PhoneLab: A Participatory Smartphone Cloud Testbed

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Google Sponsor: Matt Welsh

Abstract

The expanding capabilities and growing number of smartphones are producing a new computing infrastructure integrating phones, users, and the cloud. We call this emerging device the *phone cloud*, and its power is transforming user expectations. They now expect their phones to locate friends; identify the song playing at a restaurant; provide instant access to music, video, and other information; and help document their lives—all in addition to placing phone calls and sending text messages. Meeting these expectations requires addressing multiple challenges: efficiently utilizing multiple radio technologies and integrated sensors, harnessing powerful processors to support demanding applications, and leveraging distributed storage to move data closer to users. Yet, despite the challenges and transformative nature of the phone cloud, no public testbed exists enabling large-scale realistic smartphone experimentation.

We propose to develop PhoneLab, a new scientific instrument enabling smartphone operating system and mobile application research in a realistic environment at a scale not previously possible. PhoneLab will entually consist of 1,000 reprogrammable Android devices deployed into the hands of UB students and staff, providing the **power**, **scale**, and **realism** necessary to enable mobile computing research.

1 — Research Goals

The Problem: **No large-scale open testbed exists enabling realistic, repeatable smartphone research.**

Throughout the history of computing, testbeds have played major roles in advancing research. Multiple areas have reached a point at which small, limited, single-experiment instrumentation failed to provide the power, scale and realism needed to make progress. At these moments, the development of shared research infrastructure like Emulab [6], PlanetLab [11] and MoteLab [7] was crucial to advancing these areas.

Smartphone research has reached this critical moment. Smartphones are the most rapidly-adopted technology in human history, and conference proceedings are bulging with papers attempting to harness their power and ubiquity. As the phone cloud changes the way that we communicate and interact, scientists from a broad range of disciplines are anxious to study its effects and unlock its potential. But all of these efforts are stalled by the lack of a testbed remotely approximating the reality we are witnessing.

The Outcome: **PhoneLab, a large-scale, realistic, public Android smartphone testbed.**

While we plan on building out PhoneLab to over 1,000 phones, our initial goal is to construct a 50-node prototype. The smaller scale will allow us to develop and debug more easily and address any serious issues before scaling up to full size. The initial 50 PhoneLab participants[1] will also be users and developers and recruited as part of a SUNY Buffalo Fall 2011 class dedicated to the development of this testbed.

Google has the opportunity to provide seed funding for a tool that will prove extremely useful to the continued evolution of the Android platform. Interest in PhoneLab is high. When we surveyed the research community, we discovered a palpable sense of excitement about a smartphone testbed—34 researchers outside (21) and inside (13) SUNY Buffalo have expressed support for PhoneLab.

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[1]Throughout the proposal we use **user** to refer to a researcher experimenting using the PhoneLab testbed and **participant** to designate a person carrying a smartphone that is part of PhoneLab.

2 — Description

> SCENARIO: A researcher develops a new scheduling algorithm to prolong smartphone battery life. To establish a baseline, **(1)** she requests energy consumption data from phones using the default scheduler. PHONELAB provides access to previously-collected data capturing commonly-studied aspects of smartphone performance, accelerating research while protecting privacy. After developing her new scheduler, **(2)** PHONELAB helps establish correctness before experimentation, checking for privacy or safety violations. With validation completed, **(3)** PHONELAB pushes her software modifications into the phone cloud and soon multiple smartphones are performing her experiment. Once she has gathered enough data to test her hypothesis, **(4)** she utilizes PHONELAB's servers to analyze her data.

As demonstrated by the scenario, PHONELAB will provide the **power** to conduct diverse experiments, the **scale** to create a density of participants comparable to that found in the wild, and the **realism** to support scientific experimentation. PHONELAB comprises three components—phone, infrastructure, and interface.

2.1 — Phone : We will distribute Android phones to PHONELAB participants. We have chosen the Android platform because it is the only open-source mobile device operating system currently available.

2.2 — Infrastructure : Eventually PHONELAB will include 4G base stations and dedicated servers. 4G access points allow us to provide free data access to participants—a significant participation incentive—while producing a next-generation smartphone environment for experimentation. A back-end data center will collect and store experimental data for further analysis, while also running code interacting with software deployed on the phones. Our prototype will omit 4G base stations and utilize existing servers.

2.3 — Interface : The access layer consists of interfaces used by both users and participants. Users will use their interface to design, schedule, and monitor their PHONELAB experiments. Participants will use their interface to track the experiments they are part of and monitor the information being collected about them.

2.4 — Privacy and Usability : The main challenges to deploying PHONELAB are **privacy** and **usability**. Developing a testbed that is useful to users while being comfortable for participants is the major research challenge addressed by this proposal and one focus of our prototype deployment.

PHONELAB incorporates multiple features designed to address participants' privacy concerns. To ensure accountability, user identities will be verified before being granted testbed access. Most experiments will undergo human subjects review via an external Institutional Review Board (IRB). Experiments will be carefully monitored: what software changes they make, what data they gather, and how that data is used. This information will be shared with participants through the web interface. PHONELAB phones will include a *privacy mode* feature allowing participants to temporarily disable data gathering.

We are taking several steps to minimize participant interference and maintain realism. Highly-disruptive tasks like reprogramming and large-volume data collection will be performed only when the device is cradled and after prompting the participant. Experiments will be run in a trace-driven sandbox before reaching the full testbed, allowing regressions to be stopped before affecting participants. And if a software update does break core functionality, participants can revert to a stable software image.

2.5 — Development : Our PHONELAB prototype will be developed as part of a UB course co-taught by Professors Challen and Ko starting in August, 2011. All four co-PIs will participate in designing the course during the summer of 2011 and the two graduate students funded by the grant will serve both as teaching assistants and lead testbed developers. Each student in the course will be provided a Google Nexus S smartphone, with spares used to establish a trace-driven sandbox. Class participants will begin by learning the Android development environment and building testbed maintenance tools. In the second half of the course, students will break into teams to develop and perform experiments on the prototype testbed.

We expect that the course will help spur interest in this project at UB while developing valuable tools and building experience within our project team. We also believe that some students involved in the class will continue to work on the project during the spring after the course has concluded. During the spring semester we will work on evaluating the results from the fall class, completing and hardening testbed management software, and continuing experimentation using traces collected in the fall.

3 — Enabling Research

The primary value of PHONELAB is in the research that it will enable. Below we list four research areas PHONELAB will support. For each, we describe an example experiment and list external scientists interested in using PHONELAB for research in that area. The example research projects listed include one currently funded at UB (3.1), an external project that could use PHONELAB (3.2), and novel experiments proposed by the investigators (3.3 and 3.4).

3.1 — Applications : *crowd-sourcing, social networking, information propagation, behavioral studies, user interaction, environmental sensing, epidemiology studies.*

> **Interested Researchers —** Hakan Ferhatosmanoglu (Ohio State), Renato Figueiredo (Univ. of Florida), Adriana Iamnitchi (Univ. of South Florida), Matei Ripeanu (Univ. of British Columbia).
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> **Example Project —** An NIH/NIEHS funded project at UB led by Co-PI Demirbas along with Atri Rudra (UB CSE), Carole Rudra (UB Public Health) and Eun-hye Yoo (UB Geography) uses phones to collect time-activity data for pollutant exposure estimation. PHONELAB would greatly simply the data-collection required by this experiment.

3.2 — Infrastructure : *environmental interaction, task distribution, new wireless technologies.*

> **Interested Researchers —** Byung-Gon Chun (Intel Research), Indy Gupta (UIUC), Srikanth Kandula (MSR), Sandeep Kulkarni (Michigan State), Gregor von Laszevski (Indiana University), Z. Morley Mao (Michigan), John Regehr (Utah).
>
> **Example Project —** The CloneCloud project [5] at Intel Labs Berkeley "uses nearby computers or data centers to speed up your smart phone applications" [8]. PHONELAB provides an ideal environment for testing their approach.

3.3 — Networking : *performance, multi-radio issues, delay-tolerance, peer-to-peer.*

> **Interested Researchers —** Hari Balakrishnan (MIT), Matt Caesar (UIUC), Brighten Godfrey (UIUC), Jennifer Rexford (Princeton), Andreas Terzis (Johns Hopkins), Nitin Vaidya (UIUC).
>
> **Example Project —** Smartphones integrate multiple communication technologies—voice, SMS, WiMax, WiFi, Bluetooth—each with its own capabilities and limitations. PHONELAB is the perfect testbed to experiment with an integrated networking layer that attempts to divide traffic between multiple radios to improve performance.

3.4 — Operating Systems : *mobile operating system design, distributed systems, performance, energy management, fault-tolerance.*

> **Interested Researchers —** Landon Cox (Duke), Rodrigo Fonseca (Brown), Samuel Madden (MIT), Thomas Schmid (Utah).
>
> **Example Project —** As designers struggle to integrate more powerful technologies into ever smaller devices, energy management becomes a limiting factor. PHONELAB will allow researchers to instrument devices and study energy consumption patterns over a wide user base, leading to the development of novel approaches to extending battery life.

4 — Team Qualifications

Building PHONELAB requires expertise in smartphones, distributed systems, cloud computing, and testbed design. Our team has complementary expertise in these areas. **Geoffrey Challen** developed and maintained MoteLab [13, 7], the first wireless sensor network testbed consisting of 200 sensor nodes and supporting over 700 users. **Murat Demirbas** helped develop and deploy the "Line In The Sand" 100-node wireless sensor network [1] for detection, classification, and tracking, which led to the 1,000-node "ExScal" network [2]. **Steve Ko** helped design the HP/Intel/Yahoo! OpenCirrus^{TM} Cloud Computing Testbed [10, 3, 4], a federated multi-datacenter testbed spanning over 14 institutions in US, Europe, and Asia and including more than 1,000 servers. **Tevfik Kosar** designed and developed both the Stork distributed data scheduling system [9] currently used by institutions worldwide and the PetaShare distributed storage network [12] that manages more than 700 Terabytes of storage located across nine university campuses in Louisiana.

BUDGET

Type	Description	Price ($)	×	Quantity	=	Total ($)
Equipment	Google Nexus S Mobile Phone	530[1]		50		26,500
Travel	Travel	5,000		1		5,000
Student Support	2011-2012 Salary	18,645		2		37,290
	2011-2012 Tuition	10,602		2		21,204
PI Salary	PI Challen Summer 2011 Salary	11,050		0.5		5,525
	PI Demirbas Summer 2011 Salary	13,996		0.5		6,998
	PI Ko Summer 2011 Salary	11,440		0.5		5,720
	PI Kosar Summer 2011 Salary	13,650		0.5		6,825
					Total:	**$115,062**

[1] No contract price retrieved from `bestbuy.com` on 1/2/2011.

Table 1 — Line item budget for our proposal.

Our budget includes three core components: equipment (23%), student support (51%) and faculty summer salary (22%). We are requesting 50 Android Nexus S phones to establish a prototype PHONELAB testbed. These phones will also be used by the students enrolled in the PHONELAB development course taught by co-PIs Challen and Ko in Fall, 2011.

We expect that two graduate students will be required to help maintain critical PHONELAB infrastructure. These students will be hired as Research Assistants for the duration of the project, and also help supervise the PHONELAB-based course.

Finally, we include funding for half summer-months for each of the four co-PIs. We will use the time this summer to design the PHONELAB course and begin any development necessary before the course begins.

A small travel component is included. We expect that this money may allow the co-PIs to visit Google and develop contacts within the Android team critical to the success of the testbed.

REFERENCES

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[2] A. Arora, R. Ramnath, E. Ertin, P. Sinha, S. Bapat, V. Naik, V. Kulathumani, H. Zhang, H. Cao, M. Sridharan, S. Kumar, N. Seddon, C. Anderson, T. Herman, N. Trivedi, C. Zhang, M. Nesterenko, R. Shah, S. Kulkarni, M. Aramugam, L. Wang, M. Gouda, Y. Choi, D. Culler, P. Dutta, C. Sharp, G. Tolle, M. Grimmer, B. Ferriera, and K. Parker. Exscal: Elements of an extreme scale wireless sensor network. *Int. Conf. on Embedded and Real-Time Computing Systems and Applications*, 2005.

[3] Arutyun I. Avetisyan, Roy Campbell, Indranil Gupta, Michael T. Heath, Steven Y. Ko, Gregory R. Ganger, Michael A. Kozuch, David O'Hallaron, Marcel Kunze, Thomas T. Kwan, Kevin Lai, Martha Lyons, Dejan S. Milojicic, Hing Yan Lee, Yeng Chai Soh, Ng Kwang Ming, Jing-Yuan Luke, and Han Namgoong. Open Cirrus: A Global Cloud Computing Testbed. *IEEE Computer*, 43:35–43, 2010.

[4] Roy Campbell, Indranil Gupta, Michael Heath, Steven Y. Ko, Michael Kozuch, Marcel Kunze, Thomas Kwan, Kevin Lai, Hing Yan Lee, Martha Lyons, Dejan Milojicic, David O'Hallaron, and Yeng Chai Soh. Open Cirrus Cloud Computing Testbed: Federated Data Centers for Open Source Systems and Services Research. In *HotCloud'09: Proceedings of the 1st Workshop on Hot Topics in Cloud Computing*, 2009.

