Omprakash D. Gnawali

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University of Houston
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Houston, Texas 77204-3010

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Professional Experience

2011-now **Assistant Professor, Department of Computer Science, University of Houston.**
Teach classes and conduct research in networking and systems.

Education and Training

Stanford University, Stanford, CA
Post-doctoral scholar in Computer Science, 2009-2011.
Faculty mentor: Prof. Leonidas J. Guibas

University of Southern California, Los Angeles, CA
Ph.D. in Computer Science, 2009.
Advisor: Prof. Ramesh Govindan

Massachusetts Institute of Technology, Cambridge, MA
M.Eng. in Electrical Engineering and Computer Science, 2002.
Thesis advisor: Prof. M. Frans Kaashoek

Massachusetts Institute of Technology, Cambridge, MA
S.B. in Computer Science and Engineering, 2001.

Publications

Refereed Publications

[1] Maria Kazandjieva, Brandon Heller, Omprakash Gnawali, Philip Levis, and Christos Kozyrakis, **Green Enterprise Computing Data: Assumptions and Realities**, Third International Green Computing Conference (IGCC 2012), June 2012.

[2] Muhammad Hamad Alizai, Hanno Wirtz, Bernhard Kirchen, Tobias Vaegs, Omprakash Gnawali, Klaus Wehrle, **TinyWifi: Making Network Protocol Evaluation Portable Across Multiple Phy-Link Layers**, In proceedings of the Sixth ACM International Workshop on Wireless Network Testbeds, Experimental evaluation and Characterization (WiNTECH 2011), September 2011.

[3] Eunjoon Cho, Kevin Wong, Omprakash Gnawali, Martin Wicke, and Leonidas Guibas, **Inferring Mobile Trajectories Using a Network of Binary Proximity Sensors**, To appear in the proceedings of the 8th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2011), June 2011. Acceptance Rate – 66/241 (27.4%)

[4] Arik Motskin, Ian Downes, Branislav Kusy, Omprakash Gnawali, and Leonidas Guibas, **Network Warehouses: Efficient Information Distribution to Mobile Users**, In proceedings of the 30th IEEE International Conference on Computer Communications (INFOCOM 2011), April 2011. Acceptance Rate – 291/1823 (15.9%)

[5] Jeonggil Ko, Stephen Dawson-Haggerty, Omprakash Gnawali, David Culler and Andreas Terzis, Evaluating the Performance of RPL and 6LoWPAN in TinyOS, Extending the Internet to Low power and Lossy Networks (IP+SN 2011), April 2011.

[6] Daniele Puccinelli, Omprakash Gnawali, SunHee Yoon, Silvia Santini, Ugo Maria Colesanti, Silvia Giordano, and Leonidas Guibas, **The Impact of Network Topology on Collection Performance**, In proceedings of the 8th European Conference on Wireless Sensor Networks (EWSN 2011), February 2011. Acceptance Rate – 20%

[7] Ian Downes, Branislav Kusy, Omprakash Gnawali, and Leonidas Guibas, **Interactive Analysis and Simulation of VANETs Using MOWINE**, In proceedings of the IEEE Vehicular Networking Conference (VNC 2010), December 2010.

[8] Zixuan Wang, Omprakash Gnawali, Kyle Heath, and Leonidas Guibas, **Collaborative Image Annotation Using Image Webs**, In proceedings of the Army Science Conference (ASC 2010), November 2010. Acceptance Rate for Sensors and Information Processing Track – 20/93 (21.5%)

[9] Omprakash Gnawali, Leonidas Guibas, and Philip Levis, **A Case for Evaluating Sensor Network Protocols Concurrently**, In Proceedings of the Fifth ACM International Workshop on Wireless Network Testbeds, Experimental evaluation and Characterization (WiNTECH 2010), September 2010.

[10] Jeongyeup Paek, Ben Greenstein, Omprakash Gnawali, Ki-Young Jang, August Joki, Marcos Vieira, John Hicks, Deborah Estrin, Ramesh Govindan, and Eddie Kohler, **The Tenet Architecture for Tiered Sensor Networks**, ACM Transactions on Sensor Networks (TOSN), Vol. 6, No. 4, 2010.

