exact algorithm of minimizing the Rudin-Osher-Fatemi functional in one dimension*, School of Mathematics, Georgia Institute of Technology, Oct.12, 2009.
- *Modeling and simulation of nematic liquid crystal elastomers*, (poster presentation) the 5th International Liquid Crystal Conference, Sept. 24---26, 2009.
- *A neuronal network model of primary visual cortex explains spatial frequency selectivity*, (organizer and speaker) 2009 SIAM Conference on Dynamical Systems, Snowbird, Utah, May.17—May21, 2009.
- *A neuronal network model of primary visual cortex explains spatial frequency selectivity*, Neuroscience Annual Meeting 2008, Washington DC, Nov.18, 2008.

Before starting at the University of Alabama, Tuscaloosa

- *A neuronal network model of primary visual cortex explains spatial frequency selectivity*, (poster presentation) Sloan-Swartz Meeting 2008, Princeton University, Jul.22, 2008.
- *Modeling and Simulation of Liquid Crystal Elastomers*, Department of Mathematical Sciences, Kent State University, Kent, OH, Mar. 7, 2008.
- *Modeling and Simulation of Liquid Crystal Elastomers*, School of Mathematics, Georgia Institute of Technology, Atlanta, GA, Feb. 12, 2008.
- *Modeling and Simulation of Liquid Crystal Elastomers*, Department of Mathematics, University of Alabama, Tuscaloosa, AL, Feb. 4, 2008.
- *Modeling and Simulation of Liquid Crystal Elastomers*, Department of Mathematics, Louisiana State University, Baton Rouge, LA, Jan. 29, 2008.
- *Two Mathematical Problems in Vision*, Department of Mathematics, Washington State University, Pullman, WA, Mar. 20, 2007.
- *Two Mathematical Problems in Vision*, Department of Mathematics, University of Connecticut, Storrs, CT, Feb. 8, 2007.
- *Level Set Based Shape Prior Segmentation*, IEEE Computer Society Conference on Computer Vision and Pattern Recognition, San Diego, CA, Jun. 20-26, 2005.
- *Capturing Illusory Contours Using Curvature*, Department of Mathematics, Michigan State University, East Lansing, MI, Nov.15, 2004.
- *Image Denoising Using Mean Curvature Information*, Special Session on PDE Based Methods in Imaging and Vision, AMS Meeting, Pittsburgh, PA, Nov 6-7, 2004.
- *Segmentation with Depth: A Level Set Approach*, Minisymposium at SIAM Conference on Image Science, Salt Lake City, UT, May 3-5, 2004.
- *Capturing Illusory Contours: A Level Set Approach*, Minisymposium at SIAM Conference on Image Science, Salt Lake City, UT, May 3-5, 2004.
- *Segmentation with Depth: A Level Set Approach*, (Posters Presentation), 4th Southern California Applied Mathematics Symposium, Claremont Colleges, CA, April 24, 2004.
- *Capturing Illusory Contours Using Curvature*, Image Processing Seminar in Math Department of UCLA, April, 2004.
- *Illusory Contours Using Shape Information*, Image Processing Seminar in Math Department of UCLA, April, 2003.

Courses Taught:

Assistant Professor

University of Alabama, Tuscaloosa, 2008-present

Calculus I, II, III, Applied Differential Equations, Theory of Ordinary Differential Equations (graduate level), Introduction to Linear Algebra, Numerical Linear Algebra (graduate level), Boundary Value Problems, Mathematical Statistics, Numerical Analysis (graduate level)

Courant Instructor

New York University, 2005-2006

Intensive Calculus, Calculus

Graduate Teaching Assistant

University of California, Los Angeles, 2000-2003

Calculus, Applied Numerical Methods, Mathematical Modeling, Optimization,
Applied Ordinary Differential Equations

Professional Service:

1. Reviewer for the following journals:

- SIAM Journal on Scientific Computing
- International Journal of Biomedical Imaging
- Communications in Mathematical Sciences
- Inverse Problems and Imaging
- SIAM Journal on Imaging Sciences
- Advances in Computational Mathematics
- Numerical Mathematics: Theory, Methods and Applications
- Journal of Microscopy
- Optics Express

2. Committee Member

- Duc Nguyen (Ph.D dissertation, Mathematics)
- Yihan He (Master thesis, Mathematics)
- Yujing Sun (Ph. D dissertation, Physics and Astronomy)
- Adam Schweiger (Ph.D dissertation, Mathematics)

3. Student Supervising

- Mengpu Chen (Ph.D)
- Ramin Goudarzi (Ph.D)