[5] Byung-Gon Chun and Petros Maniatis. Augmented smartphone applications through clone cloud execution. In *HotOS'09: Proceedings of the 12th conference on Hot topics in operating systems*, pages 8–8, Berkeley, CA, USA, 2009. USENIX Association.

[6] Emulab Total Network Testbed. Emulab - Network Emulation Testbed Home. `http://www.emulab.net/`.

[7] Harvard MoteLab Testbed. MoteLab. `http://motelab.eecs.harvard.edu`.

[8] Intel Berkeley CloudClone Project. CloudClone. `http://berkeley.intel-research.net/bgchun/clonecloud/`.

[9] T. Kosar and M. Livny. Stork: Making data placement a first class citizen in the grid. In *Proceedings of ICDCS'04*, pages 342–349, March 2004.

[10] OpenCirrus (TM) the HP/Intel/Yahoo! Open Cloud Computing Research Testbed. OpenCirrus (TM). `http://opencirrus.org`.

[11] PlanetLab Consortium. PlanetLab: An open platform for developing, deploying, and accessing planetary-scale services. `http://www.planet-lab.org/`.

[12] X. Wang, D. Huang, I. Akturk, M. Balman, G. Allen, and T. Kosar. Semantic enabled metadata management in petashare. *Journal of Grid and Utility Computing (IJGUC)*, 2009.

[13] Geoff Werner-Allen, Pat Swieskowski, and Matt Welsh. MoteLab: A Wireless Sensor Network Testbed. In *the Fourth International Conference on Information Processing in Sensor Networks (IPSN'05)*, April 2005.

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Research Interests

Energy management, computer systems, smart phones, embedded and distributed systems, sensor networks, resource management.

Education

- **Ph.D. in Computer Science,** Harvard University, May 2010
Adviser: Matt Welsh. Thesis title: "Data Fidelity and Resource Management for Data-Rich Sensor Networks."

- **A.B with Honors in Physics,** Harvard University, June 2003

Experience

- **Assistant Professor**, University at Buffalo, State University of New York, August 2011 -

- **Post-Doctoral Assistant**, Massachusetts Institute of Technology, September 2010 - June 2011
Working with Hari Balakrishnan, studied ways to reduce 802.11 power consumption in the context of the AirBlue FPGA-based software-radio platform.

- **Research Assistant,** Harvard University, June 2003 - May 2010
Working with Matt Welsh, designed sensor network systems supporting the scientific study of active volcanoes. Developed the Lance architecture for optimizing high-resolution signal collection. Participated in the design of the Pixie operating system and the Mercury architecture for medical monitoring. Designed and built the IDEA sensor network service enabling coordinated distributed energy management. Deployed and maintained MoteLab, a wireless sensor network testbed. Working with Radhika Nagpal, implemented and evaluated a firefly-inspired scale-free algorithm enabling time synchronicity.

- **Head Teaching Fellow,** Harvard University, Spring 2005, '06, '07, '09
Head Teaching Fellow for Computer Science 161: Operating Systems. Responsibilities included course administration, preparing course materials, teaching section, holding office hours, consulting with students and grading.

- **Teaching Fellow,** Harvard University, Fall 2000 - Spring 2004
Responsibilities included teaching section, holding office hours, student consultation and grading.
    - Math 21a: Multivariable Calculus (*Fall, Spring 2000*)
    - Computer Science 161: Operating Systems (*Spring 2003, 2004*)
    - Computer Science 261: Research Topics in Operating Systems (*Fall 2004*)
    - Computer Science 263: Modern Distributed Systems (*Fall 2004*)

- **Intern,** Microsoft Research, June - August 2007
Research internship in the Networked Embedded Computing group. Working with Feng Zhao, developed and evaluated a tiny Web Services stack for mPlatform, a stackable sensor node platform designed for rapid prototyping.

- **Developer Intern,** Microsoft Corporation, June - December 2001
Developer internship in Windows XP Desktop Performance group. Ran performance tests and analyzed results. Proposed, developed, and tested solutions. Developed diagnostic tools. Participated in design and testing of significant changes to core Windows XP kernel components.

Publications

- **IDEA: Integrated Distributed Energy Awareness for Wireless Sensor Networks**
Geoffrey Werner Challen, Jason Waterman and Matt Welsh. In *Proceedings of the 8th Annual International Conference on Mobile Systems, Applications and Services* (MobiSys'10).

- **Mercury: A Wearable Sensor Network Platform for High-Fidelity Motion Analysis**
Konrad Lorincz, Bor-rong Chen, Geoffrey Werner Challen, Atanu Roy Chowdhury, Shyamal Patel, Paolo Bonato and Matt Welsh. In *Proceedings of the Seventh ACM Conference on Embedded Networked Sensor Systems* (Sensys'09).

- **Peloton: Coordinated Resource Management for Sensor Networks**
Jason Waterman, Geoffrey Werner Challen, and Matt Welsh. In *Proceedings of the 12th Workshop on Hot Topics in Operating Systems* (HotOS'09).

- **Lance: Optimizing High-Resolution Data Collection in Wireless Sensor Networks**
Geoffrey Werner-Allen, Stephen Dawson-Haggerty and Matt Welsh. In *Proceedings of the Sixth ACM Conference on Embedded Networked Sensor Systems* (Sensys'08).

- **Resource-Aware Programming in the Pixie OS**
Konrad Lorincz, Bor-rong Chen, Jason Waterman, Geoffrey Werner-Allen and Matt Welsh. In *Proceedings of the Sixth ACM Conference on Embedded Networked Sensor Systems* (Sensys'08).

- **Pixie: An Operating System for Resource-Aware Programming of Embedded Sensors**
Konrad Lorincz, Bor-rong Chen, Jason Waterman, Geoffrey Werner-Allen, and Matt Welsh. In *Proceedings of the Fifth Workshop on Embedded Networked Sensors* (HotEmNets'08).

- **Fidelity and Yield in a Volcano Monitoring Sensor Network**
Geoffrey Werner-Allen, Konrad Lorincz, Jeff Johnson, Jonathan Lees and Matt Welsh. In *Proceedings of the Seventh USENIX Symposium on Operating Systems Design and Implementation* (OSDI'06).

- **Deploying a Wireless Sensor Network on an Active Volcano**
Geoffrey Werner-Allen, Konrad Lorincz, Mario Ruiz, Omar Marcillo, Jeff Johnson, Jonathan Lees and Matt Welsh. In *IEEE Internet Computing*, Special Issue on Data-Driven Applications in Sensor Networks, March/April 2006.

- **Firefly-Inspired Sensor Network Synchronicity with Realistic Radio Effects**
Geoffrey Werner-Allen, Geetika Tewari, Ankit Patel, Radhika Nagpal and Matt Welsh. In *Proceedings of the Third ACM Conference on Embedded Networked Sensor Systems* (Sensys'05).

- **MoteLab: A Wireless Sensor Network Testbed**
Geoffrey Werner-Allen, Pat Swieskowski, and Matt Welsh. In *Proceedings of the Fourth International Conference on Information Processing in Sensor Networks* (IPSN'05), Special Track on Platform Tools and Design Methods for Network Embedded Sensors (SPOTS).

- **Monitoring Volcanic Eruptions with a Wireless Sensor Network**
Geoffrey Werner-Allen, Jeff Johnson, Mario Ruiz, Jonathan Lees, and Matt Welsh. In *Proceedings of the Second European Workshop on Wireless Sensor Networks* (EWSN'05).

- **Simulating the Power Consumption of Large-Scale Sensor Network Applications**
Victor Shnayder, Mark Hempstead, Bor-rong Chen, Geoffrey Werner-Allen, and Matt Welsh. In *Proceedings of the Second ACM Conference on Embedded Networked Sensor Systems* (SenSys'04).

Talks

- **Managing Sensor Network Resource Consumption and Monitoring Active Volcanoes**
Brown University, 10/15/2009; UMass Amherst 10/20/2009; New York University, 10/21/2009; University of Southern California, 11/092009; Rice University, 11/11/2009; University of Texas at Austin, 11/13/2009; Johns Hopkins University, 12/02/2009; Northwestern University, 12/04/2009; University of Illinois at Chicago, 12/07/2009; Princeton University, 12/15/2009.

Books and Book Chapters

- **Wireless Sensor Networks: Deployments and Design Frameworks**
Elena Gaura, Mike Allen, Lewis Girod, James Brusey, Geoffrey Werner Challen. Springer Publishing, 2010. Book co-editor and chapter co-author.

Professional Activities

- **Program Committee Member** for the Second ACM Workshop on Social Network Systems (SNS-2009); the Sixth IEEE International Workshop on Sensor Networks and Systems for Pervasive Computing (PerSeNS 2010); the 9th ACM Conference on Embedded Networked Sensor Systems (SenSys 2011).

- **External Reviewer** for IPSN'10, IPSN'08, EWSN'06, Sensys'05, and others.

- **Resident Tutor,** Eliot House, Harvard University, 2006 - Present
Responsibilities include mentoring, advising, and providing both academic and personal advice to Harvard undergraduates.

- **Assistant Dean,** Harvard Summer School, Summer 2009
Led staff of 18 proctors supervising over 200 summer school students. Organized social activities and helped address disciplinary issues.

Undergraduate Advising

- **Patrick Swieskowski,** Summer 2006
Work on algorithms for automatic seismic wave arrival time detection led to demo presented at SenSys'06. Now co-founder of BaseShield.

- **Stephen Dawson-Haggerty,** Spring and Summer 2007
Helped design software for and support Summer 2007 deployment on Tungurahua Volcano. Now graduate student at University of California, Berkeley.

Awards

- **2005 DEAS Teaching Award**
Given by the Harvard School of Engineering and Applied Sciences for work as Teaching Fellow for "CS161: Operating Systems" in Spring, 2004.

- **2008 Sensys'08 Best Student Presentation Award**
Given for presentation on "Lance: Optimizing High-Resolution Signal Collection in Wireless Sensor Networks."

- **2009-2010 Siebel Scholar**
Presented for "outstanding academic performance and leadership."

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Education

- Post-doctorate   Sept 2004 – Aug 2005
  Theory of Distributed Systems Group
  MIT CSAIL, Cambridge, MA, USA
  Supervisor: Prof. Nancy Lynch

- Doctor of Philosophy   Aug 2004
  Department of Computer Science and Engineering
  The Ohio State University, Columbus, OH, USA
  Dissertation Title: "*Scalable Design of Fault-Tolerance for Wireless Sensor Networks*"
  Advisor: Prof. Anish Arora

- Master of Science   March 2000
  Department of Computer Science and Engineering
  The Ohio State University, Columbus, OH, USA
  Thesis: "*Resettable Vector Clocks: A Case Study in Designing Graybox Fault-Tolerance*"
  Advisor: Prof. Anish Arora

- Bachelor of Science   June 1997
  Department of Computer Science and Engineering
  Middle East Technical University, Ankara, Turkey

Employment history

- Assistant Professor   Aug 2005 – on going
  Computer Science and Engineering Department
  State University of New York at Buffalo

- Post-doctoral Research Associate   Sept 2004 – Aug 2005
  Theory of Distributed Systems Group
  MIT CSAIL, Cambridge, MA, USA
  Under the supervision of Prof. Nancy Lynch

- Graduate Research Associate   Sept 1998 – Aug 2004
  Department of Computer Science and Engineering
  The Ohio State University, Columbus, OH, USA
  Under the supervision of Prof. Anish Arora

- Summer Intern   June 2001 – Sept 2001
  Gryphon Project, IBM Research
  IBM T.J. Watson Research Center, Hawthorne, NY, USA
  Under the supervision of Dr. Robert Strom

Awards

- Google Research Award, 2010

- UB Exceptional Scholars Young Investigator Award, 2010

- NSF CAREER Award, 2008 for "An In-network Collaboration and Coordination Framework for Wireless Sensor Actor Networks"

- ICDCS 2002 Best Paper Award for "Convergence Refinement"
  1st place of 335 papers at the International Conference on Distributed Computing Systems (ICDCS), Vienna, Austria, July 2002.

- Outstanding Researcher Award by the Department of Computer Science and Engineering at The Ohio State University, 2001-2002

- Full scholarship for participation in Advanced School on Mobile Computing, Pisa, Italy, September 2003. Organized by Scuola Normale Superiore and LIST Group

- Turkish Government Fellowship, 1998

- Best Industrial Project Award for graduation project, 1997

- Ranked in the top 100 among 1.4 million examinees in Nation-wide University Entrance Examinations, Turkey, 1993

Professional memberships and activities

Professional Membership

- Association for Computing Machinery (ACM).

- Institute of Electrical and Electronic Engineers (IEEE).