[11] Scott H Moeller, Avinash Sridharan, Bhaskar Krishnamachari, and Omprakash Gnawali, **Routing Without Routes: The Backpressure Collection Protocol**, In Proceedings of the ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2010), Stockholm, Sweden, April 12-16, 2010. Acceptance Rate – 20/117 (17.1%)

[12] Scott H Moeller, Avinash Sridharan, Bhaskar Krishnamachari, and Omprakash Gnawali, **Backpressure Routing Made Practical**, Infocom Student Workshop, March 2010.

[13] HyungJune Lee, Martin Wicke, Branislav Kusy, Omprakash Gnawali, and Leonidas Guibas, **Data Stashing: Energy-efficient Information Delivery to Mobile Sinks through Trajectory Prediction**, In Proceedings of the ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2010), Stockholm, Sweden, April 12-16, 2010. Acceptance Rate – 20/117 (17.1%)

[14] Yang Chen, Omprakash Gnawali, Maria Kazandjieva, Philip Levis, and John Regehr, **Surviving Sensor Network Software Faults**, In Proceedings of the 22nd ACM Symposium on Operating Systems Principles (SOSP 2009), October 11-14, 2009. Acceptance Rate – 23/140 (16.4%)

[15] Omprakash Gnawali, Rodrigo Fonseca, Kyle Jamieson, David Moss, and Philip Levis, **Collection Tree Protocol**, In Proceedings of the Seventh ACM Conference on Embedded Networked Sensor Systems (SenSys 2009), Berkeley, CA, November 4-6, 2009. Acceptance Rate – 21/119 (17.6%).

[16] Omprakash Gnawali, Jongkeun Na, and Ramesh Govindan, **Application-Informed Radio Duty-Cycling in a Re-Taskable Multi-User Sensing System**, In Proceedings of the ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2009), San Francisco, CA, April 13-16, 2009. Acceptance Rate - 21/117 (17.9%)

[17] Rodrigo Fonseca, Omprakash Gnawali, Kyle Jamieson, and Philip Levis, **Four Bit Wireless Link Estimation**, In Proceedings of the Sixth Workshop on Hot Topics in Networks (HotNets VI), Atlanta, GA, November 14-15, 2007. Acceptance Rate - 22/124 (17.7%)

[18] Omprakash Gnawali, Ben Greenstein, Ki-Young Jang, August Joki, Jeongyeup Paek, Marcos Vieira, Deborah Estrin, Ramesh Govindan, and Eddie Kohler, **The TENET Architecture for Tiered Sensor Networks**, In Proceedings of the ACM Conference on Embedded Networked Sensor Systems (SenSys 2006), Boulder, CO, October 31 - November 3, 2006. Acceptance Rate - 24/122 (19.7%)

[19] Jeongyeup Paek, Omprakash Gnawali, Ki-Young Jang, Daniel Nishimura, Ramesh Govindan, John Caffrey, Mazen Wahbeh, and Sami Masri, **A Programmable Wireless Sensing System for Structural Monitoring**,

In Proceedings of the Fourth World Conference on Structural Control and Monitoring (4WCSCM), San Diego, CA, July 11-13, 2006.

[20] Krishna Chintalapudi, Jeongyeup Paek, and Omprakash Gnawali, Tat Fu, Karthik Dantu, John Caffrey, Ramesh Govindan, Erik Johnson, **Structural Damage Detection and Localization Using NetSHM**, In Proceedings of the Fifth International Conference on Information Processing in Sensor Networks: Special track on Sensor Platform Tools and Design Methods for Networked Embedded Systems (IPSN/SPOTS 2006), Nashville, TN, April 19-21, 2006. Acceptance Rate - 14/52 (26.9%)

[21] Ramakrishna Gummadi, Omprakash Gnawali, and Ramesh Govindan, **Macro-programming Wireless Sensor Networks using Kairos**, In Proceedings of the First International Conference on Distributed Computing in Sensor Systems (DCOSS 2005), Marina del Rey, CA, June 30 – July 1, 2005. Acceptance Rate - 26/85 (30.6%)

[22] Omprakash Gnawali, Mike Polyakov, Prasanta Bose, and Ramesh Govindan, **Data Centric, Position-Based Routing In Space Networks**, In Proceedings of the 26th IEEE Aerospace Conference (Aeroconf 2005), Big Sky, MT, March 5-12, 2005.

