




# TIAN CAO

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INTERESTS	Machine Learning, Image Analysis, Computer Vision	
EDUCATION	<b>University of North Carolina at Chapel Hill</b> , Chapel Hill, NC	08/2010-present
	Ph.D. candidate in Computer Science	
	<b>Sichuan University</b> , Chengdu, Sichuan, China	09/2007-06/2010
	M.S. in Computer Science	
	<b>Sichuan University</b> , Chengdu, Sichuan, China	09/2003-05/2007
	B.E. in Computer Science	
EXPERIENCE	<b>Research Assistant, UNC Chapel Hill</b> , Chapel Hill, NC.	09/2010-present
	Coupled Dictionary Learning for Image Analysis	
	<ul style="list-style-type: none"><li>• Developed coupled dictionary learning methods for multi-modal image prediction, classification and registration.</li><li>• Learning coupled dictionaries based on sparse coding, and applied the learned dictionary to simplify the multi-modal image analysis problems.</li><li>• Applied the algorithm to Correlative Microscope images.</li><li>• Implemented in VTK, ITK, matlab and C++.</li></ul>	
	<b>Research Intern, IBM Almaden Research Center</b> , San Jose, CA.	05/2014-08/2014
	Multi-atlas based Image Segmentation	
	<ul style="list-style-type: none"><li>• Investigated methods of learning from ambiguous labels.</li><li>• Investigated atlas based image segmentation methods with different local features and classifiers.</li><li>• Implemented atlas based image segmentation framework in Java and matlab.</li></ul>	
	<b>Research Intern, Siemens Corporate Research</b> , Princeton, NJ.	05/2012-08/2012
	Real-time Object Detection in Ultrasound Videos	
	<ul style="list-style-type: none"><li>• Developed and implemented a needle detection method for ultrasound videos.</li><li>• Implemented a 3D steerable filtering method to incorporate spatial and temporal information for needle detection in C++ and MFC.</li><li>• Incorporated with different features and hough transform to vote the needle segment.</li></ul>	
	<b>Research Assistant, Chinese Academy of Sciences</b> , Shenzhen, China	09/2009-03/2010
	Energy based Crowd Motion Analysis	
	<ul style="list-style-type: none"><li>• Developed an energy based crowd motion analysis algorithm based on mutual information.</li><li>• Applied the algorithm to detect the crowd abnormal behaviors.</li><li>• Implemented in OPENCV and C++.</li></ul>	
	<b>Research Assistant, Sichuan University</b> , Chengdu, China	01/2008-09/2009
	Super-resolution for Ultrasound Speckle Reduction	
	<ul style="list-style-type: none"><li>• Developed a fast and robust super-resolution method for intima reconstruction in ultrasound.</li><li>• Applied anisotropic diffusion to reduce speckle with edge enhancement in image reconstruction.</li><li>• Implemented anisotropic diffusion method in C++ and GLSL.</li></ul>	

## PUBLICATIONS

- [1].**Tian Cao**, Nikhil Singh, Vladimir Jovic, Marc Niethammer, “Semi-coupled Dictionary Learning for Deformation Prediction”, *International Symposium on Biomedical Imaging (ISBI)*, 2015.
- [2].**Tian Cao**, Christopher Zach, Marc Niethammer et al., “Multi-modal Registration for Correlative Microscopy using Image Analogies”, *Medical Image Analysis (MedIA)*, Elsevier, 2014.
- [3].**Tian Cao**, Vladimir Jovic, Marc Niethammer et al., “Robust Multimodal Dictionary Learning”, *The 16th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2013.
- [4].**Tian Cao**, Christopher Zach, Marc Niethammer et al., “Registration for Correlative Microscopy using Image Analogies”, *Fifth Workshop on Biomedical Image Registration (WBIR)*, 2012.
- [5].Bo Wang, **Tian Cao**, Yuguo Dai, Dong C. Liu, “Ultrasound Speckle Reduction via Super Resolution and Nonlinear Diffusion”, *the 9th Asian Conference on Computer Vision (ACCV)*, 2009.
- [6].**Tian Cao**, Bo Wang, Dong C. Liu, “Optimized GPU Framework of Semi-implicit AOS Scheme Based Speckle Reducing Nonlinear Diffusion”, *proceedings of SPIE Medical Imaging (SPIE MI)*, 2009.
- [7].**Tian Cao**, Chaowei Tan, Dong C. Liu, “Adaptive Curve Region based Motion Estimation and Motion Visualization of Cardiac Ultrasound Imaging”, *the 3rd International Conference on Bioinformatics and Biomedical Engineering (ICBBE)*, 2009.
- [8].**Tian Cao**, Xinyu Wu, Jinnian Guo, Shiqi Yu, Yangsheng Xu, “Abnormal Crowd Motion Analysis”, *IEEE International Conference on Robotics and Biomimetics (ROBIO)*, 2009.

## PROFESSIONAL SKILLS

C/C++, Java, Matlab, Python, Bash, ITK, VTK, OPENCV, CUDA, MFC

## SELECTED AWARDS

Guanghua Scholarship.	2010
Outstanding graduate Student Award, Sichuan University.	2010
Graduate Student Fellowship, Sichuan University.	2007-2010
Student Innovation Award, Sichuan University.	2005-2007
1st prize of China Undergraduate Mathematical Contest in Modeling.	2006