Funding Proposal Review

- National Science Foundation (NSF), CISE CSR panel 2010

- NSF, CISE CSR panel 2010

- NSF, CISE CSR panel 2009

- NSF, CISE CPS panel 2009

- NSF, CISE/CCF panel 2009

- NSF, CISE NETS panel 2009

- NSF, CISE NETS panel 2008

- NSF, CISE CSR panel 2008

Publication/Web Chair

- The 28th IEEE Symposium on Reliable Distributed Systems (SRDS) 2009

- IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM) 2006

Program Committee Membership

- The 30th International Conference on Distributed Computing Systems (ICDCS) 2010

- The 7th IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS) 2010

- IEEE Global Communications Conference (Globecom) 2010

- 35th IEEE Conference on Local Computer Networks (LCN) 2010

- The 25th ACM Symposium on Applied Computing (ACM-SAC-10)

- IEEE International Conference on Communication (ICC) 2010

- IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC) 2010

- International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS) 2010

- IEEE International Conference on Communication (ICC) 2009

- 10th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM) 2009

- 34th IEEE Conference on Local Computer Networks (LCN) 2009

- 18th International Conference on Computer Communications and Networks (ICCCN 2009)

- The 7th IEEE/IFIP International Conference on Embedded and Ubiquitous Computing (EUC-09)

- The Sixth International ICST Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness (QShine-09)

- International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS) 2009

- IEEE International Conference on Communication (ICC) 2008

- IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS) 2008

- International Conference on Wireless Algorithms, Systems and Applications (WASA) 2008

- IEEE/IFIP International Conference On Embedded and Ubiquitous Computing (EUC) 2008

- 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS) 2008

- IEEE International Symposium on Ubisafe Computing 2007

- 6th International Workshop on Assurance in Distributed Systems and Networks (ADSN) 2007

- 10th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS) 2007

- IEEE WoWMoM Workshop on Autonomic and Opportunistic Communications (AOC) 2007

- First International Workshop on Protocols and Algorithms for Reliable and Data Intensive Sensor Networks (PARIS) 2007

- 11th International Conference on Principles of Distributed Systems (OPODIS) 2007

- IEEE 20th International Conference on Advanced Information Networking and Applications (AINA) 2006

- International Conference on Parallel and Distributed Systems (ICPADS) 2005

- 4th International Workshop on Assurance in Distributed Systems and Networks (ADSN) 2005

Journal paper referee

- ACM Distributed Computing

- ACM Transactions on Embedded Computing Systems

- ACM Transactions on Sensor Networks

- Elsevier Ad Hoc Networks

- Elsevier Computers and Electrical Engineering

- Elsevier Computer Networks

- Elsevier Theoretical Computer Science

- IEEE Transactions on Parallel and Distributed Systems

- IEEE Transactions on Computers

- IEEE Transactions on Vehicular Technology

- IEEE Communications Letters

- Information Processing Letters

- Journal of Parallel and Distributed Computing

- Journal of Aerospace Computing, Information, and Communication

- Journal of Systems and Software

- SIAM Journal on Computing

Panel membership

- Second International IEEE WoWMoM Workshop on Autonomic Communications and Computing ACC 2006

- The Sixth International Workshop on Assurance in Distributed Systems and Networks (ADSN2007),

- Third IEEE WoWMoM Workshop on Autonomic and Opportunistic Communications 2010

School service

- Junior Faculty Panel speaker for Future Faculty Workshop at UB 2009

- Junior Faculty Panel speaker for Future Faculty Workshop at UB 2010

Departmental service

- Faculty Recruitment Committee member (2009-10)

- Distinguished Speaker Committee member (2009-10)

- Graduate Studies Committee member (2009-10, 2008-09, 2007-08, 2006-07, 2005-06)

- Graduate Admissions Committee member (2009-10, 2006-07, 2005-06)

- Colloquium Committee chair (2007-08)

- Colloquium Committee member (2006-07)

Courses taught

- CSE 4/586: Distributed Systems (*Spring 2010, Spring 2009*) with classes of **60** students.

- CSE 646: Wireless Networking & Mobile Computing (*Fall 2009, Fall 2008, Spring 2008, Fall 2006, Fall 2005*) with classes of around **20** students.

- CSE 4/589: Modern Networking Concepts (*Fall 2007*) with a class of **120** students.

- CSE 703 (earlier called 719): Seminar on Wireless Sensor Networks (*Spring 2010, Fall 2009, Fall 2008, Fall 2007, Spring 2007, Spring 2006*) with classes of around **15** students.

- UE141: Discovery Seminar on iPhone Programming (*Fall 2009*),
  Discovery Seminar on Wireless Sensor Networks (*Fall 2007*)

Research Supervision

Ph.D. supervision

- Xuming Lu: "*In-network querying and tracking for wireless sensor networks*", graduated in Spring 2009, working at Bloomberg Inc.

- Murat Ali Bayir: "*Enabling location aware smartphone applications via mobility profiling*", graduated in Summer 2010, working as a research scientist at Ask.com

- Onur Soysal: "*A distributed algorithmic approach for improving reliability and energy efficiency in wireless sensor networks*", graduated in Summer 2010, accepted a position at Google Inc.

- Ismail Bahadir Aydin: (RA supported by ONR grant)

- Fatih Bulut: (RA supported by NSF CAREER grant)

- Hanifi Gunes: (RA supported by ONR grant)

- Serafettin Tasci: (RA supported by NSF CSR grant)

- Zuhal Tepecik: (Government sponsored)

- Yavuz Selim Yilmaz: (TA)

M.S. thesis supervision

- Cuneyt Gurcan Akcora: "*Crowdsourced sensing and opinion mining using Twitter*", graduated in Summer 10, accepted a PhD position in Italy.

- Srivats Balachandran: "*Robcast: A reliable MAC layer protocol for broadcast in wireless sensor networks*", graduated in Spring 08, working at Microsoft.

M.S. project

- Ken Yian Chow

- Abhijeet More

- Krishnan Narayanan

- Brian Parfitt

- Pradeep Phatak

- Youngwhan Song,

- ChiehShyan Wan

- and over 30 more M.S. students from the CSE 646: Wireless Sensor Networking courses.

PhD Dissertation Committees

- Seokhoon Yoon

- Taekyeun Lee

- Xuming Lu (chair)

- Murat Ali Bayir (chair)

- Onur Soysal (chair)

Grant support

- 1R21ES017826: Use of cellphone-based time-activity data for air pollutant exposure estimation
  co-Investigator: Murat Demirbas
  NIH/NIEHS, $330,000 from 10/1/10 to 9/30/12.

- Crowdsourced sensing and collaboration using Twitter
  Principal Investigator (PI): Murat Demirbas
  Google Research Award, $50,000 from 2010-2011.

- Tool-Support for Producing High-Assurance and Reliable Software for Wireless Sensor Actor Networks
  PI: Murat Demirbas and coPI: Sandeep Kulkarni
  NSF Computer Systems Research, $500,000 from 2009-2012.

- Efficient and resilient querying and tracking services for wireless sensor networks
  PI: Murat Demirbas
  Office of Naval Research, $510,000 from 2009-2012

- An In-network Collaboration and Coordination Framework for Wireless Sensor Actor Networks
  PI: Murat Demirbas
  NSF CAREER Award, $450,000 from 2008-2013

- Research Experiences for Undergraduates
  PI: Murat Demirbas
  NSF $10,000 from 2008-2009

Publications

Refereed book chapters

[B01] M. Demirbas, A. Arora, and M. Gouda. Pursuer-Evader Tracking in Sensor Networks. *Sensor Network Operations, IEEE Press*, Chapter 9, April 2006. (Cited by **12**) (Conference version is cited by **60**)

Refereed journal papers

[J01] M. A. Bayir*, M. Demirbas, A. Cosar. A Web Based Personalized Mobility Service for Smartphone Applications. Accepted. To appear in *The Computer Journal*.

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*denotes co-author was Murat's student when the work was done

[J02] TK Lee, C. Qiao, M. Demirbas, J. Xu. ABC-MC: A New Multi-Channel Geographic Forwarding Scheme for Wireless Sensor Networks. *Ad Hoc Networks, Elsevier*, Accepted. To appear.

[J03] M. A. Bayir*, M. Demirbas, N. Eagle. Discovering SpatioTemporal Mobility Profiles of Cellphone Users. Accepted. To appear in *Elsevier Pervasive and Mobile Computing Journal, Special Issue on Human Behaviour in Ubiquitous Environments.* (conference version cited by **6**)

[J04] X. Lu*, M. Demirbas. A Lightweight Soft-State Tracking Framework for Dense Mobile Ad Hoc Networks. *Pervasive and Mobile Computing Journal, Elsevier*, 6(3): 297–311, 2010.

[J05] SK Yoon, O. Soysal*, M. Demirbas, C. Qiao. Coordinated Locomotion and Monitoring using Autonomous Mobile Sensor Nodes. Accepted. To appear in *IEEE Transactions on Parallel and Distributed Systems.*

[J06] TK Lee, C. Qiao, M. Demirbas, J. Xu. ABC: A Simple Geographic Forwarding Scheme Capable of Bypassing Routing Holes in Sensor Networks. *Ad Hoc Networks, Elsevier*, 8(4): 361–377, 2010.

[J07] V. Kulathumani, A. Arora, M. Demirbas, M. Sridharan. Trail: A Distance-Sensitive Network Service for Distributed Object Tracking. *ACM Transactions on Sensor Networks (TOSN)*, 5(2): 1–40, 2009. (cited by **2**, conference version cited by **11**)

[J08] G. Chockler, M. Demirbas, S. Gilbert, N. Lynch, C. Newport, and T. Nolte. Consensus and collision detectors in radio networks. *Distributed Computing (Springer)*, 21(1): 55–84, 2008. (cited by **16**, conference version cited by **57**)

[J09] M. Demirbas, A. Arora, V. Kulathumani. A Lightweight Querying Service for Wireless Sensor Networks. *Theoretical Computer Science Journal, Elsevier*, 410(6-7): 500-513, 2009.

[J10] M. Demirbas, X. Lu*, P. Singla. An In-Network Querying Framework for Wireless Sensor Networks. *IEEE Transactions on Parallel and Distributed Systems*, 99(1): 1202–1215, 2008. (cited by **5**, conference version cited by **9**)

[J11] K. Akkaya, M. Demirbas, and S. Aygun. The Impact of Data Aggregation on the Performance of Wireless Sensor Networks. *Journal of Wireless Communications and Mobile Computing*, 8(2): 171-193, 2008. (cited by **10**)

[J12] M. Demirbas, A. Arora, V. Mittal, V. Kulathumani. A Fault-Local Self-Stabilizing Clustering Service for Wireless Ad Hoc Networks. *IEEE Transactions on Parallel and Distributed Systems, Special Issue on Localized Communication and Topology Protocols for Ad Hoc Networks*, 17(9): 912–923, 2006. (cited by **14**, conference version cited by **16**, workshop version cited by **36**)

[J13] A. Arora, S. S. Kulkarni, and M. Demirbas. Resettable Vector Clocks. *Journal of Parallel and Distributed Computing (JPDC)*, 66(2): 221–237, 2006. (cited by **25**)

[J14] A. Arora, P. Dutta, S. Bapat, V. Kulathumani, H. Zhang, V. Naik, V. Mittal, H. Cao, M. Demirbas, M. Gouda, Y. Choi, T. Herman, S. Kulkarni, U. Arumugam, M. Nesterenko, A. Vora, and M. Miyashita. A Line in the Sand: A Wireless Sensor Network for Target Detection, Classification, and Tracking. *Computer Networks (Elsevier)*, 46(5): 605–634, 2004. (cited by **376**)

Under submission to journals

[JS01] M. Demirbas, O. Soysal*. A Transactional Programming Framework for Wireless Sensor/Actor Networks. Submitted to the *IEEE Transactions on Parallel and Distributed Systems.*

[JS02] M. Demirbas, A. Arora. Specification Based Design of Self-Stabilization. Submitted to the *IEEE Transactions on Parallel and Distributed Systems.*

[JS03] R. Sudhaakar, A. Sanzgiri, M. Demirbas, C. Qiao. A Plant and Play Wireless Sensor Network System for Gate Monitoring. Submitted to the *IEEE Transactions on Parallel and Distributed Systems.*

Refereed conference papers

[C01] M. Demirbas, S. Tasci*, H. Gunes*, A. Rudra. Singlehop Collaborative Feedback Primitives for Threshold Querying in Wireless Sensor Networks. *25th IEEE International Parallel & Distributed Processing Symposium,* 2011. (acceptance ratio =**20%**)

[C02] M. Arumugam, M. Demirbas, S. Kulkarni. Slow is Fast for Wireless Sensor Networks in the presence of Message Losses. *12th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS),* 2010.

[C03] M.A. Bayir* and M. Demirbas. PRO: A Profile Based Routing Algorithm for Pocket Switched Networks. *IEEE Global Communications Conference (Globecom),* 2010.