[23] Omprakash Gnawali, Mark Yarvis, John Heidemann, and Ramesh Govindan, **Interaction of Retransmission, Blacklisting, and Routing Metrics for Reliability in Sensor Network Routing**, In Proceedings of The First International Conference on Sensor and Ad Hoc Communications and Networks (SECON 2004), Santa Clara, CA, October 2-4, 2004. Acceptance Rate - 67/370 (18.1%)

Posters and Demos

[24] Maria Kazandjieva, Omprakash Gnawali, and Philip Levis, **Visualizing Sensor Network Data with Powertron**, In ACM Conference on Embedded Networked Sensor Systems (SenSys 2010), November 2010. (Demo)

[25] Daniele Puccinelli, Omprakash Gnawali, SunHee Yoon, Silvia Giodano, Leonidas Guibas, **END: A Topology-Aware Metric for Sensor Networks**, In ACM Conference on Embedded Networked Sensor Systems (SenSys 2010), November 2010. (Poster)

[26] Omprakash Gnawali, Rodrigo Fonseca, Kyle Jamieson, Kannan Srinivasan, and Philip Levis, **Routing Principles in Wireless Mesh Networks**, 6th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2009), 2009. (Poster)

[27] Omprakash Gnawali and Mark Yarvis, **"Do Not Disturb", An Application Leveraging Heterogeneous Sensor Networks**, In ACM Conference on Embedded Networked Sensor Systems (SenSys 2003), November 2003. (Demo)

Book Chapters / Technical Reports / Invited Papers

[28] Maria Kazandjieva, Brandon Heller, Omprakash Gnawali, Wanja Hofer, Philip Levis, and Christos Kozyrakis, **Software or Hardware: The Future of Green Enterprise Computing**, Computer Science Technical Report CSTR 2011-02, Stanford University, 2011.

[29] Omprakash Gnawali and Matt Welsh, **Sensor Network Architectures and Protocols**, Chapter 5 in Emerging Wireless Technologies and the Future Mobile Internet, edited by Dipankar Raychaudhuri and Mario Gerla, Cambridge University Press, 2011.

[30] Maria Kazandjieva, Omprakash Gnawali, Brandon Heller, Philip Levis, and Christos Kozyrakis, **Identifying Energy Waste through Dense Power Sensing and Utilization Monitoring**, Computer Science Technical Report CSTR 2010-03, Stanford University, 2010.

[31] Omprakash Gnawali, Ramesh Govindan, and John Heidemann, **Implementing a Sensor Database System using a Generic Data Dissemination Mechanism**, In IEEE Data Engineering Bulletin, March 2005, Vol. 28, No. 1. (Invited Paper)

Theses

[32] Omprakash Gnawali, **Robust Routing and Energy Management in Wireless Sensor Networks**, Ph.D. Thesis, University of Southern California, 2009.

[33] Omprakash Gnawali, **A Keyword-Set Search System for Peer-to-Peer Networks**, Masters Thesis, Massachusetts Institute of Technology, 2002.

Internet Engineering Task Force (IETF) RFC and Draft

[34] Omprakash Gnawali and Philip Levis, **The Minimum Rank Objective Function with Hysteresis** (draft-ietf-roll-minrank-hysteresis-of-04), April 2011.

[35] Philip Levis, Thomas Heide Clausen, Jonathan Hui, Omprakash Gnawali, and JeongGil Ko, **RFC 6206: The Trickle Algorithm**, March 2011.

Teaching Experience

Stanford University

June 2010 **Lecturer** at the Army High Performance Computing Research Center Summer Institute.

Winter 2010 **Co-instructor** for CS 321: Information Processing for Sensor Networks, a graduate level course on sensor networks.

University of Southern California

Spring 2003 **Teaching Assistant** for CS 551: Computer Communications, a graduate level course in computer networks.

Fall 2002 **Teaching Assistant** for CS 410: Translation of Programming Languages, a senior-level undergraduate course in compiler design and implementation.

Massachusetts Institute of Technology

Spring 2002 **Teaching Assistant** for 6.033: Computer System Engineering, a senior-level undergraduate course on operating systems, hardware modularity, networks, and distributed systems.

High School at East China Normal University, Shanghai, China

Sum. 1998 **Visiting Instructor** at the high school at East China Normal University teaching a summer course on programming to high school students.

