

# Mithun George Jacob

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## Education

### Doctor of Philosophy, Industrial Engineering, July 2014

CGPA: 3.88/4.0

School of Industrial Engineering, Purdue University, West Lafayette, IN

Advisor: Prof. Juan P. Wachs

Thesis: “*Optimal Modality Selection for Multimodal Human-Machine Systems using RIMAG*”

Relevant Courses: Theoretical Foundations of Optimization, Nonlinear Programming, Pattern Recognition

### Master of Science in Engineering, Robotics, August 2009

GRASP Lab, School of Computer & Information Science, University of Pennsylvania, Philadelphia, PA

Advisor: Prof. Jianbo Shi

Thesis: “*Segmentation and Recognition in Driving Videos*”

Relevant Courses: Computer Vision, Advanced Robotics, Machine Learning, Convex Optimization, Algorithms

### Bachelor of Technology, Mechanical Engineering, May 2007

School of Mechanical and Building Sciences, VIT University, India

Advisor: Prof. V.G. Sridhar

Thesis: “*Automated vision inspection system for a water bottling industry*”

## Technical Skills

**Languages:** C/C++, MATLAB, Python, R

**IDE/VCS:** QtCreator, Microsoft Visual C++, Tortoise SVN, GitHub, Mercurial

**API:** ROS, KinectSDK, OpenNI, OpenCV, OpenMP, Player/Gazebo 3D simulator, MFC

**Robots:** Barret 7-DOF WAM, FANUC LR Mate 200iB, Aldebaran NAO.

## Work Experience

**Bosch Research and Technology Center, Research Scientist 2**, Palo Alto, CA

Jan 2016 — present

**Bosch Research and Technology Center, Research Scientist**, Palo Alto, CA

Jul 2014 — Dec 2015

- Working on localization, mapping and traffic rules adherence in automated driving.

**Technicolor Corporate Research, Research Engineer Intern**, Princeton, NJ

Aug 2009 — Aug 2010

- Developed multiple approaches for smart video compression by exploiting geometric redundancies in video.

**Thomson (Technicolor) Corporate Research, Summer Intern**, Princeton, NJ

Summer 2008

- Worked on improving low-bit rate mobile video content by enhancing tracked objects of interest in soccer videos

## Academic Research

**ISAT (Intelligent Systems and Assistive Technologies) Laboratory, Purdue University**

- Developed a novel methodology to generate Pareto-optimal lexicons for cooperative, multimodal human-robot task completion.
- Developed a sterile, touchless, gesture-based MRI navigation system utilizing contextual cues in the operating room. A novel gesture training algorithm was developed for the interface.

**GRASP (General Robotics, Automation, Sensing and Perception) Lab, University of Pennsylvania**

- Designed an accurate RANSAC-based pose estimation algorithm for calibrated stereo videos of a car driving in an urban environment under the assumption of dominant pixel flow by ego-motion.

- Investigated algorithms for segmentation and recognition of driving videos learned visual cues in noisy 3D reconstructions of street scenes from calibrated stereo videos.

#### VIT University, India

- Developed an automated computer-vision based water bottle quality control system.

## Selected Publications

- **Mithun George Jacob**, Juan P. Wachs, “[Optimal Modality Selection for Cooperative Human-Robot Task Completion](#)” in the IEEE Transactions on Cybernetics (*accepted for publication in December 2015*).
- **Mithun George Jacob**, Juan P. Wachs, “[Context-based hand gesture recognition for the operating room](#)” in Pattern Recognition Letters, June 2013.
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, “[“Surgical Instrument Handling and Retrieval in the Operating Room with a Multimodal Robotic Assistant”](#)” in the Proceedings of the 2013 IEEE International Conference on Robotics and Automation, May 6-10 2013, Karlsruhe, Germany.
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, A. George Akingba, “[Collaboration with a Robotic Scrub Nurse](#)” in Commun. ACM 56(5): 68-75 (2013).
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, “[Gestonurse: a multimodal robotic scrub nurse](#)” in Proceedings of the Seventh Annual ACM/IEEE International Conference on Human-Robot Interaction (HRI), Boston, MA, 2012, pp. 153 —154.
- **Mithun George Jacob**, Yu-Ting Li, Juan P. Wachs, “[A Gesture Driven Robotic Scrub Nurse](#)” In Proceedings of the 2011 IEEE International Conference on Systems, Man, and Cybernetics (SMC), pp. 2039-2044.

## Patents

- **Mithun George Jacob**, Sitaram Bhagavathy, “[Motion compensating transformation for video coding](#)”, Patent PCT/US2012/020888 pending, January 2012.
- Dong-Qing Zhang, Sitaram Bhagavathy, **Mithun George Jacob**, “[Methods and Apparatus for Encoding Video Signals using Motion compensated Example-based Super-resolution for Video Compression](#)”, Patent PCT/US2011/050913 pending, September 2011.
- Dong-Qing Zhang, Sitaram Bhagavathy, **Mithun George Jacob**, “[Methods and Apparatus for Decoding Video Signals using Motion compensated Example-based Super-resolution for Video Compression](#)”, Patent PCT/US2011/050915 pending, September 2011.
- Jesus Barcons-Palau, Sitaram Bhagavathy, Joan Llach, **Mithun George Jacob**, “[Segmenting grass regions and playfield in sports videos](#)”, Patent PCT/US2010/000004 pending, April 2010.
- **Mithun George Jacob**, Sitaram Bhagavathy, Jesus Barcons-Palau, Joan Llach, “[Detection of field lines in sport videos](#)”, Patent PCT/US2010/000032 pending, July 2010.

## Selected Awards

- 2014 Outstanding Graduate Student Research Award - College of Engineering, April 2014, Purdue University
- Best Poster Award — Industrial Engineering Research Symposium, April 2013, Purdue University
- Best Poster Award — Industrial Engineering Research Symposium, April 2012, Purdue University
- Student Travel Award — IE Graduate Student Organization, September 2011, Purdue University.
- Best Student Paper Finalist — 2011 IEEE International Conference on Systems, Man, and Cybernetics (SMC), September 2011, Anchorage, Alaska.
- Second place in GETC (Programming) in Phreak, a National Level Programming Contest in 2005, India
- First place in Panacea (Debugging & Programming) at, ISTE Confluence 2004, India