[C04] O. Soysal*, M. Demirbas. Data Spider: A Resilient Mobile Basestation Protocol for Efficient Data Collection in Wireless Sensor Networks. The *6th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS),* pages 393–408, 2010. (acceptance ratio = **29%** for the algorithms track)

[C05] M. Demirbas, M.A. Bayir*, C.G. Akcora*, Y. Yilmaz*, H. Ferhatosmanoglu. Crowd-sourced Sensing and Collaboration Using Twitter. *11th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM),* 2010. (acceptance ratio =**21%**)

[C06] X. Lu*, M. Demirbas, C. Qiao. A Holistic Solution to the Pursuer Evader Tracking Problem. *The 28th IEEE Symposium on Reliable Distributed Systems (SRDS),* pages 179–188, 2009. (acceptance ratio = **22%**)

[C07] M. A. Bayir*, M. Demirbas, A. Cosar. TRACK ME! A Web Based Location Tracking and Analysis System for Smartphone Users. *24th International Symposium on Computer and Information Sciences (ISCIS),* pages 117–122, 2009.

[C08] M. A. Bayir*, M. Demirbas, N. Eagle. Discovering SpatioTemporal Mobility Profiles of Cellphone Users. *The 10th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WOWMOM),* 2009. (acceptance ratio =**24%**)

[C09] R. Sudhaakar, A. Sanzgiri*, M. Demirbas, C. Qiao. A Plant-and-Play Wireless Sensor Network System for Gate Monitoring. *The 10th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WOWMOM)*, 2009. (acceptance ratio =**24%**)

[C10] TK Lee, C. Qiao, M. Demirbas, J. Xu. ABC-MC: A simple multi-channel geographic forwarding scheme for wireless sensor networks. *International Performance Computing and Communications Conference (IPCCC)*, pages 9–16, 2009.

[C11] M. Demirbas, A. Arora. An Application of Specification-Based Design of Self-stabilization to Tracking in Wireless Sensor Networks. *The 10th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS)*, pages 203-217, 2008. (acceptance ratio < **30%**)

[C12] X. Lu*, M. Demirbas. A Lightweight Tracking Framework for Mobile Ad Hoc Networks. *The 5th IEEE International Conference on Mobile Ad Hoc and Sensor Systems (MASS)*, pages 359–364, 2008. (acceptance ratio =**13%**)

[C13] TK. Lee, C. Qiao, M. Demirbas, J. Xu. ABC: A Novel Integrated MAC and Routing Protocol for Wireless Ad Hoc Networks. *17th IEEE International Conference on Computer Communications and Networks (ICCCN)*, pages 320–327, 2008. (acceptance ratio < **26%**)

[C14] SK Yoon, O. Soysal*, M. Demirbas, C. Qiao. Coordinated Locomotion of Mobile Sensor Networks. *Fifth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, pages 126–134, 2008. (acceptance ratio = **21%**)

[C15] M. Demirbas, O. Soysal*, M. Hussain*. Transact: A Transactional Programming Framework for Wireless Sensor/Actor Networks. *IEEE/ACM International Conference on Information Processing in Sensor Networks (IPSN)*, pages 295–306, 2008. (acceptance ratio = **19%**)

[C16] M. Demirbas, O. Soysal*, M. Hussain*. Singlehop Collaborative Feedback Primitives for Wireless Sensor Networks. *IEEE INFOCOM*, pages 2047-2055, 2008. (acceptance ratio =**29%**) (cited by **10**)

[C17] M. Demirbas, O. Soysal*, and A. S. Tosun. Data Salmon: A Greedy Mobile Basestation Protocol for Efficient Data Collection in Wireless Sensor Networks. *IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS)*, pages 267–280, 2007. (acceptance ratio < **27%**) (cited by **9**)

[C18] M. Demirbas, X. Lu*. Distributed Quad-Trees for Spatial Querying in Wireless Sensor Networks. *IEEE International Conference on Communication (ICC)*, pages 3325–3332, 2007. (Acceptance rate < **30%**) (Cited by **9**)

[C19] V. Kulathumani, A. Arora, M. Demirbas, M. Sridharan. Trail: A Distance-Sensitive Network Service for Distributed Object Tracking. *European conference on Wireless Sensor Networks (EWSN)*, pages 83–100, 2007. (acceptance ratio = **13%**) (cited by **11**)

[C20] M. Demirbas, A. Arora, V. Kulathumani. A Lightweight Querying Service for Wireless Sensor Networks. *International Conference on Principles of Distributed Systems (OPODIS)*, pages 242–257, 2006. (acceptance rate = **13%**) (cited by **3**)

[C21] M. Demirbas and M. Hussain*. A MAC Layer Protocol for Priority-based Reliable Multicast in Wireless Ad Hoc Networks. *Broadband Wireless Networking Symposium (BroadNets)*, 2006. (cited by **4**)

[C22] G. Chockler, M. Demirbas, S. Gilbert, C. Newport, and T. Nolte. Consensus and Collision Detectors in Wireless Ad Hoc Networks. *ACM Symposium on Principles of Distributed Computing (PODC)*, pages 197–206, 2005. (acceptance ratio=**23%**) (cited by **57**)

[C23] M. Demirbas, A. Arora, T. Nolte, and N. Lynch. A Hierarchy-based Fault-local Stabilizing Algorithm for Tracking in Sensor Networks. *International Conference on Principles of Distributed Systems (OPODIS)*, pages 299–315, 2004. (acceptance ratio < **30%**) (cited by **37**, brief announcement version cited by **10**)

[C24] M. Demirbas, A. Arora, V. Mittal, and V. Kulathumani. Design and Analysis of a Fast Local Clustering Service for Wireless Sensor Networks. *Invited paper at Broadband Wireless Networking Symposium (BroadNets)*, pages 700–709, 2004. (acceptance rate < 30%) (cited by **16**, workshop version cited by **36**)

[C25] M. Demirbas and H. Ferhatosmanoglu. Peer-to-Peer Spatial Queries in Sensor Networks. *IEEE International Conference on Peer-to-Peer Computing (P2P)*, pages 32–39, 2003. (cited by **100**)

[C26] M. Demirbas, A. Arora, and M. Gouda. A Pursuer-Evader Game for Sensor Networks. *Symposium on Self-Stabilizing Systems (SSS)*, pages 1–16, 2003. (cited by **66**)

[C27] P. A. G. Sivilotti and M. Demirbas. Introducing Middle School Girls to Fault Tolerant Computing. *Technical Symposium on Computer Science Education (SIGCSE)*, pages 327-331, 2003. (cited by **6**)

[C28] M. Demirbas and A. Arora. Convergence Refinement. **Best paper** at *International Conference on Distributed Computing Systems (ICDCS)*, pages 589–597, 2002. (acceptance ratio=**18%**) (cited by **16**)

[C29] A. Arora, M. Demirbas, and S. S. Kulkarni. Graybox Stabilization. *International Conference on Dependable Systems and Networks (ICDSN)*, pages 389–400, 2001. (acceptance ratio=**35%**) (cited by **14**)

[C30] A. Arora, S. S. Kulkarni, and M. Demirbas. Resettable Vector Clocks. *ACM Symposium on Principles of Distributed Computing (PODC)*, pages 269–278, 2000. (acceptance rate= **27%**) (cited by **25**)

Refereed workshop papers

[W1] M. F. Bulut, Y. S. Yilmaz, M. Demirbas. Crowdsourcing Location-based Queries *Second IEEE Workshop on Pervasive Collaboration and Social Networking (PerCol)*, (in conjunction with IEEE PERCOM), 2011.

[W2] J. Aspnes, E. Blais, M. Demirbas, R. O'Donnell, A. Rudra, S. Uurtamo. k+ Decision Trees. *International Workshop on Algorithms for Sensor Systems, Wireless Ad Hoc Networks and Autonomous*

Mobile Entities, 2010.

[W3] C. G. Akcora*, M. A. Bayir*, M. Demirbas, H. Ferhatosmanoglu. Identifying Breakpoints in Public Opinion. *Workshop on Social Media Analytics 2010*, [Held in conjunction with The 16th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2010)].

[W4] B. Sriram, D. Fuhry, E. Demir, H. Ferhatosmanoglu, M. Demirbas. Short Text Classification in Twitter to Improve Information Filtering. The 33rd ACM SIGIR Conference, pages 841–842, 2010.

[W5] M. Demirbas, C. Rudra, A. Rudra, M. A. Bayir*. iMAP: Indirect Measurement of Air Pollution with Cellphones. *International Workshop on Information Quality and Quality of Service for Pervasive Computing* (in conjunction with IEEE PERCOM), 2009.

[W6] M. Demirbas, S. Balakrishnan*. RoBcast: A Singlehop Reliable Broadcast Protocol for Wireless Sensor Networks. *International Workshop on Assurance in Distributed Systems and Networks*, 2007.

[W7] M. Demirbas. A Transactional Framework for Programming Wireless Sensor/Actor Networks. *Future Trends of Distributed Computing Systems (FTDCS)*, March 2007.

[W8] T. Herman and M. Demirbas. Position paper: High-Confidence Software Platforms for Cyber-Physical Systems. *High-Confidence Software Platforms for Cyber-Physical Systems (HCSP-CPS) Workshop*, November 2006.

[W9] M. Demirbas and M. Hussain*. A MAC Layer Protocol for Priority-based Reliable Broadcast in Wireless Ad Hoc Networks. *IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WOWMOM)*, Buffalo, NY, pages 447-449, 2006.

[W10] M. Demirbas and Y.W. Song*. An RSSI-based Scheme for Sybil Attack Detection in Wireless Sensor Networks. *Advanced EXPerimental activities ON WIRELESS networks and systems (EXPONWIRELESS) Workshop* (as part of WOWMOM 2006), Buffalo, NY, pages 564-570, 2006. (cited by **66**)

[W11] M. Demirbas, K.Y. Chow*, and C.S. Wan*. INSIGHT: Internet-Sensor Integration for Habitat Monitoring. *Advanced EXPerimental activities ON WIRELESS networks and systems (EXPONWIRELESS) Workshop* (as part of WOWMOM 2006), Buffalo, NY, pages 553-558, 2006. (cited by **19**)

[W12] G. Chockler, M. Demirbas, S. Gilbert, and C. Newport. A Middleware Framework for Robust Applications in Wireless Ad Hoc Networks. *Forty-third Annual Allerton Conference on Communication, Control, and Computing*, 2005. (cited by **20**)

[W13] G. Chockler, M. Demirbas, S. Gilbert, N. Lynch, C. Newport, and T. Nolte. Reconciling the Theory and Practice of (Un)Reliable Wireless Broadcast. *International Workshop on Assurance in Distributed Systems and Networks*, pages 42–48, 2005. (cited by **18**)

[W14] M. Demirbas, A. Arora, T. Nolte, and N. Lynch. Brief announcement: STALK: A Self-Stabilizing Hierarchical Tracking Service for Sensor Networks. *ACM Symposium on Principles of Distributed Computing (PODC)*, page 378, 2004. (cited by **10**)

[W15] M. Demirbas, A. Arora, and V. Mittal. FLOC: A Fast Local Clustering Service for Wireless Sensor Networks. *Workshop on Dependability Issues in Wireless Ad Hoc Networks and Sensor Networks (DIWANS/DSN)*, 2004. (cited by **36**)

Invited talks

T01 University of Illinois at Urbana-Champaign, Illinois Center for Wireless Systems Seminar Series, August 2010. "Singlehop Coordination and Collaboration Primitives for WSANs"

T02 **Keynote** at the Workshop on Mobility in Wireless Sensor Networks (MobiSensors), June 2010. "Employing the smartphone (and the smart human) for mobile sensing"

T03 **Keynote** at the Third IEEE WoWMoM Workshop on Autonomic and Opportunistic Communications, June 2010. "Employing the smartphone (and the smart human) for mobile sensing"

T04 Cornell University, Cornell Systems Lunch, May 2010. "Singlehop Coordination and Collaboration Primitives for WSANs"

T05 Harvard University, Sensor Networks Lab, April 2010. "Singlehop Coordination and Collaboration Primitives for WSANs"

T06 MIT, CSAIL, Theory of Distributed Systems Seminar, April 2010. "Singlehop Coordination and Collaboration Primitives for WSANs"

T07 University of Texas at San Antonio, CS Seminar Series, November 2007. "A Transactional Programming Framework for Wireless Sensor/Actor Networks"

T08 University of Vermont, CSSA Seminar Series, Burlington, VT, April 2007. "A Transactional Programming Framework for Wireless Sensor/Actor Networks"

T09 US Japan Next Generation Buildings Workshop, Honolulu, HW, Feb 2007. "Wireless Sensor Networks for Monitoring Next Generation Buildings"

T10 Los Alamos National Labs, Los Alamos, NM, Sept 2006. "Scalable Self-Healing in Wireless Sensor Networks"

T11 Middle East Technical University, Computer Science & Engineering Department, Ankara, Turkey, May 2006. "Scalable Tracking and Querying in Wireless Sensor Networks"

T12 Bilkent University, Computer Science & Engineering Department, Ankara, Turkey, May 2006. "Scalable Tracking and Querying in Wireless Sensor Networks"

Conference presentations & attendance

P01 12th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS), New York, NY, Sept 2010.

P02 IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS), Santa Barbara, CA, June 2010.

