

# Henry Shu Here

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[henryshu@cs.cmu.edu](mailto:henryshu@cs.cmu.edu), [henry\\_shu@alumni.caltech.edu](mailto:henry_shu@alumni.caltech.edu)

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**Website**     <http://www.cs.cmu.edu/~henryshu/>  
(See several of my program demos there.)

**Education**     **Baccalaureate, Electrical and Computer Engineering (Graduate with Honors)**  
*September 2001 - June 2005, California Institute of Technology*  
**Graduate Student, Language Technologies Institute – School of Computer Science**  
*August 2007 - Present, Carnegie Mellon University*

**Citizenship**   **United States Citizen**

Cumulative GPA from Caltech

4.0 (Transcripts available upon request)

Selected Coursework (Course Titles)

Distributed computation laboratory, randomized algorithms, machine learning systems, computational decidability and tractability, discrete mathematics, methods of applied and computational mathematics, networking, computing systems, electronics laboratory, signals/systems/transforms, digital signal processing, communication-system fundamentals, data compression, wavelets and modern signal processing, , number theory, linear algebra, probability theory, statistics, differential equations, quantum mechanics, noncooperative game theory.

**Summary of Qualifications**

- Fervent passion in algorithms, probability theory, and ways in combining them to attack computational problems.
- Experienced programmer armed with mathematical rigor and theoretical computational expertise. (Ex. I'm aware when a problem is P/poly or nonbipartite-weighted-matching-complete.)
- Arthritically firm grip on C/C++, Java (ant/jsp/servlet), SQL and database systems, Matlab, and Mathematica as engineering tools.
- Extensive job experiences: Search relevance, information retrieval, data mining, algorithmic efficiency in digital image processing/real-time object detection, and much more.
- Extensive research experience: Computational vision, autonomous robots, clustering learning, fast ( $O(1)$ ) information retrieval, distributed computational framework, and much more.
- Highly experienced in the Windows/Linux developing environment.
- Native-level written and verbal skills in English and Chinese; conversational in Japanese & Taiwanese.

**Publication**

How to Leverage Existing Spectral Knowledge when Clustering Hyperspectral Data.  
Kiri Wagstaff, Henry Shu, and Rebecca Castano. New Technology Report # 41287, Aug. 2004, JPL, NASA.

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## Research/Work Experience

### Nextag, San Mateo, CA

May 2006 – July 2007

- Nextag's Search Team: Search relevance and search quality.
- Application and analysis of various search algorithms. Design and analysis of new algorithms including search and keyword correction.
- Automatic discovery and adaptation to search behaviors at the user level using the Bayesian prediction model.
- Information retrieval and data mining: automatic discovery of knowledge from terabytes of data and automatic assessment of the discoveries.
- Database systems optimization: system designs to handle very large amount of data (terabytes) efficiently.
- Fast splitting of arbitrarily concatenated keyword: try type the following in [www.nextag.com](http://www.nextag.com) search box and see what happens in 2 milliseconds.
  - Japanesegardenfirewallnetworkwirelesslaptopdesktopunderweartrashcanbanan  
arepubliccomputersmachinelearningsunglassescalculatorhikingbootsipodnanor  
adiowomanwearmansweatercarseatbearnorthpolesouthpoleofficedepothomede  
potcandlelightbirthdaycakedaycaregucci

### DXG Technology Inc., City of Industry, CA

Aug 2004 – February 2005

- Firmware Engineer in the Mach 4 Digital Camera Project
- Mach 4 Digital Camera: Built with the X3 direct image sensor from Foveon Inc. that directly captures red, green, and blue light at each pixel in a single exposure.
- Designed and implemented the image processing pipeline for X3, with pipeline including dark subtraction, filtering, flare correction, exposure neutralization, de-quantization in spatial and frequency domain, tone curving..., etc.
- Revolutionary image quality with the X3 technology and the various noise removal algorithms.
- AE, AF, and AWB algorithms development.
- Mpeg4 Advanced Single Profile and H.264 image compression technology study.

### Oracle USA, Redwood Shores, CA

July 2005 – May 2006

- Oracle E-Business Suite: Flow Manufacturing and Work in Process engineer.
- Flow Manufacturing database programming and performance tuning.

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## Caltech Summer Undergraduate Research Fellowship

- Algorithmic methods in leveraging existing spectral knowledge to achieve autonomous clustering of hyperspectral data obtained onboard remote-sensing spacecrafts. (*Research stipend: 5K*)  
2004, JPL
- Semi-autonomous multi-agent control of robotic vehicles, with object avoidance, real-time task allocation, primitive path planning, non-linear optimization, and fault tolerance. (*Research stipend: 5K*)  
2003, Caltech

## Projects

- Stochastic and non-periodic texture synthesis.  
2005
- Distributed evolutionary approaches in finding optimal strategies in games, the traveling salesperson's problem, and competition in the noncooperative market.
- Design and implementation of command-line based P2P file sharing network with fast ( $\lg n$  in the number of nodes) file searching engine and node fault tolerance.
- Unsupervised pattern recognition with neural networks and support vector machines.  
2004
- Fast human face recognition based on the Viola-Jones algorithm.
- PTIME approximation algorithm for NP-hard problems based on insect behavior simulation.  
2003

## **Honors**

- Tregidga Scholarship for the Distinguished Caltech Junior 2003 – 2004
- The Caltech Grant 2002 – 2005
- Pomona-Wisconsin Mathematics and Engineering Talent Search First Place Winner 1998 – 1999
- LA County Science Fair Senior Division First Place Winner 1999 –  
2000
- The LA County Science Fair Project of 2000 (All Divisions) 1999 –  
2000
- USA Mathematics Talent Search Medal 1999 - 2000, 2000 -  
2001
- Mars Scientific Symposium Proposal Regional Winner (NASA) 1997 -  
1998
- California Math League Highest Achievement 1998 - 1999, 1999 - 2000, 2000 – 2001

## **Selected Leadership Activities**

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## Bible Study Group Leader

2005

- Leading the Caltech Avery house Bible study group.

## Caltech Go Club Member Recruiter

2002-04

- Recruiting members for the Caltech go (board game with black and white stones) club.
- Promoting interests in go for the Caltech community.

## Caltech Chinese Festival Coordinator and MC

2003

- Chief coordinator and MC of the festival, hosting over 20 programs, including karaoke, talk show, cooking show, musical performances, dance, etc.