

## Curriculum Vitae - Anand Ranganathan

307, E. John St,  
Champaign, IL-61820  
ranganat@uiuc.edu

Cell: (217) 417-4375  
Office: (217) 333-7937  
<http://choices.cs.uiuc.edu/~ranganat>

### OBJECTIVE:

Looking for a tenure-track faculty position in 2005

### EDUCATION:

- ◆ **PhD, Computer Science, University of Illinois, Urbana-Champaign (expected)** **2000-2005**  
Dissertation Title: A Framework for Autonomic Pervasive Computing  
Advisor: Prof. Roy H. Campbell  
GPA: 3.941/4.00
- ◆ **B.Tech, Computer Science & Engg, Indian Institute of Technology, Madras, India** **1996-2000**  
GPA: 9.18/10.00

### RESEARCH INTERESTS:

I am interested in various aspects of Pervasive or Ubiquitous Computing, Autonomic Computing, the Semantic Web, Distributed Systems and Middleware. I am particularly interested in trying to make large-scale pervasive computing environments easier to program and manage, and smarter in their interaction with humans. Other areas of interest are context-aware computing, artificial intelligence, security, workflows, human-computer interfaces, social networks and ontologies.

### AWARDS AND HONORS:

- Received the C.W. Gear Outstanding Graduate Student Award from the Department of Computer Science, University of Illinois at Urbana-Champaign in 2004.
- Elected to the Honor Society of Phi Kappa Phi at the University of Illinois at Urbana-Champaign.
- Received the Graduate Service Award from the Department of Computer Science, University of Illinois at Urbana-Champaign in 2003.
- Received Student Travel Grants for PerCom 2005 and Middleware 2003
- Received the Institute Blues Award from the Indian Institute of Technology (IIT-M) in 2000 for contributions in the fields of cultural and organizational activities.
- Stood 3<sup>rd</sup> in my high school in the All India Senior School Certificate Examination (AISSCE – 1996). I also received a merit certificate from the Central Board of Secondary Education (CBSE), India for being among the top 0.1 % of candidates in Physics, Chemistry and Mathematics nationwide.
- Secured ALL INDIA 25<sup>th</sup> rank in the highly competitive Joint Entrance Examination, 1996, for admission to the IITs from a pool of nearly 100,000 students.
- Received a gold medal in the Indian National Physics Test, 1996.

### DISSERTATION ABSTRACT:

The complexity of developing, managing and using pervasive computing environments has become a significant challenge. These environments feature large distributed systems, contain a variety of inter-dependent, heterogeneous services and devices, and are highly dynamic and fault-prone. My thesis focuses on building a framework for autonomic pervasive computing, that enables these environments to be self-configuring, self-repairing, and adaptive, and require minimal user intervention. The framework allows developers and administrators to program and configure pervasive computing environments in terms of high-level, parameterized tasks. The values of task parameters may be specified by the developer or administrator, provided by the end-user or automatically inferred by the framework based on the current state of the environment, context-sensitive policies, and learned user preferences. The framework uses a novel semantic discovery process to infer the best values of parameters. The autonomic framework frees developers, administrators and end-users from the burden of choosing myriad task parameter values, although it does allow them to override system choices and manually configure how the task is to be

performed. The framework also uses AI planning to compose actions and tasks to achieve high-level goals. It can recover from failures of one or more actions by re-planning. Experiments have shown that this framework does make it easier to program, configure and use our prototype environment.