P03 The 11th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WOWMOM), Montreal, Canada, June 2010.

P04 The 28th IEEE Symposium on Reliable Distributed Systems (SRDS), Buffalo, NY, Sept 2009.

P05 The 10th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WOWMOM), Kos, Greece, June 2009.

P06 The 10th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS), Detroit, MI, Nov 2008.

P07 ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN), St. Louis, MI, April 2008.

P08 IEEE Infocom, Phoenix, AZ, April 2008.

P09 The Sixth International Workshop on Assurance in Distributed Systems and Networks (ADSN) (in conjunction with ICDCS), Toronto, CA, June 2007.

P10 IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS), Santa Fe, NM, June 2007.

P11 Future Trends of Distributed Computing Systems (FTDCS), Sedona, AZ, March 2007.

P12 International Conference on Principles of Distributed Systems (OPODIS), Bordeaux, France, December 2006.

P13 High-Confidence Software Platforms for Cyber-Physical Systems (HCSP-CPS) Workshop, Washington, DC, November 2006.

P14 Broadband Wireless Networking Symposium (BroadNets), San Jose, CA, October 2006.

P15 IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks, Buffalo, NY, June 2006.

P16 International Conference on Distributed Computing Systems (ICDCS), Columbus, OH, June 2005.

P17 Broadband Wireless Networking Symposium (BroadNets), San Jose, CA, October 2004.

P18 Third IEEE International Conference on Peer-to-Peer Computing (P2P), Linkoping, Sweden, September 2003.

P19 Sixth Symposium on Self-Stabilizing Systems (SSS), San Francisco, CA, June 2003

P20 Seminar on Self-Stabilizing Systems (Invited presentation), Luminy, France, October 2002

P21 International Conference on Distributed Computing Systems (ICDCS), Vienna, Austria, July 2002

P22 International Parallel and Distributed Processing Symposium (IPDPS), Fort Lauderdale, FL, April 2002

P23 International Conference on Dependable Systems and Networks (ICDSN), Goteborg, Sweden, July 2001

P24 ACM Symposium on Principles of Distributed Computing (PODC), Portland, OR, July 2000

Steven Y. Ko

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stevko@buffalo.edu, (716) 645-4725

EDUCATION

University of Illinois at Urbana-Champaign **Urbana, IL**
Ph.D. in Computer Science 2009
Advisor: Prof. Indranil Gupta
Dissertation: Efficient On-Demand Operations in Large-Scale Infrastructures

Seoul National University **Seoul, Korea**
M.S. in Computer Science and Engineering 2002

Yonsei University **Seoul, Korea**
B.S. in Mathematics, minor in Computer Science 1999

PROFESSIONAL EXPERIENCE

Assistant Professor, University at Buffalo, SUNY 2010-Present

Postdoctoral Research Associate, Princeton University 2009-2010

Research Assistant, University of Illinois at Urbana-Champaign 2005 - 2009

Summer Intern, HP Labs (Palo Alto) 2006

Summer Intern, Lawrence Livermore National Lab 2005

Research Assistant, National Center for Supercomputing Applications 2003-2005

Research Assistant, Seoul National University 2000-2002

RESEARCH AND WORK SUMMARY

Princeton University
SCAFFOLD Project
- Participated in the design and implementation of a new network architecture for service-based naming, addressing, and routing.

DPRG (Distributed Protocols Research Group), UIUC

1) Intermediate Data Storage for Dataflow Programs: Designed and implemented a new data storage that
- serves as a plug-in for dataflow programming frameworks such as MapReduce and Dryad
- redundantly copies the intermediate data generated in-between computation stages to prevent cascaded re-execution
- improves the overall completion time of each job in the presence of failures

2) Moara: Designed and implemented a new distributed querying system that
- allows users to specify and query groups in distributed infrastructures
- allows flexible querying over unions and/or intersetions of existing groups

3) HoneyAdapt: Studied a new peer-to-peer algorithm for Grid applications inspired by the behavior of honey bees that
- chooses the best algorithm among N possible algorithms under given workload characteristics
- self-adapts to the best algorithm as the workload characteristics change at run-time

4) Worker-centric Grid Scheduler: Designed and evaluated new worker-centric Grid scheduling strategies that
- targets data-intensive Grid applications
- exploits data-sharing among tasks, which results in significant reduction of file transfers

5) MON (Management Overlay Network): Designed and implemented MON, a system that allows

- monitoring and querying the status of distributed systems (e.g. PlanetLab)
- executing commands on every node simultaneously
- detecting a node crash and restarting applications on a live node automatically

6) MPIL (Multi-Path Insertion and Lookup): Designed and evaluated a new peer-to-peer object discovery algorithm that
- is robust under highly dynamic network condistions
- can be used over any overlay topology

HP Labs (Palo Alto)
Distributed Subset Aggregation for Data Center Level Metrics
- Identified opportunities of using subset aggregation for data center level metrics
- Implemented subset aggregation on top of SDIMS

LLNL (Lawrence Livermore National Lab)
DPCL (Dynamic Probe Class Library) on BlueGene/L
- Ported DPCL, a library that lets performance tools insert and remove instructions dynamically from/to running processes, to BlueGene/L supercomputer with 64,000 nodes
- Implemented a new process control mechanism for DPCL, using an MPI job launcher, libelf, and libptrace
- Replaced the socket communication layer of DPCL with MRNet (Multicast Reduction Network) for scalability

NCSA (National Center for Supercomputing Applications), UIUC
Network Performance Advisor
- Developed a distributed archive of network measurement data for *Network Performance Advisor*, a single application that integrates the measuring, analyzing, and displaying of network performance statistics
- Designed and implemented a distributed network measurement infrastructure that integrates network measurement tools (e.g. ping, iperf, etc) and reports end-to-end network conditions

CSE Department, Seoul National University
1) Project PANDA II
- Verified a cache-coherence protocol and designed a cache controller for a CC-NUMA system
- Proposed a cache replacement policy for remote caches to reduce bus traffic, which turned into the master's thesis

2) Resource Sharing over IEEE 1394
- Implemented an IEEE 1394 NDIS-WDM device driver for Windows 2000 that enables resource-sharing over IEEE 1394 between two computers

PUBLICATIONS
1. "CloudPolice: Taking Access Control out of the Network," L. Popa, M. Yu, S. Y. Ko, I. Stoica, and S. Ratnasamy, *in Proceedings of the Workshop on Hot Topics in Networks (HotNets), 2010*
2. "Making Cloud Intermediate Data Fault-Tolerant," S. Y. Ko, I. Hoque, B. Cho, and I. Gupta, *in Proceedings of the ACM Symposium on Cloud Computing 2010 (SOCC), 2010*
3. "Open Cirrus: A Global Cloud Computing Testbed," A. I. Avetisyan et al., *IEEE Computer, April, 2010*
4. "Open Cirrus Cloud Computing Testbed: Federated Data Centers for Open Source Systems and Services Research," R. Campbell et al., *in Proceedings of the USENIX Workshop on Hot Topics in Cloud Computing (HotCloud), 2009*
5. "On Availability of Intermediate Data in Cloud Computations," S. Y. Ko, I. Hoque, B. Cho, and I. Gupta, *in Proceedings of the USENIX Workshop on Hot Topics in Operating Systems (HotOS), 2009*

6. "Moara: Flexible and Scalable Group-based Aggregation System," S. Y. Ko, P. Yalagandula, I. Gupta, V. Talwar, D. Milojicic, and S. Iyer, *in Proceedings of ACM/IFIP/USENIX Middleware, 2008*

7. "Efficient On-Demand Operations in Dynamic Distributed Infrastructures," S. Y. Ko, and I. Gupta, *Workshop on Large-Scale Distributed Systems and Middleware (LADIS), 2008*

8. "Using Tractable and Realistic Churn Models to Analyze Quiescence Behavior of Distributed Protocols," S. Y. Ko, I. Hoque, and I. Gupta, *in Proceedings of IEEE Symposium on Reliable Distributed Systems (SRDS), 2008*

9. "A New Class of Nature-Inspired Algorithms for Self-Adaptive Peer-to-Peer Computing," S. Y. Ko, I. Gupta, and Y. Jo, *ACM Transactions on Autonomous and Adaptive Systems (TAAS), September, 2008*

10. "New Worker-Centric Scheduling Strategies for Data-intensive Grid Applications," S. Y. Ko, R. Morales, and I. Gupta, *in Proceedings of ACM/IFIP/USENIX Middleware, 2007*

11. "Querying Large Distributed Infrastructures," (invited) S. Y. Ko, P. Yalagandula, I. Gupta, V. Talwar, D. Milojicic, and S. Iyer, *IEEE TCSC Newsletter Volume 9, No.1, 2007.*

12. "Dynamic Binary Instrumentation and Data Aggregation on Large Scale Systems," G. Lee, M. Schulz, D. Ahn, A. Bernat, B. R. de Supinski, S. Y. Ko, and B. Rountree, *International Journal of Parallel Programming (IJPP), 2007.*

13. "Novel Mathematics-Inspired Algorithms for Self-Adaptive Peer-to-Peer Computing," S. Y. Ko, I. Gupta, and Y. Jo, *in Proceedings of the First IEEE International Conference on Self-Adaptive and Self-Organizing Systems, 2007.*

14. "Data Center Level Metrics via In-Network Aggregation," S. Iyer, P. Yalagandula, V. Talwar, D. Milojicic, S. Y. Ko, I. Gupta, and J. Purushothaman, *in Proceedings of the Hewlett-Packard Technical Conference (HP TechCon), 2007.*

15. "MON: On-Demand Overlays for Distributed System Management," J. Liang, S. Y. Ko, I. Gupta, and K. Nahrstedt, *in Proceedings of the Second Workshop on Real, Large Distributed Systems (WORLDS), 2005.*

16. "Scalable Dynamic Bynary Instrumentation for BlueGene/L" M. Schulz, D. Ahn, A. Bernat, B. de Supinski, S. Y. Ko, G. Lee, and B. Rountree, *in Proceedings of the Workshop on Binary Instrumentation and Applications (WBIA), 2005.*

17. "Perturbation-Resistant and Overlay-Independent Resource Discovery," S. Y. Ko and I. Gupta, *in Proceedings of IEEE Dependable Systems and Networks (DSN), 2005.*

18. "The Case for Methodology Research in Self-* Distributed Systems," I. Gupta, S. Y. Ko, N. Thompson, M. Nagda, C. Devaraj, R. Morales, and J. A. Patel, *LNCS 3460, Self-Star Properties in Complex Information Systems, 2005.*

19. "A BGP Attack Against Traffic Engineering," J. Kim, S. Y. Ko, D. M. Nicol, X. A. Dimitropoulos, and G. F. Riley, in *Proceedings of the Winter Simulation Conference (WSC), 2004.*

HONORS

Yonsei Scholarship (4-year full scholarship)	1995-1999
Highest Honor Award for 4.0 GPA	1997

NATIONALITY

USA

Curriculum Vitae

TEVFIK KOSAR, Ph.D.

201 Bell Hall, University at Buffalo, Buffalo, NY 14260
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http://www.cse.buffalo.edu/~tkosar

RESEARCH INTERESTS

Petascale distributed systems, eScience, Grids, Clouds, and collaborative computing with a focus on **large-scale data-intensive distributed applications;** C**yber-Infrastructure design and development**; end-to-end workflow management; I/O optimization, modeling, and scheduling; storage management; coordination of computation and I/O in distributed environments. Major application areas include biology, health sciences, astronomy, high-energy physics, and coastal and environmental sciences.

