# Jixu (Barry) Chen

| CONTACT INFORMATION | Jixu Chen<br>1 Research Circle,<br>Niskayuna, NY, 12309 | *Phone:* (518) 428-9318<br>*E-mail:* barryrpi at gmail.com<br>*WWW:* www.ecse.rpi.edu/~cvrl/chenj |

**RESEARCH INTERESTS**

Computer vision, probabilistic graphical model, human computer interaction, human behavior tracking and analysis.

**EDUCATION**

**Rensselaer Polytechnic Institute (RPI)**, Troy, NY USA
*Department of Electrical, Computer, and Systems Engineering (ECSE)*

Ph.D., Electrical Engineering, December 2010 (awarded May, 2011)

- Dissertation : "Automatic Human Behavior Tracking and Analysis"

**University of Science and Technology of China (USTC)** , Hefei, P.R.China
*Department of Electronic Science and Technology*

M.S., Electrical Engineering, July, 2006
B.S., Electrical Engineering, July, 2003

- GPA: 3.7/4.0, ranking 4th over 105

**ACADEMIC EXPERIENCE**

**GE Global Research**, Niskayuna, NY, USA
Research Scientist, Visualization and Computer Vision Group          March 2011 - Current


**Rensselaer Polytechnic Institute**, Troy, NY, USA
Graduate Research Assistant, supervised by Prof. Qiang Ji          August 2006 - March 2011

Developed various computer vision systems for human behavior tracking and analysis, including:

*Eye Gaze Tracking System*

- Developed a gaze tracking system using stereo-camera and two IR lights that achieves accuracy less than one degree with one-time calibration.
- Developed a gaze tracking system with only one camera and without IR lights, achieving achieves accuracy less than three degrees with one time calibration.
- Proposed a probabilistic gaze estimation algorithm which can estimate eye parameters and eye gaze without personal calibration.

*Facial Feature Tracking System*

- Developed a robust facial feature tracking system that first detects and tracks the face region in video sequence, and then tracks 28 facial feature points under different facial expressions and varying face poses.
- Developed facial feature tracking software for companies, including:
    1. Facial feature tracker for animation. Mobinex, Inc.
    2. Facial feature tracker in thermal video. Li Creative Technologies (LcT), Inc.

*Facial Expression Recognition System*

Developed probabilistic graphical models which are utilized to robustly recognize facial expression by systematically modeling rigid and non-rigid facial motions, their spatiotemporal interactions, and their image observations.

*Human Body Pose Tracking System*

- Proposed the Switching Gaussian Process Dynamic Model (SGPDM) to capture the dynamics of the complex human body motion.
- Developed a knowledge-based body pose model learned from domain knowledge. This model does not need any training data, and it can generalize to any natural body movements.

**Microsoft Research Asia**, Beijing, China

Intern, hosted by Dr. Frank Soong                                          June 2005 - August 2005

Developed an isolate word recognition demo system on smartphone based on advanced speech segmentation algorithm.

**University of Science and Technology of China**, Hefei, China

Research Assistant, supervised by Prof. Beiqian Dai                September 2003 - June 2005

Developed speaker verification system. This system participated the NIST04 and NIST05 Speaker Recognition Evaluation (SRE) and ranked 5th among 23 systems, competing with MIT, SRI, etc.

PUBLICATIONS   **Book Chapters**

1 Yongmian Zhang, <u>Jixu Chen</u>, Yan Tong, Qiang Ji, "Spontaneous Facial Expression Analysis and Synthesis for Interactive Facial Animation", in *Computer Vision for Multimedia Applications: Methods and Solutions.* pp.20-37, IGI press, 2011

2 Lei Zhang, <u>Jixu Chen</u>, Zhi Zeng, Qiang Ji, "A Generic Framework for 2D and 3D Upper Body Tracking", in *Machine Learning for Human Motion Analysis: Theory and Practice.* (Eds.) Liang Wang, Li Cheng, and Guoying Zhao. pp. 133-151, IGI press, 2010

**Journals**

1 Yan Tong, <u>Jixu Chen</u> and Qiang Ji, "A Unified Probabilistic Framework for Spontaneous Facial Action Modeling and Understanding", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, p258-274, Vol. 32, No. 2, February, 2010

**Conference Proceedings**

1 <u>Jixu Chen</u> and Qiang Ji, "Probabilistic Gaze Estimation Without Active Personal Calibration", *Proc. IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2011.