#### RESEARCH EXPERIENCE:

- **Research Assistant (Software Research Group), Dept. of Computer Science, University of Illinois at Urbana-Champaign** **July 2000- current**  
Advisors: Prof. Roy H. Campbell and Prof. M. Dennis Mickunas  
Involved in the development of Gaia, a middleware for Pervasive Computing Environments. I am currently working on programming frameworks and architectures to enable autonomic behavior of pervasive computing environments. I have worked on a variety of pervasive computing issues including modeling, sensing, reasoning about and using context information, ontologies, security issues, location-awareness, mobility, metrics and wearable computing.
- **Summer Intern, IBM T.J.Watson Research Centre, Hawthorne, NY** **Jun 2004-Aug 2004**  
Mentor: Dr. Richard Goodwin  
Worked in the area of Social Networks. I developed a system that enhanced collaboration in large organizations through the use of social networks.
- **Summer Intern, IBM T.J.Watson Research Centre, Hawthorne, NY** **May 2003-Aug 2003**  
Mentor: Dr. Scott McFaddin  
Worked in the area of Workflows. I developed a pervasive environment that made use of workflows to help users achieve their goals and interact with the environment more easily.
- **Summer Intern, IBM T.J.Watson Research Centre, Hawthorne, NY** **May 2002-Aug 2002**  
Mentor: Dr. Hui Lei  
Worked in the area of Context-Aware Pervasive Computing. I developed a context-aware unified communication system that enabled users to talk to each other on heterogeneous devices.
- **Summer Intern, Microsoft Corporation, Redmond, WA** **May 2001-Aug 2001**  
Mentor: Nikhil Bobde  
I was part of the real-time communications group and was involved in developing various advanced call control features in the Windows Messenger.
- **Summer Intern, Motorola India Electronics Ltd., Bangalore, India** **May 1999-July 1999**  
Mentor: P. Sundar  
I was involved in developing test cases for testing the functionality and performance under load of the mobility manager in Motorola's Wireless Local Loop System

#### TEACHING AND MENTORING EXPERIENCE:

- **Mentor, University of Illinois, Urbana-Champaign** **2001-2004**  
Mentored a total of 14 graduate and undergraduate students in course projects and masters theses, which were mainly concerned with different aspects of pervasive computing.
- **Head Teaching Assistant, IIT-M** **Fall 1999**  
Course: Introduction to Computing  
Coordinated other TAs while during evaluation of assignments and exams, helped in organizing the curriculum, interacted with faculty, lectured discussion sessions, graded assignments and helped students in office hours and in the lab.
- **Teaching Assistant, IIT-M** **Spring 1999**  
Course: Introduction to Computing.  
Lectured to discussion sessions, graded assignments and exams, interacted with faculty and helped students in office hours and in the lab.
- **Teaching Assistant, IIT-M** **Fall 1998**  
Course: Engineering Design  
Lectured to discussion sessions, graded assignments, interacted with faculty, and helped students with projects.

## PROFESSIONAL ACTIVITIES:

- Program Committee Member of PerWare'04, Middleware Support for Pervasive Computing Workshop at the 2'nd International Conference on Pervasive Computing, PerCom 2004, Orlando, FL
- Paper Reviewer for various journals and conferences including PerCom 2003-2005, UbiComp 2003, WMCSA 2004, ICDCS 2003, Middleware 2003-2004, WCNC 2005, OOPSLA 2004, ACM SAC 2004, MDM 2005, JPDC, IEEE TMC.
- Member, IEEE

## OTHER ACTIVITIES AND SKILLS:

- Publicity and Fund-raising coordinator, ASHA - UIUC, a non-profit organization that supports education projects in India, 2004-2005
- Treasurer, Computer Science Graduate Student Organization, UIUC, 2003-2004
- Academic Affairs Secretary, IIT-M, 1999-2000
- Student Head, Organizing Committee of Shaastra 2000, an annual nation-wide technical festival organized at IIT-M.
- Member of the Classical Fencing Club, UIUC and the Taekwondo at UIUC club
- Languages: English, Hindi, Tamil, Spanish (Intermediate), Arabic (Beginner), French (Beginner)
- Other hobbies include running marathons, various racquet sports, and sketching.

## REFERENCES:

- Prof Roy H. Campbell  
Department of Computer Science,  
University of Illinois at Urbana-Champaign,  
201, N. Goodwin, Urbana, IL 61801  
(217)-333-0215  
rhc@uiuc.edu
- Prof. Dan Roth  
Department of Computer Science,  
University of Illinois at Urbana-Champaign,  
201, N. Goodwin, Urbana, IL 61801  
(217)-244-7068  
danr@cs.uiuc.edu
- Prof. M. Dennis Mickunas  
Department of Computer Science,  
University of Illinois at Urbana-Champaign,  
201, N. Goodwin, Urbana, IL 61801  
(217)-333-6351  
mickunas@cs.uiuc.edu
- Dr. Richard T. Goodwin  
Manager, IBM TJ Watson Research Center,  
19 Skyline Drive,  
Hawthorne, NY 10532  
(914) 784-7608  
rgoodwin@us.ibm.com