EDUCATION

Ph.D. Computer Science, **University of Wisconsin-Madison**, Madison, WI, August 2005
Thesis: "Data Placement in Widely Distributed Systems"
Advisor: Prof. Miron Livny

M.S. Computer Science, **Rensselaer Polytechnic Institute**, Troy, NY, August 1999
Thesis: "Harvesting Idle Processor Cycles in Clusters of Workstations"
Advisor: Prof. Boleslaw K. Szymanski

B.S. Computer Engineering, **Bogazici University**, Istanbul, Turkey, June 1997

AWARDS & HONORS

- NSF **CAREER** Award, 2009
- Business Report's **Top 40 Under 40**, 2009
- LSU **Rainmaker** Award, 2009
- LSU **Flagship Faculty**, 2009
- LSU College of Basic Sciences **Research Award,** 2009
- 1012 Corridor's **Young Scientist**, 2009
- LSU CCT **Faculty of the Year** Award, 2008
- Turkish Ministry of Education Scholarship to Study Abroad, 1998-2000
- Alarko Scholarship, 1995-1998
- Istanbul Chamber of Industry Scholarship, 1994-1997
- National Culture Foundation Scholarship, 1993-1998
- Bogazici University Scholarship, 1993-1995
- Higher Education Council Scholarship, 1993-1994

ACADEMIC EXPERIENCE

Associate Professor   University at Buffalo
Department of Computer Science & Engineering   01/2011 –

Assistant Professor   Louisiana State University
Department of Computer Science   08/2005 – 12/2010

Assistant Professor   Louisiana State University
Center for Computation and Technology   08/2005 – 12/2010

Research Assistant   University of Wisconsin-Madison
Department of Computer Science   01/2000 – 08/2005

Summer Intern   IBM T.J. Watson Research Center
Service Management Middleware Department   06/2004 – 09/2004

Summer Intern   IBM T.J. Watson Research Center
Network Hosted Applications Department   06/2001 – 09/2001

Summer Intern   IBM T.J. Watson Research Center
Network Hosted Applications Department   06/2000 – 09/2000

Teaching Assistant   University of Wisconsin-Madison
Department of Computer Science   08/1999 – 01/2000

Research & Teaching Assistant   Bogazici University
Department of Computer Engineering   09/1997 – 08/1998

Undergraduate Teaching Assistant   Bogazici University
Department of Computer Engineering   09/1996 – 08/1997

Summer Intern   Bima Software Company
Web Services Department   06/1996 – 09/1996

Summer Intern   Turkish Telecom
System Administration Department   06/1995 – 09/1995

Summer Intern   Elit Software Company
Database Management Department   06/1994 – 09/1994

GRANTS (FUNDED PROJECTS)

Kosar as Principal Investigator:

1. "CAREER: Data-aware Distributed Computing for Large-scale Collaborative Science"
   Funded by: **NSF - CAREER** Program
   Amount: **$400,001** [02/15/09 - 01/31/14]
   Role: Kosar as single PI

2. "STCI: Development of Stork Data Scheduler for Mitigating the Data Bottleneck in Petascale Distributed Computing Systems"
   Funded by: **NSF - STCI** Program (Strategic Technologies for Cyber-Infrastructure)
   Amount: **$495,514** [09/01/09 - 08/31/12]
   Role: Kosar as single PI

3. "MRI: Development of PetaShare: A Distributed Data Archival, Analysis and Visualization System for Data Intensive Collaborative Research"
   Funded by: **NSF – MRI** Program
   Amount: **$957,678** [08/15/06 - 07/31/10]
   Role: Kosar as lead PI (with co-PIs: G. Allen, D. Katz, R. Twilley, W. Wischusen)

4. "Enabling End-to-end Processing and Analysis of Large-scale Coastal Data"
   Funded by: **Louisiana Board of Regents – RCS** Program
   Amount: **$133,888** [07/01/06 - 06/30/09]
   Role: Kosar as single PI

5. "Attracting Superior Students to Build Next Generation Cyber-Infrastructure for Coastal and Environmental Research"
   Funded by: **LSU Graduate School** through Louisiana Board of Regents – EDA Progr.
   Amount: **$25,000** [08/21/07 - 05/15/08]
   Role: Kosar as single PI

6. "Incorporation of CCT Efforts for Large Scale Data Handling in Coastal Modeling Applications"
   Funded by: **LSU CCT - GDP** Program
   Amount: **$32,000** [07/01/06 - 06/30/07]
   Role: Kosar as lead PI (with co-PI: G. Allen)

7. "Deploying a Campus-wide Distributed Computing System"
   Funded by: **LSU CCT – GDP** Program
   Amount: **$10,000** [01/15/06 - 12/31/06]
   Role: Kosar as single PI

Kosar as Co-Principal Investigator:

8. "Collaborative Research: Community Infrastructure for General Relativistic MHD"
   Funded by: **NSF – PIF** Program

Amount: LSU Share: **$400,000** (Total Amount: $1Million) [10/01/2009 - 09/30/2012]
Role: Kosar as co-PI at LSU *(PI: G. Allen)*

9. "Recruitment of Superior Graduate Fellows in Computer Science"
    Funded by: **Louisiana Board of Regents - Graduate Fellows** Program
    Amount: **$100,000** [08/21/2010 - 05/15/2013]
    Role: Kosar as co-PI *(PI: S.S. Iyengar)*

10. "RII: Louisiana's Research Infrastructure Improvement Strategy (CyberScience)"
    Sponsor: **NSF/LA BoR - EPSCoR** Program
    Amount: LSU Share: **$2,279,033** (Total: $12Million) [10/01/2007 - 09/30/2010]
    Role: Kosar as co-PI at LSU *(Lead PI: M. Khonsari; LSU PI: G. Allen)*

11. "The LONI Institute: Advancing Biology, Materials, and Computational Sciences for
    Research, Education, and Economic Development"
    Funded by: **Louisiana Board of Regents - PKSFI** Program
    Amount: **$7,000,000** [06/01/2007 - 06/30/2012]
    Role: Kosar as co-PI *(PI: M. Jarrell)*

12. "Ubiquitous Computing and Monitoring System (UCoMS) for Discovery"
    Funded by: **DOE / LA BoR – EPSCoR** Program
    Amount: LSU Share: **$630,000** (Total Amount: $2.1Million) [07/01/2007 - 06/30/2010]
    Role: Kosar as co-PI at LSU *(PI: C. White)*

13. "SURA Coastal Ocean Observing and Prediction Program (SCOOP)"
    Funded by: **NOAA / SURA**
    Amount: LSU Share: **$237,863** [12/01/2006 - 08/31/2008]
    Role: Kosar as co-PI at LSU *(PI: G. Allen)*

Kosar as Senior Investigator:

14. "MRI: CRON: Development of a Cyberinfrastructure Reconfigurable Optical Network
    for Large-Scale Scientific Discovery"
    Funded by: **NSF – MRI** Program
    Amount: **$495,181** [08/01/2008 - 07/31/2011]
    Role: Kosar as Senior Personnel *(PI: S.J. Park)*

15. "The LONI Grid - Leveraging HPC Resources of the Louisiana Optical Network
    Initiative for Science and Engineering Research and Education"
    Funded by: **NSF – HPCOPS** Program
    Amount: **$2,200,000** [2007 – 2009]
    Role: Kosar as Senior Personnel *(PI: C. McMahon)*

16. "Center for Excellence in Integrated Smart Cyber-centric Sensor Surveillance Systems"
    Funded by: **Louisiana Board of Regents – PKSFI** Program
    Amount: LSU Share: **$1,236,615** (Total Amount $3Million) [06/01/2007 - 06/30/2012]
    Role: Kosar as Senior Personnel *(PI: S.S.Iyengar)*

17. "Doctoral Research and Training in Information Networks for Monitoring, Assessment and Relief Activities for Natural and Man-Made Disasters"
Funded by: **US Department of Education – GAANN** Program
Amount: **$126,675** [08/16/06 - 08/15/09]
Role: Kosar as Senior Personnel *(PI: E.Triantaphyllou)*

PUBLICATIONS

PS: The authors with a (*) are graduate students working under the supervision of Tevfik Kosar at LSU.

Books and Monographs

1. T. Kosar. Data Intensive Distributed Computing: Challenges and Solutions for Large-scale Information Management. *Edited book under contract with IGI Global Publishers, to appear in 2010.*

Book Chapters

2. T. Kosar, A. Hutanu, J. McLaren and D. Thain. Coordination of Access to Large-scale Datasets in Distributed Environments. *In Scientific Data Management: Challenges, Existing Technology, and Deployment, Editors: A. Shoshani and D. Rotem, CRC Press/Taylor and Francis Books, November 2009 (ISBN: 978-1-4200-6980-8).*

3. T. Kosar. Data-aware Distributed Batch Scheduling. *In Handbook of Research on Grid Technologies and Utility Computing: Concepts for Managing Large-Scale Applications, Editor: E.Udoh, Information Science Reference, May 2009 (ISBN: 978-1-60566-184-1)*

4. P. Couvares, T. Kosar, A. Roy, J. Weber, and K. Wegner. Workflow Management in Condor. *In Workflows for e-Science, Editors: E. Deelman, I. Taylor, D.Gannon, M.Shields, Springer Press, January 2007 (ISBN: 1-84628-519-4).*

5. T. Kosar, S. Son, G. Kola, and M. Livny. Data placement in widely distributed environments. *In Grid Computing: The New Frontier of High Performance Computing, Editor: Lucio Grandinetti, Elsevier Press, November 2005 (ISBN: 0-444-51999-8).*

Journal Papers

6. E. Yildirim*, D. Yin*, and T. Kosar. Prediction of Optimal Parallelism Level in Wide Area Data Transfers. *To appear in IEEE Transactions on Parallel and Distributed Computing (TPDS), 2010.*

7. M. Balman* and T. Kosar. Error Detection and Error Classification: Failure Awareness in Data Transfer Scheduling. *To appear in the International Journal of Autonomic Computing (IJAC), 2010.*

8. T. Kosar and M. Balman*. A New Paradigm: Data-Aware Scheduling in Grid Computing. *In Future Generation Computing Systems (FGCS), Vol.25 No.4 (2009) pp.406-413.*

9. X. Wang*, D. Huang*, I. Akturk*, M. Balman*, G. Allen and T. Kosar. Semantic Enabled Metadata Management in PetaShare. *In International Journal of Grid and Utility Computing (IJGUC), Vol.1 No.4 (2009), pp.275-286.*

10. D.Katz, G.Allen, R.Cortez, C.Cruz-Neira, R.Gottumukkala, Z.Greenwood, L.Guice, S.Jha, R.Kolluru, T.Kosar, L.Leger, H.Liu, C.McMahon, J.Nabrzyski, B.Rodriguez-Milla, E.Seidel, G.Speyrer, M.Stubblefield, B.Voss, and S.Whittenburg. Louisiana: A Model for Advancing Louisiana: A Model for Advancing Regional e-Research through Cyberinfrastructure. *In Philosphical Transactions of Royal Society, Vol.367 (2009) pp.2459-2469.*

11. G. Allen, P. Bogden, T. Kosar, A. Kulshrestha, G. Namala, S. Tummala*, and E. Seidel. Cyberinfrastructure for Coastal Hazard Prediction. *In CTWatch Quarterly, Vol.4 No.1 (2008) pp.17-26.*

12. E. M. Bahsi*, E. Ceyhan*, and T. Kosar. Conditional Workflow Management: A Survey and Analysis. *In Scientific Programming Journal (SPJ), Vol.15 No.4 (2007) pp.283-297.*

13. S. Tummala* and T. Kosar. Data management challenges in coastal applications. *In Journal of Coastal Research (JCR), Special Issue No.50 (2007), pp.1188-1193.*

14. E. Ceyhan*, P. Basuchowdhuri, T. Judeh*, B. Estrade, and T. Kosar. Towards a faster and improved ADCIRC (ADvanced Multi-Dimentional CIRCulation) model. *In Journal of Coastal Research (JCR), Special Issue No.50 (2007), pp.949-954.*

15. E. Deelman, T. Kosar, C. Kesselman, and M. Livny. What makes workflows work in an opportunistic environment? *In Concurrency and Computation: Practice and Experience, Vol.18 No.10 (2006) pp.1187-1199.*

16. T. Kosar, G. Kola, and M. Livny. Building reliable and efficient data transfer and processing pipelines. *In Concurrency and Computation: Practice and Experience, Vol.18 No.6 (2006) pp.609-620.*

17. T. Kosar and M. Livny. A Framework for reliable and efficient data placement in distributed computing systems. *In the Journal of Parallel and Distributed Computing (JPDC), Vol.65, no.10 (2005) pp.1146-1157.*

18. G. Kola, T. Kosar, and M. Livny. Run-time adaptation of Grid data-placement jobs. *In Scalable Computing: Practice and Experience, Vol.6 No.3 (2005) pp.33*

19. B. P. Miller, M. Christodorescu, R. Iverson, T. Kosar, A. Mirgorodskii, and F. Popovici. Playing inside the black box: Using dynamic instrumentation to create security holes. *Parallel Processing Letters, Vol. 11 Nos. 2 & 3 (2001) pp.267-280.*

Conference Papers

20. T. Kosar, M. Balman*, I. Suslu*, E. Yildirim*, and D. Yin*. Data-Aware Distributed Computing with Stork Data Scheduler. *In Proceedings of SEE-GRID-SCI'09, Istanbul, Turkey, December 2009.*

21. D. Yin*, E. Yildirim*, and T. Kosar. A Data Throughput Prediction and Optimization Service for Widely Distributed Many-Task Computing. *In Workshop on Many-Task Computing on Grids and Supercomputers (MTAGS), in conjunction with Supercomputing09, Portland, OR, November 16, 2009.*

22. X. Wang* and T. Kosar. Design and Implementation of Metadata System in PetaShare. *In Proceedings of 21st International Conference on Scientific and Statistical Database Management (SSDBM 2009), New Orleans, LA, June 2009*

23. E. Yildirim*, D. Yin*, and T. Kosar . Balancing TCP Buffer vs Parallel Streams in Application Level Throughput Optimization *In Proceedings of DADC'09 (in conjunction with HPDC'09), Munich, Germany, June 2009*

24. M. Balman* and T. Kosar. Early Error Detection and Classification in Data Transfer Scheduling. *In Proceedings of Third International Workshop on P2P, Parallel, Grid and Internet Computing (3PGIC-2009), Tsukuba, Japan, March 2009*

