



# Yi Shang

*Professor of CS, Director of Graduate Studies*



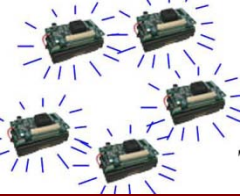
- 1997: PhD CS UIUC. Joined CECS at MU
  - Dissertation: "Global Search Methods for Solving Nonlinear Optimization Problems." Developed new generic search and optimization methods and applied them to solve the satisfiability problem (was among the fastest algorithms), neural network learning, and digital filter bank design problems
- 2001-2003: Xerox Palo Alto Research Center (PARC)
  - Birthplace of PC, PDA, tablet PC, Ethernet, Laser printer, etc. Turing Award'10, Chuck Thacker
  - Worked on networked embedded systems, wireless sensor networks, adaptive optimization and control
- Research: AI, combinatorial and nonlinear optimization, NN, GA, SAT, Web search, WSN, adaptive robotic control, traffic monitoring and control, mobile computing, location aware services, recommendation systems, protein folding, etc.
- Funding: NSF, NIH, DoD, Microsoft, Raytheon, DARPA
- Teaching: AI, Theory of Comp., WSN, WWW, OO, PDC, etc.



# Selected Current Research Areas

- Intelligent mobile computing and wireless sensor networks
  - The world is going mobile and becoming smart. Smartphones. IBM's smarter planet. Google's smarter search.
  - 4<sup>th</sup> IT age: mainframe, PC, WWW, smartphone
  - Many exciting new applications and researches around mobile devices with integrated sensing, computing, and communication capabilities. Localization. Location-based applications. Collaborative information processing. Ad hoc networking.
- 3-D Protein Structure Prediction and Quality Assessment
  - Protein folding -- a grand challenge. In 2005, *Science* named it one of the 125 biggest unsolved problems in science.
  - Developing new efficient methods to generate 3-D protein models and assess their quality.
  - In the world-wide CASP9 competition (protein structure prediction's Olympics) in 2010, we are #1 in the human/server prediction category (Mufold) and #1 in the quality assessment category (MUFOLD-WQA).





# Sample Student Projects

- Todd Sullivan (BS'07). "Bridging Wireless Sensor Networks and Autonomous Agents"



TRI: a TinyOS robot integration server supporting WSN data management, agent-agent communication, and human-readable messaging protocol. Sony Aibo and Berkeley motes.

Won DoD's National Defense Science and Engineering Graduate (NDSEG) Fellowship (1/around 20 awards for computer and computational sciences in US per year). Went to Stanford.

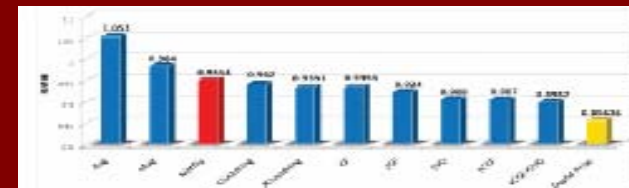
- Ibrahim Almosallam (MS'08). "A New Adaptive Framework for Collaborative Filtering Prediction"



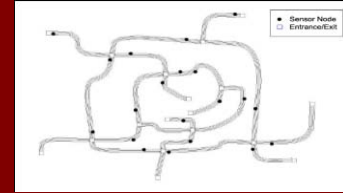
In 2006, Netflix announced the \$1M Netflix Prize Challenge for improving recommendation systems.

Developed a unified framework and new techniques for collaborative filtering to effectively handle large sparse data sets.

- Ranked in top 0.5% among over 32,000 teams worldwide.
- Won MU Distinguished MS Thesis Award (1 per year) in 2009.



# Sample Student Projects



- Peng Zhuang (PhD'10). "Statistical Inference in Wireless Sensor and Mobile Networks"



Developed new spatial/temporal statistical inferences methods for energy efficient distributed solving of data authentication, faulty sensor detection, indoor localization and tracking.

Developed a top iPhone App NearBuy and won MU's iPhone competition in 2009. Also developed Newsy app, a top news app.

- Won MU's Donald K. Anderson GRA Award in 2010 (1 per year).  
Joined Google.

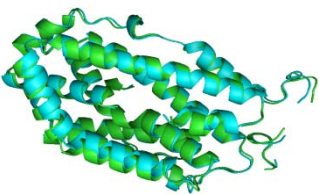
- Qingguo Wang (PhD'11). "Novel Algorithms for Multiple Longest Common Subsequence (MLCS) Problem and 3-D Protein Structure Prediction Quality Assessment"



Developed the fastest exact and approximate algorithm for MLCS.

#1 in the human/server prediction category and #1 in the quality assessment category in the world-wide CASP9 competition in 2010.

Won a UPE (the only international honor society for computing and information disciplines) Award (1/20 this year in the US)



Computer Science