## PUBLICATIONS:

### JOURNALS:

- **Use of Ontologies in a Pervasive Computing Environment.** Anand Ranganathan, Robert E. McGrath, Roy H. Campbell, M. Dennis Mickunas, In *The Knowledge Engineering Review*, Vol 18:3, 209-220, 2004, Cambridge University Press.
- **An Infrastructure for Context-Awareness based on First Order Logic** Anand Ranganathan, Roy H. Campbell. In *Personal And Ubiquitous Computing* (2003) 7:353-364
- **Gaia: a Middleware Platform for Active Spaces.** Manuel Román, Christopher K. Hess, Renato Cerqueira, Anand Ranganathan, Roy H. Campbell, Klara Nahrstedt. In *ACM SIGMOBILE Mobile Computing and Communications Review*, Volume: 6 , Issue: 4, pp 65-67, Oct 2002

### MAGAZINES:

- **Towards Fault Tolerant Pervasive Computing.** Shiva Chetan, Anand Ranganathan, Roy Campbell. To appear in IEEE Magazine on Computers and Society
- **Reasoning about Uncertain Contexts in Pervasive Computing Environments.** Anand Ranganathan, Jalal Al-Muhtadi, Roy H. Campbell. In *IEEE Pervasive Computing*, pp 62-70, Apr-June 2004
- **Using Context Information to Improve Human Communication.** Anand Ranganathan, Hui Lei. In *IEEE Computer*, Volume: 36, Issue: 4, pp 90-92, Apr 2003
- **Gaia: A Middleware Infrastructure to Enable Active Spaces.** Manuel Román, Christopher K. Hess, Renato Cerqueira, Anand Ranganathan, Roy H. Campbell, and Klara Nahrstedt, In *IEEE Pervasive Computing*, pp. 74-83, Oct-Dec 2002.
- **ConChat: A Context-Aware Chat Program.** Anand Ranganathan, Roy H. Campbell, Arathi Ravi and Anupama Mahajan, In *IEEE Pervasive Computing*, pp. 52-58, July-Sept 2002.

### CONFERENCES:

- **Olympus: A High-Level Programming Model for Pervasive Computing Environments.** Anand Ranganathan, Shiva Chetan, Jalal Al-Muhtadi, Roy H. Campbell, M. Dennis Mickunas. To appear in *IEEE International Conference on Pervasive Computing and Communications (PerCom 2005)*, Kauai Island, Hawaii, Mar 8-12, 2005.
- **MiddleWhere: A Middleware for Location Awareness in Ubiquitous Computing Applications.** Anand Ranganathan, Jalal Al-Muhtadi, Shiva Chetan, Roy Campbell, M. Dennis Mickunas. In Proceedings of *ACM/IFIP/USENIX 5'th International Middleware Conference*, Toronto, Canada, Oct 18-22, 2004
- **Mobile Polymorphic Applications in Ubiquitous Computing Environments.** Anand Ranganathan, Shiva Chetan, Roy Campbell. In Proceedings of *Mobiquitous 2004 : The First Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services*, pp 402-411, Boston, Massachusetts, Aug 22-25, 2004
- **Using Workflows to Coordinate Web Services in Pervasive Computing Environments.** Anand Ranganathan and Scott McFaddin. In Proceedings of *2nd International Conference on Web Services (ICWS 2004)*, pp 288-295, San Diego, California, Jul 6-9, 2004
- **Pervasive Autonomic Computing Based on Planning.** Anand Ranganathan and Roy H. Campbell. In Proceedings of *IEEE International Conference on Autonomic Computing (ICAC 2004)*, pp 80-87, New York, New York, May 17-18, 2004
- **Context-Aware Unified Communication.** Hui Lei and Anand Ranganathan. In Proceedings of *IEEE International Conference on Mobile Data Management (MDM 2004)*, pp 174-186, Berkeley, California, Jan 19-22, 2004
- **Towards Pluggable Discovery Frameworks for Mobile and Pervasive Applications.** Stefan Berger, Carl Binding, Christian Hoertnagl, Scott McFaddin, Anand Ranganathan. In Proceedings of *IEEE International Conference on Mobile Data Management (MDM 2004)*, pp 308-319, Berkeley, California, USA, Jan 19-22, 2004
- **Investigations of Semantic Interoperability in Ubiquitous Computing Environments.** Robert E. McGrath, Anand Ranganathan, M. Dennis Mickunas, Roy H. Campbell. In Proceedings of *15th*