25. M. Balman* and T. Kosar. Dynamic Adaptation of Parallelism Level in Data Transfer Scheduling. *In Proceedings of Second International Workshop on Adaptive Systems in Heterogeneous Environments (ASHEs2009), Tsukuba, Japan, March 2009*

26. I. Suslu*, F. Turkmen, M. Balman*, and T. Kosar. Choosing Between Remote I/O versus Staging in Large Scale Distributed Applications. *In Proceedings of ISCA 21st Int. Conference on Parallel and Distributed Computing and Applications (PDCCS 2008), New Orleans, LA, September 2008*

27. E. Yildirim*, I. Suslu*, and T. Kosar. Which Network Measurement Tool is Right for You? A Multidimensional Comparison Study. *In Proceedings of IEEE/ACM Int. Conference on Grid Computing (Grid 2008), Tsukuba, Japan, September 2008*

28. E. Yildirim*, M. Balman*, and T. Kosar. Dynamically Tuning Level of Parallelism in Wide Area Data Transfers. *In Proceedings of DADC'08 (in conjunction with HPDC'08), Boston, MA, June 2008*

29. E. Ceyhan*, G. Allen, C. White, and T. Kosar. A Grid-enabled Workflow System for Reservoir Uncertainty Analysis. *In Proceedings of CLADE'08 (in conjunction with HPDC'08), Boston, MA, June 2008*

30. D. Huang*, X. Wang*, G. Allen, and T. Kosar. Semantic Enabled Metadata

Framework for Data Grids. *In Proceedings of International Workshop on P2P, Parallel, Grid and Internet Computing (3PGIC-2008), Barcelona, Spain, March 2008*

31. E. Ceyhan* and T. Kosar. Large Scale Data Management in Sensor Networking Applications. *In Proceedings of Cyberspace Research Workshop, Shreveport, LA, November 2007*

32. I. Akturk* and T. Kosar. Merge of Two Emerging Technologies - Sensor Networks and Grids: A Survey on Sensor Grids *In Proceedings of Cyberspace Research Workshop, Shreveport, LA, November 2007.*

33. E. Yildirim*, H. Topcuoglu and T. Kosar. A Memetic Algorithm for Reliability-based Dynamic Scheduling in Heterogeneous Computing Environments. *In Proceedings of 19th IASTED International Conference on Parallel and Distributed Computing and Systems (PDCS 2007), Cambridge, MA, November 2007.*

34. M. Xie, F. Zhou, Z. Yun, G. Allen, T. Kosar, and G. Allen. Collaborating Mechanical Design Phases Across a Grid. *In Proceedings of International Multi-Symposiums on Computer and Computational Sciences 2007 (IMSCCS 2007), Iowa City, IA, August 2007.*

35. I. H. Suslu* and T. Kosar. Balancing the Use of Remote I/O versus Staging in Distributed Environments. *In Proceedings of the 9th International Conference on Enterprise Information Systems Doctoral Syposium (DCEIS 2007), Madeira, Portugal, June 2007.*

36. M. Balman* and T. Kosar. Data Scheduling for Large Scale Distributed Applications. *In Proceedings of the 9th International Conference on Enterprise Information Systems Doctoral Symposium (DCEIS 2007), Madeira, Portugal, June 2007.*

37. T. Kosar. A New Paradigm in Data Intensive Computing: Stork and the Data-Aware Schedulers. *In Proceedings of Challenges of Large Applications in Distributed Environments (CLADE 2006) Workshop, Paris, France, June 2006.*

38. G. Kola, T. Kosar and M. Livny. Faults in Large Distributed Systems and What We Can Do About Them. *In Proceedings of 11th European Conference on Parallel Processing (Euro-Par 2005), Lisbon, Portugal, August 2005.*

39. G. Kola, T. Kosar, J. Frey, M. Livny, R. J. Brunner and M. Remijan. DISC: A System for Distributed Data Intensive Scientific Computing. *In Proceedings of First Workshop on Real, Large Distributed Systems (WORLDS '04), San Francisco, CA, December 2004.*

40. G. Kola, T. Kosar, and M. Livny. Phoenix: Making Data-intensive Grid Applications Fault-tolerant. *In Proceedings of 5th IEEE/ACM International Workshop on Grid Computing (Grid 2004), Pittsburgh, PA, November 2004.*

41. T. Kosar, G. Kola, R. J. Brunner, M. Livny, and M. Remijan. Reliable, Automatic Transfer and Processing of Large Scale Astronomy Datasets. *In Proceedings of 14th Astronomical Data Analysis Software and Systems Conference (ADASS 2004), Pasadena, CA, October 2004.*

42. T. Kosar, G. Kola, and M. Livny. Data-pipelines: Enabling Large Scale Multi-Protocol Data Transfers. *In Proceedings of 2nd International Workshop on Middleware for Grid Computing (MGC 2004) Toronto, Canada, October 2004.*

43. G. Kola, T. Kosar, and M. Livny. Client-centric Grid knowledgebase. *In Proceedings of the 2004 IEEE International Conference on Cluster Computing (Cluster 2004), San Diego, CA, September 2004.*

44. G. Kola, T. Kosar, and M. Livny. Profiling Grid data transfer protocols and servers. *In Proceedings of 10th European Conference on Parallel Processing (Euro-Par 2004), Pisa, Italy, August 2004.*

45. G. Kola, T. Kosar, and M. Livny. A fully automated fault-tolerant system for distributed video processing and off-site replication. *In Proceeding of the 14th ACM International Workshop on Network and Operating Systems Support for Digital Audio and Video (Nossdav 2004), Kinsale, Ireland, June 2004.*

46. T. Kosar and M. Livny. Stork: Making data placement a first class citizen in the Grid. *In Proceedings of 24th IEEE International Conference on Distributed Computing Systems (ICDCS 2004), Tokyo, Japan, March 2004.*

47. M. Dillman, R. Brunner, T. Kosar, M. Livny, and Z. Miller. Mining the Sky with Condor. *In Proceedings of American Astronomical Society Meeting, January 2004.*

48. T. Kosar, G. Kola, and M. Livny. A framework for self-optimizing, fault-tolerant, high performance bulk data transfers in a heterogeneous Grid environment. *In Proceedings of 2nd International Symposium on Parallel and Distributed Computing (ISPDC 2003), Ljubljana, Slovenia, October 2003.*

49. G. Kola, T. Kosar, and M. Livny. Run-time adaptation of Grid data-placement jobs. *In Proceedings of International Workshop on Adaptive Grid Middleware (AGridM 2003), New Orleans, LA, September 2003.*

50. M. Buco, R. Chang, T. Kosar, L. Luan, S. U. Shah, C. Ward, J. Wolf, and P. Yu. Managing eBusiness on demand SLA contracts in business terms using the cross-SLA execution manager SAM. *In Proceedings of 6th International Symposium on Autonomous Decentralized Systems (ISADS 2003), Pisa, Italy, March 2003.*

51. B. P. Miller, M. Christodorescu, R. Iverson, T. Kosar, A. Mirgorodskii, and F. Popovici. Playing inside the black box: Using dynamic instrumentation to create security holes. *In Proceedings of Second Los Alamos Computer Science Institute Symposium, Santa Fe, NM, October 2001.*

Selected Abstracts/Short Papers/Posters

52. Z. Yun, Z. Lei, D. S. Katz, J. Ramanujam, G. Allen, T. Kosar, and S. Jha. Integrating Multiclusters for Efficient Application Execution *(poster). In Proceedings of the 2009 IEEE/ACM Conference on Supercomputing (SC09), Portland, Oregon, USA.*

53. X. Wang*, I. Akturk*, and T. Kosar. Cross-Domain Metadata Management in Data Intensive Distributed Computing Environment *(poster) . In Proceedings of IEEE International Conference on Cluster Computing (Cluster 2009), New Orleans, LA, August 2009.*

54. Z. Yun, Z. Lei, G. Allen, D. Katz, T. Kosar, S. Jha and J. Ramanujam. An Innovative Application Execution Toolkit for Multicluster Grids *(poster) . In Proceedings of IEEE International Conference on Cluster Computing (Cluster 2009), New*

Orleans, LA, August 2009.

55. M. Balman*, I. Akturk*, and T. Kosar. Intermediate Gateway Service to Aggregate and Cache the I/O Operations into Distributed Storage Repositories *(poster).   In Proceedings of 7th USENIX Conference on File and Storage Technologies (FAST 2009), San Francisco, CA, February 2009.*

56. T. Kosar. Grid Data Scheduling with Stork *(abstract). In Proceedings of the Open Source Grid and Cluster Conference, Oakland, CA, May 2008.*

57. M. Balman*, I. Suslu*, and T. Kosar. Distributed Data Management with PetaShare *(poster). In Proceedings of ACM SIGAPP 15th Mardi Gras Conference, Baton Rouge, LA, January 2008.*

58. M. Balman* and T. Kosar. From Micro- to Macro-processing: A Generic Data Management Model *(poster). In Proceedings of the 8th IEEE/ACM International Conference on Grid Computing (Grid2007), Austin, TX, September 2007.*

59. Z. Lei, G. Allen, T. Kosar, G. Qin, T. Tsai, X. Li, and C White. Grid-enabled Ensemble Inverse Modeling *(poster). In Proceedings of the 8th IEEE/ACM International Conference on Grid Computing (Grid2007), Austin, TX, September 2007.*

Publications Currently Under Review

1. D. Yin*, E. Yildirim*, and Tevfik Kosar. A Data Throughput Prediction and Optimization Service for Widely Distributed Many-Task Computing. S*ubmitted to the IEEE Transactions on Parallel and Distributed Computing (TPDS).*

2. E. Yildirim*, H. Topcuoglu, and T. Kosar. Reliability-based Dynamic Scheduling of Independent Tasks in Heterogeneous Computing Environments. *Submitted to the Journal of Parallel and Distributed Computing (JPDC).*

Invention Disclosures

1. R. Chang, T. Kosar, and S. Shah. Policy Based Transparent Staging Apparatus, System, and Method for Storage Networks with SCSI -Like Interface. *IBM Corporation, 2001.*

2. R. Chang, T. Kosar, and S. Shah. Apparatus, System and Methods for Prioritizing Service Level Management Events with Time-varying Business Impact. *IBM Corporation, YOR8-2001-0900.*

3. R. Chang, D. Kim, and T. Kosar. Apparatus, System and Method for predicting the utilization of web server resources. *IBM Corporation, YOR8-2000-1027.*

SELECTED TALKS AND SEMINARS

1. Data-Aware Distributed Computing with Stork Data Scheduler. *SEE-GRID-SCI'09, Istanbul, Turkey, December 2009.*

2. Enabling Collaborative Science with Data Intensive Distributed Computing, *Southern University Colloquium, November 2009.*

3. Balancing TCP Buffer vs Parallel Streams in Application Level Throughput

Optimization. *International Workshop on Data-ware Distributed Computing, Munich, Germany, June 2009.*

4. PetaShare Storage Network. *DOSAR VII Workshop, Baton Rouge, LA, April 2009.*

5. Dynamic Adaptation of Parallelism Level in Data Transfer Scheduling. *International Workshop on Adaptive Systems in Heterogeneous Environments), Tsukuba, Japan, March 2009.*

6. Grid Data Scheduling with Stork. *Open Source Grid and Cluster Conference, Oakland, CA, May 2008.*

7. Data-aware Distributed Computing: Enabling Data Intensive Collaborative Science. *Bogazici University, Istanbul, Turkey, July 2008.*

8. Dynamically Tuning Level of Parallelism in Wide Area Data Transfers. *International Workshop on Data-ware Distributed Computing, Boston, MA, June 2008.*

9. A Grid-enabled Workflow System for Reservoir Uncertainty Analysis. *Workshop on Challenges of Large Applications in Distributed Environments, Boston, MA, June 2008.*

10. Condor in Louisiana. *Condor Week 2008, Madison, WI, April 2008.*

11. PetaShare: Enabling Data Intensive Collaborative Science in Louisiana. *Supercomputing Conference, Reno, NV, November 2007.*

12. PetaShare: Enabling Data Intensive Science. *Louisiana Tech University, Ruston, LA, June 2007.*

13. Enabling Data Intensive Science with PetaShare. *DOSAR V Workshop, Ames, IA, April 2007.*

14. Enabling Data Intensive Science with PetaShare. *Supercomputing Conference, Tampa, FL, November 2006.*

15. Advancing Academic Research: Data Challenges for Complex Applications. *HPC Expo Online Conference, October 2006.*

16. A New Paradigm in Data Intensive Computing: Stork and the Data-Aware Schedulers. *Workshop on Challenges of Large Applications in Distributed Environments, Paris, France, June 2006.*

17. LONI: Louisiana Optical Network Initiative. *DOSAR IV Workshop, Arlington, TX, March 2006.*

18. Enabling Large Scale Applications: Grid and the Data Challenge. *HPC Expo Online Conference, October 2005.*

19. Stork: State of the Art. *Condor Week 2005, Madison, WI, April 2005.*

20. Phoenix: Making Data-intensive Grid Applications Fault-tolerant. *IEEE/ACM International Workshop on Grid Computing, Pittsburgh, PA, November 2004.*