2 <u>Jixu Chen</u> and Qiang Ji, "A Hierarchical Framework for Simultaneous Facial Activity Tracking", *Automatic Face and Gesture Recognition (FG)*, 2011.

3 William Maio, <u>Jixu Chen</u>, and Qiang Ji, "Constrained-Based Gaze Estimation Without Active Calibration", *Automatic Face and Gesture Recognition (FG)*, 2011.

4 <u>Jixu Chen</u> and Qiang Ji, "Efficient 3D Upper Body Tracking with Self-Occlusions", *Proc. International Conference on Pattern Recognition (ICPR)*, 2010.

5 <u>Jixu Chen</u>, Minyoung Kim, Yu Wang, and Qiang Ji, "Switching Gaussian Process Dynamic Models for Simultaneous Composite Motion Tracking and Recognition", *Proc. IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2009.

6 <u>Jixu Chen</u>, Wayne Gray, and Qiang Ji, Eye tracking, "A Robust 3D Eye Gaze Tracking System using Noise Reduction", *Proc. Eye Tracking Research and Applications Symposium (ETRA)*, 2008.

7 <u>Jixu Chen</u> and Qiang Ji, "3D Gaze Estimation based on Eye Corners with a Single Camera, *Proc. International Conference on Pattern Recognition (ICPR)*, 2008.

8 Lei Zhang, <u>Jixu Chen</u>, Zhi Zeng, and Qiang Ji, "2D and 3D Upper Body Tracking with One Framework, *Proc. International Conference on Pattern Recognition (ICPR)*, 2008.

9 <u>Jixu Chen</u> and Qiang Ji, "Online Spatial-temporal Data Fusion for Robust Adaptive Tracking, *IEEE workshop on Online Learning for Classification in conjunction with IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2007.

10 <u>Jixu Chen</u>, Dai Beiqian, Sun Jun. "Prosodic Features Based on Wavelet Analysis for Speaker Verification, *Proceedings of InterSpeech*, Lisbon, Portugal, 2005

11 <u>Jixu Chen</u>, Liu Minghui, Dai Beiqian, Li Hui. "A New Method of Score Normalization for Text-Independent Speaker Verification, *Signal Processing 2006 (Chinese)*

PROFESSIONAL SKILLS

- Proficient in C, C++, Matlab, and Perl.
- Proficient in open source libraries such as OpenCV libraries, Bayes Net Toolbox for Matlab, etc.
- Technical skills: Geometry Reconstruction, Bayesian Network, Markov Random Fields, Hidden Markov Model, Inference and learning for graphical model, Active Shape/Appearance Model, Particle filtering, etc

TEACHING EXPERIENCE

**Rensselaer Polytechnic Institute**, Troy, NY, USA

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| Teaching Assistant for Computer Components & Operations (ECSE-2610) | Spring 2009 |
| Teaching Assistant for Computer Graphics (ECSE-4750) | Fall 2009 |

PROFESSIONAL ACTIVITIES

Reviewer for the following journals:
IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), International Journal on Computer Vision (IJCV), Computer Vision and Image Understanding (CVIU), Machine Vision and Applications (MAVP), IEEE Transactions on Systems, Man, and Cybernetics-Part B, Pattern Recognition.

Reviewer for the following conferences:
IEEE Conf. on Computer Vision and Pattern Recognition (CVPR), European Conf. on Computer Vision (ECCV), Automatic Face and Gesture Recognition (FG), Eye Tracking Research and Applications Symposium (ETRA), International Conference on Pattern Recognition (ICPR).

HONORS & AWARDS

- Guanghua Scholarship, 2005, USTC (10 out of 200+)
- Outstanding Student Scholarship, 2002, USTC (10 out of 105)
- Outstanding Student Scholarship, 2001,USTC (10 out of 105)
- Outstanding Student Scholarship, 2000,USTC (10 out of 105)