*IASTED International Conference on Parallel And Distributed Computing And Systems (PDCS 2003)*  
Nov 3-5, 2003, Marina del Rey, California, USA

- **A Middleware for Context-Aware Agents in Ubiquitous Computing Environments.** Anand Ranganathan, Roy H. Campbell, In Proceedings of *ACM/IFIP/USENIX International Middleware Conference*, pp 143-161, Rio de Janeiro, Brazil, Jun 16-20, 2003
- **Cerberus: A Context-Aware Security Scheme for Smart Spaces.** Jalal Al-Muhtadi, Anand Ranganathan, Roy H. Campbell, Dennis Mickunas, In Proceedings of *IEEE International Conference on Pervasive Computing and Communications (PerCom 2003)*, pp 489-494, Dallas-Fort Worth, Texas, Mar 23-26 2003.

#### **WORKSHOPS AND WORK-IN-PROGRESS PAPERS:**

- **Towards a Pervasive Computing Benchmark.** Anand Ranganathan, Jalal Al-Muhtadi, Jacob Biehl, Brian Ziebart, Roy Campbell, and Brian Bailey. To appear in *PerWare '05 (Workshop on Middleware Support for Pervasive Computing) at PerCom 2005*, Kauai Island, Hawaii, Mar 8-12, 2005
- **A Middleware Architecture for Securing Ubiquitous Computing Cyber Infrastructures.** Raquel Hill, Jalal Al-Muhtadi, Roy Campbell, Apu Kapadia, Prasad Naldurg, Anand Ranganathan. Work-in-Progress paper. In *ACM/IFIP/USENIX 5'th International Middleware Conference*, Toronto, Ontario, Canada, Oct 18th - 22nd, 2004
- **A Framework for Automatically Satisfying Security.** Raquel Hill, Geetanjali Sampemane, Anand Ranganathan and Roy H. Campbell. In *Workshop on Specification and Automated Processing of Security Requirements - SAPS'04 at the 19th IEEE International Conference on Automated Software Engineering*, Linz, Austria, Sept 20-24, 2004
- **Towards Fault Tolerant Pervasive Computing.** Shiva Chetan, Anand Ranganathan, Roy Campbell, In *1'st International Workshop on Sustainable Pervasive Computing, at Pervasive 2004*, Vienna, Austria, Apr 20, 2004
- **Super Spaces: A Middleware for Large-Scale Pervasive Computing Environments.** Jalal Al-Muhtadi, Shiva Chetan, Anand Ranganathan, Roy H. Campbell, In *PerWare2004: Middleware Support for Pervasive Computing Workshop at the 2'nd IEEE International Conference on Pervasive Computing and Communications (PerCom 2004)*, pp 198-202, Orlando, Florida, Mar 14, 2004
- **Incorporating "Semantic Discovery" into a Ubiquitous Computing Infrastructure.** Robert E. McGrath, Anand Ranganathan, Roy H. Campbell, M. Dennis Mickunas. In *System Support for Ubiquitous Computing Workshop at the Fifth Annual Conference on Ubiquitous Computing (UbiComp 2003)*, Seattle, Washington, Oct 12, 2003
- **Ontologies in a Pervasive Computing Environment.** Anand Ranganathan, Robert E. McGrath, Roy H. Campbell, M. Dennis Mickunas, In *Workshop on Ontologies and Distributed Systems (part of 18'th International Joint Conference on Artificial Intelligence (IJCAI 2003)*, Acapulco, Mexico, Aug 9 2003
- **Advertising in a Pervasive Computing Environment.** Anand Ranganathan, Roy H. Campbell, In *2'nd ACM International Workshop on Mobile Commerce*, pp 10-14, Atlanta, Georgia, Sept 28, 2002.
- **A Flexible, Privacy-Preserving Authentication Framework for Ubiquitous Computing Environments.** Jalal Al-Muhtadi, Anand Ranganathan, Roy Campbell and M. Dennis Mickunas, In *International Workshop on Smart Appliances and Wearable Computing (IWSAWC 2002) (part of ICDCS 2002)*, pp. 771 -776, Vienna, Austria, Jul 2, 2002.

- Complete list of publications and electronic reprints available at:  
<http://choices.cs.uiuc.edu/~ranganat/publications.htm>

#### **PATENTS:**

- **Method and System for Context Aware Communication**, Hui Lei and Anand Ranganathan, Patent Application Filed.