21. Reliable, Automatic Transfer and Processing of Large Scale Astronomy Datasets. *Astronomical Data Analysis Software and Systems Conference, Pasadena, CA, October 2004.*

22. Data-pipelines: Enabling Large Scale Data Transfers Among Heterogeneous Systems. *International Workshop on Middleware for Grid Computing, Toronto, Canada, October 2004.*

23. A Client-centric Grid Knowledgebase. *IEEE International Conference on Cluster Computing, San Diego, CA, September 2004.*

24. Reliable and Efficient Data Placement in a Grid Environment. *IBM T.J. Watson Research Center, Hawthorne, NY, June 2004.*

25. Stork: Making Data Placement a First Class Citizen in the Grid. *European Center for Nuclear Research (CERN), Geneve, Switzerland, May 2004.*

26. Reliable and Efficient Grid Data Placement. *Grid Physics Network (GriPhyn) All Hands Meeting, University of Chicago, IL, May 2004.*

27. Reliable and Efficient Grid Data Placement using Stork and DiskRouter. *Condor Week 2004, Madison, WI, April 2004.*

28. Stork: Making Data Placement a First Class Citizen in the Grid. *IEEE International Conference on Distributed Computing Systems, Tokyo, Japan, March 2004.*

TEACHING EXPERIENCE

At Louisiana State University (*includes research courses):

Semester	Dept.	Course No.	Course Title	# of Students
Spring 2006	CSC	4101	Programming Languages	26
Spring 2006	CSC	7999	Selected Readings in CSC	3
Spring 2006	HNRS	3991	Honors College Thesis Research	1
Summer 2006	SYSC	8000	Systems Science Thesis Research	1
Fall 2006	CSC	7700	Data Intensive Distributed Comp.	17
Fall 2006	CSC	7999	Selected Readings in CSC	1
Fall 2006	SYSC	8000	Systems Science Thesis Research	1
Fall 2006	HNRS	3992	Honors College Thesis Research	1
Spring 2007	CSC	4103	Operating Systems	32
Spring 2007	CSC	7999	Selected Readings in CSC	5
Spring 2007	CSC	9000	Dissertation Research	3
Spring 2007	SYSC	7090	Systems Science Project Design	3
Spring 2007	SYSC	8000	Systems Science Thesis Research	1
Spring 2008	CSC	4103	Operating Systems	14
Spring 2008	CSC	7999	Selected Readings in CSC	3
Spring 2008	CSC	9000	Dissertation Research	2
Spring 2008	SYSC	7090	Systems Science Project Design	2
Spring 2008	SYSC	8000	Systems Science Thesis Research	1
Summer 2008	SYSC	7090	Systems Science Project Design	2
Summer 2008	CSC	9000	Dissertation Research	1
Summer 2008	SYSC	8000	Systems Science Thesis Research	1

Fall 2008	CSC	4304	Systems Programming	15
Fall 2008	CSC	9000	Dissertation Research	4
Fall 2008	SYSC	8000	Systems Science Thesis Research	1
Spring 2009	CSC	9000	Dissertation Research	4
Spring 2009	CSC	7999	Selected Readings in CSC	2
Spring 2009	SYSC	7090	Systems Science Project Design	1
Summer 2009	CSC	9000	Dissertation Research	2
Fall 2009	CSC	4103	Operating Systems	23
Fall 2009	CSC	7999	Selected Readings in CSC	6
Fall 2009	CSC	9000	Dissertation Research	4
Fall 2009	SYSC	7090	Systems Science Project Design	4

At University of Wisconsin-Madison (*as Teaching Assistant):

Semester	Dept.	Course No.	Course Title
Fall 1999	CS	132	Using Computers

At Bogazici University (*as Teaching Assistant):

Semester	Dept.	Course No.	Course Title
Spring 1998	CMPE	420	Programming Languages
Spring 1998	CMPE	496	Cryptography
Fall 1997	CMPE	230	Systems Programming
Fall 1997	CMPE	320	Principles of Programming Languages
Spring 1997	CMPE	150b	Introduction to Pascal Programming
Fall 1996	CMPE	150a	Introduction to C Programming

SERVICE

Grant Proposal Review Panelist:

1. NSF Panel member for the CISE - Computer Systems Research (CSR) program, May 2009.

2. DOE Panel member for the SCIDAC program, May 2009.

3. NSF Panel member for the Cyberinfrastructure for Environmental Observatories (CEO:P) program, May 2006.

4. External Reviewer for the NSF - Major Research Instrumentation (MRI) Program, 2007.

5. External reviewer for the Los Alamos National Laboratory's SDC LDRD-ER research program, 2007.

Editorial Board

1. Editor, ICST Transactions on Network Computing (TNC)
2. Guest Editor, International Journal of Web and Grid Services (IJWGS)
3. Editor, Proceedings of the 15th ACM Mardi Gras Conference, ACM, 2008.

Conference Chair/Organizer:

1. Workshop Chair: Int. Workshop on Data-Intensive Distributed Computing (DIDC), 2010

2. Conference Track Chair: International Conference on Complex, Intelligent and Software Intensive Systems (CISIS), 2010.

3. Conference Track Chair: International Conference on Network-Based Information Systems (NBiS), 2010.

4. Publicity Co-Chair: Int. Workshop on Cluster Computing (CLUSTER), 2009

5. Workshop Chair: Int. Workshop on Data-Aware Distributed Computing (DADC), 2009

6. Workshop Chair: DOSAR VII Workshop, 2009.

7. Conference Track Chair: International Conference on Complex, Intelligent and Software Intensive Systems (CISIS), 2009.

8. Workshop Chair: Int. Workshop on Data-Aware Distributed Computing (DADC), 2008.

9. Poster Chair: Mardi Gras Conference, 2008.

Conference Program Committee Member (PC):

1. IEEE Int. Conference on Cluster, Cloud, and Grid Computing (CCGrid), 2010
2. Int. Symposium on Parallel and Distributed Computing (ISPDC), 2010
3. Workshop on Scientific Cloud Computing (ScienceCloud), 2010
4. IEEE Int. Conf. on Advanced Inf. Networking and Applications (AINA), 2009
5. High Performance Computing and Simulation Symposium, (HPCS), 2009
6. Workshop on Workflows in Support of Large-Scale Science (WORKS), 2009
7. Workshop on Desktop Grids and Volunteer Computing Systems (PCGrid), 2009
8. Workshop on Many-Task Computing on Grids and Supercomputers (MTAGS), 2009
9. IEEE Int. Conference on Computational Science and Engineering (SCE), 2008
10. Workshop on Grid Enabling Applications (GEA), 2008
11. IEEE Int. Conf. on Advanced Inf. Networking and Applications (AINA), 2008
12. IASTED Int. Conf. on Parallel and Distributed Computing and Networks (PDCN), 2008
13. Int. Conference on Grid and Distributed Computing (GDC), 2008
14. IEEE TCSC Doctoral Symposium, 2008
15. IEEE Int. Conference on Grid Computing, 2008
16. High Performance Computing and Simulation Symposium (HPCS), 2008

17. Workshop on Desktop Grids and Volunteer Computing Systems (PCGrid), 2008
18. Workshop on Challenges of Large Applications in Distr. Environments (CLADE), 2008
19. Int. Workshop on Middleware for Grid Computing (MGC), 2008
20. Workshop on Workflows in Support of Large-Scale Science (WORKS), 2008
21. Workshop on Many-Task Computing on Grids and Supercomputers (MTAGS), 2008
22. Int. Workshop on P2P, Grid and Internet Computing (3PGIC), 2008
23. Int. Symp. on Innovations and Real-time Appl. of Distr. Sensor Networks (IRA-DSN), 2007
24. Cyberspace Research Workshop, 2007
25. IEEE TCSC Doctoral Symposium, 2007
26. IEEE Int. Conference on Grid Computing, 2007
27. Workshop on Workflows in Support of Large-Scale Science (WORKS), 2007
28. Int. Workshop on Middleware for Grid Computing (MGC), 2007
29. Workshop on Challenges of Large Applications in Distr. Environments (CLADE), 2007
30. IEEE Int. Conf. on Advanced Inf. Networking and Applications (AINA), 2006
31. Workshop on Workflows in Support of Large-Scale Science (WORKS), 2006
32. Int. Workshop on Middleware for Grid Computing (MGC), 2006

Journal/Conference External Reviewer:

1. IEEE Transactions on Parallel and Distributed Systems, 2009, 2010
2. Journal of Parallel and Distributed Computing, 2004, 2005, 2006, 2008, 2009
3. Journal of Grid Computing, 2005, 2006
4. Journal of Parallel Computing, 2008
5. Scientific Programming Journal, 2006, 2007
6. Future Generation Computer Systems Journal, 2008
7. Concurrency and Computation: Practice and Experience Journal. 2007, 2008
8. IEEE Int. Conference on High Performance Distributed Computing (HPDC), 2007
9. IEEE/ACM Supercomputing Conference, 2007
10. International Conference on Supercomputing (ICS), 2004, 2007
11. International Conference on e-Science and Grid Computing, 2005
12. IEEE International Conference on Communications (ICC), 2005
13. International Coastal Symposium, 2007

Professional Memberships:

1. IEEE, IEEE Computer Society
2. ACM, ACM SIGCOMM, ACM SIGOPT
3. IEEE Technical Committee on Distributed Processing
4. IEEE Technical Committee on Parallel Processing
5. IEEE Technical Committee on Scalable Computing
6. IEEE Technical Committee on Mass Storage Systems
7. OGF Workflow Management Research Group
8. OGF Grid Scheduling Architecture Research Group

9. OGF Grid Storage Management Work Group

University Service & Committees:

1. LSU College of Basic Sciences Scholarship and Awards Committee
2. LSU CSC Graduate Admissions Committee
3. LSU CSC Undergraduate Curriculum Committee
4. LSU CSC General Exam Committee
5. LSU CSC Hiring Committee
6. LSU CSC Scholarships and Awards Committee
7. LSU CSC Departmental Seminar Committee
8. LSU CSC Departmental Equipment Committee
9. LSU CSC Ph.D General Exam, Operating Systems Area Subcommittee
10. LSU CSC Ph.D General Exam, Programming Lang. Area Subcommittee
11. LSU CCT Postdoc Search Committe
12. LSU CCT Events and Visitor Committee

Contributions to K-12 Education:

President of Pelican Educational Foundation (2005 – 2010), which has created two Math & Science based K-12 Charter schools in Louisiana. The team lead by Kosar consists of faculty members from LSU, Southern University and South Eastern Louisiana University. The idea is to use state-of-the art technology and innovative ideas in education and give the students a Math & Science based education starting from the very early ages. These two schools emphasize integration of technology into curriculum and constructivist learning, cross-disciplinary education, use of digital arts in education, as well as providing Web-based training, examination and monitoring and encouraging student collaboration with universities to participate in national and international science competitions.

THESES/DISSERTATIONS DIRECTED

Ph.D. Students Currently Supervised:
1. Mehmet Balman   (Data Scheduling with Advanced Reservations)
2. Esma Yildirim   (Application-level End-to-end Throughput Optimization)
3. Xinqi "Jack" Wang   (Cross-domain Semantic Metadata Framework)
4. Ibrahim Suslu   (Remote I/O Modeling)
5. Dengpan Yin   (Data Throughput Prediction)
6. Ismail Akturk   (PetaShare Distributed Storage)

M.S. Students Currently Supervised:
1. Sreekanth Pothnis   (Distributed Storage Load Balancing)
2. Dilip Somavarapu   (End-to-end Workflow Management)
3. Wan Huang   (Distributed I/O Optimization)
4. Wei Zhang   (Hierarchical Storage Management)
5. Mukta Pathak   (Dynamic Pre-fetching and Caching)

B.S. Students Currently Supervised:
1. Brandon Ross   (Stork Data Scheduler)
2. Aaron Chauvin   (Digital Media & Visualization)

Graduated Students:
1. Ismail Akturk (M.S. 2009)   – "Asynchronous Replication of Multi-Master Metadata Servers in Distributed Storage"

2. Jia "Jacob" Chen (M.S. 2009)   – "Towards an Open Source Standalone Stork Data Scheduler"

3. Sirish Tummala (M.S. 2008)   – "Priority-based Scheduling of Dynamic Data-driven Storm-surge Workflows"

4. Sidhanti Sudheendra (M.S. 2008)   – "An Enhanced Data Scheduler with Data Grid Interoperability Support"

5. Emir Mahmut Bahsi (M.S. 2008)   – "Dynamic Workflow Management for Large Scale Scientific Applications"

6. Mehmet Balman (M.S 2008)   – "Failure-Awareness and Dynamic Adaptation in Data Scheduling"

7. Emrah Ceyhan (M.S. 2007)   – "A Grid-Enabled Workflow System for Reservoir Uncertainty Analysis"

8. Vikram Gopu (M.S. 2007)   – "A Web Service for Managing and Monitoring Data Placement Jobs"

9. Marc Noel (B.S. 2007)   – "Condor and Cooperative Linux"