# Siddharth Narayanaswamy

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## Skills

extensive experience with algorithms, computer-vision, signals and systems, robotics, machine learning, statistics, visual perception, cognitive science, linguistice, knowledge representation, compiler design, haptics, automatic-differentiation, stochastic and non-deterministic programming languages, functional programming, logic and constraint programming, parallel programming, contributions to open-source projects

### Languages

Scheme, Haskell, Lisp, C/C++, MATLAB, Python, Prolog, Java, VHDL, Verilog, DSP(AD Blackfin) assembly, microcontroller assembly, x86 assembly

native English, Tamil, and Hindi

## Experience

**PhD student, Artificial Intelligence** *2008 – present*
Jeffrey Mark Siskind Purdue University

- designed and built custom robots for general manipulation tasks
- solved vision and robotic manipulation problems using AD-based optimization
- implemented closed-loop visual-servoing mechanism to drive motor control
- developed and implemented stochastic programs to use language & vision, and reasoning about rules jointly, to solve for perception
- developed novel and robust tracking, segmentation, and action recognition methods as part of the DARPA Mind's Eye program
- nondeterministic programming for solving constraint-satisfaction problems
- stochastic modeling via probabilistic programming
- designed and evaluated human-subject experiments on event recognition using fMRI data collection and analysis tools
- TA for ECE473 & ECE570, Artificial Intelligence
- http://iffsid.com/research/

**Undergraduate Research Project** *May 2007 – Aug. 2008*
Guided by Professor Muniyandi Manivannan IIT-Madras

- implemented a DIY Part-Task Laparoscopic Simulator
- optimized vision algorithms to run on low-cost uncalibrated components
- tested against industry-standard equipment to demonstrate reasonably low error margins
- worked on a haptic-vision developmental interface
- collaborated with practicing doctors to test feasibility

**Part-Time Instructor** *Oct. 2007 – Aug. 2008*
The Princeton Review(Manya Education Pvt.Ltd.) Chennai, India

- for the GRE and GMAT standardized exams
- tutored around 250 students

**Undergraduate Research Intern** *May 2007 – Sept. 2007*
Doors and Gates Pvt.Ltd. Chennai, India

- implemented a range of IR control mechanisms for controller operations
- tested and used implemented mechanisms successfully in robots during competitions
- designed hybrid control mechanism for non-line-of-sight applications that included switching between multiple modes of operation autonomously

## Education

**Phd Student, Artificial Intelligence** — *2008 – present*, Purdue University

Artificial Intelligence, Computer Vision, Natural Language Processing
Machine Learning, Robotics, Cognitive Neuroscience

**Bachelor of Engineering - Electronics and Communication** — *2004 – 2008*, Anna University, India

Image Processing, Speech Processing, Computer Vision
Communication Systems, Embedded Systems (Robotics)

## Publications / Posters

**Recognizing Human Activities from Partially Observed Videos** — *Jun 2013*, Poster
Y. Cao, D. Barrett, A. Barbu, N. Siddharth, H. Yu, A. Michaux, Y. Lin, S. Dickinson, J. Siskind, S. Wang
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*

**Seeing Unseeability to See the Unseeable** — *Oct 2012*, Paper/Journal
N. Siddharth, A. Barbu, and J. M. Siskind
*Advances in Cognitive Systems(ACS)*

**Simultaneous Object Detection, Tracking, and Event Recognition** — *Oct 2012*, Paper/Journal
A. Barbu, N. Siddharth, A. Michaux, and J. M. Siskind
*Advances in Cognitive Systems(ACS)*

**Video In Sentences Out** — *Aug 2012*, Paper/Conference
A. Barbu, A. Bridge, Z. Burchill, D. Coroian and S. Dickinson , S. Fidler, A. Michaux, S. Mussman and N. Siddharth , D. Salvi, L. Schmidt, J. Shangguan and J. M. Siskind, J. Waggoner, S. Wang, J. Wei and Y. Yin and Z. Zhang
*Proceedings of the Twenty-Eighth Conf. on Uncertainity in Artificial Intelligence(UAI)*

**A Visual Language Model for Estimating Object Pose and Structure in a Generative Visual Domain** — *May 2011*, Paper/Conference
N Siddharth, A. Barbu, and J. M. Siskind
*Proceedings of 2011 IEEE International Conf. on Robotics and Automation(ICRA)*

**Learning Physically-Instantiated Game Play Through Visual Observation** — *May 2010*, Paper/Conference
A. Barbu, N Siddharth, and J. M. Siskind
*Proceedings of 2010 IEEE International Conf. on Robotics and Automation(ICRA)*

**Design of a Do-It-Yourself VR Based Laparoscopic Simulator** — *Jan. 2009*, Poster
N.Siddharth, M.Manivannan, Suresh Devasahayam, and George Mathew
*Medicine Meets Virtual Reality (MMVR17)*