Invited Talks

Excluding paper presentations at conference/workshop

The Minimum Rank Objective Function with Hysteresis, Internet Engineering Task Force ROLL Working Group, June 2010.

Long-term Properties of a Wireless Sensor Network Deployment, Stanford Wireless Research Seminar, Stanford, CA, March 2010.

The ETX Objective Function, Internet Engineering Task Force 77, Routing Over Low-power and Lossy Links Working Group, Anaheim, CA, March 2010.

The Makings of CTP Noe, Stanford Networking Seminar, Stanford, CA, October 2009.

The Network Architecture for General-purpose Sensor Networks, CSSE Annual Research Review, March 2009.

TinyOS 2.1, tutorial at ACM/IEEE IPSN 2009, San Francisco, CA, April 2009.

Efficient collection routing and radio duty-cycling in Wireless Sensor Networks. Center for Embedded Networked Sensing Technical Seminar Series, UCLA, January 2009.

TinyOS 2.x Network Protocol Working Group Annual Report. TinyOS Technology Exchange-V. UC Berkeley, CA. February 22, 2008.

CTP: Collection Tree Protocol. University of Southern California. EE 652 Guest Lecture. October 2007.

Metric-based routing in Tiny Diffusion. Intel Research and Development. Hillsboro, OR. August 2003 and CENS Systems meeting in September 2003.

Internships

Intel Research and Development, Hillsboro, OR. Research Intern.
I worked with Dr. Mark Yarvis on heterogeneous sensor network architecture and sensor network applications. (July 2003-September 2003)

Arsdigita Corporation, Cambridge, MA. Web Developer.
Built an affiliate interface and a prototype affiliate for www.site59.com. Developed content management system for www.teenvoices.com. (June 2000 - August 2000)

Leadership, Volunteer, and Service Experience

Technical Program Committee:
2013 - ACM/IEEE IPSN
2012 - ACM/IEEE IPSN, ACM SenSys, IEEE PerSeNS, MobiSensor, IEEE IoT-SoS, ICCCN, ACM SESP, IEEE SenseApp, IEEE CPSCom, IEEE IoTech
2011 - IP+SN, IEEE PerSeNS, IEEE DCOSS, IEEE SenseApp, IEEE IoTech
2010 - IEEE PerSeNS, IEEE SUTC, IEEE DCOSS, IEEE SenseApp

Proposal Review Panel: GENI Project (2010).

Publications Chair, Best Poster Selection Committee Chair, Session Chair: ACM SenSys 2011.

Poster Chair, EWSN 2013.

Computer Science Department, University of Houston

- Member, Faculty Search Committee, 2012-2013.
- Member, Graduate Studies Committee, 2011-2012.
- Panelist, How to become a successful Ph.D. student?, Ph.D. Showcase, Feb. 2012.

Chair, TinyOS 2.x Network Protocol Working Group.
Identify protocol needs of the community, recruit individuals to design and contribute software, organize regular meetings, documentation, present annual report during TinyOS 2.x Technology Exchange, help the group maintain and support network protocols in TinyOS 2.x. (January 2007-present)

Paper peer-review.
2012: TOSN, TOC, TNSM;
2011: TOSN, COMCOM, TMC;
2010: TPDS, TON, Wireless Communication and Mobile Computing, SenSys, Proceedings of the IEEE, Springer Telecommunication Systems Journal, TOSN;
2009: SENSORS, JSAC WSN, TOSN, IPDPS, Mobicom, Comnet, Transactions on Mobile Computing;
2008: IEEE TDSC, SENSORS, IJSNET, WiNTECH, NSDI, IEEE Internet Computing;
2007: Mobicom, Globecom, DCOSS;
2006: IEEE Communications Letters;
2005: SenSys, SECON, JZUS;
2004: EmNets, HiPC, SenSys, SIGCOMM;
2003: SOSP, AdHoc Network Journal - Elsevier, IPSN, Computer Networks.

Awards

Best Paper Award, ACM/IEEE IPSN, 2010.

Dean's Doctoral Merit Fellowship, University of Southern California, 2002-2004.

Fourth place (out of 25 teams), **6.370 MIT IEEE/ACM Programming Competition**, January 2001, Massachusetts Institute of Technology, Cambridge, MA

First place (out of 400+ students), **6.001 Programming Competition**, April 1998, Massachusetts Institute of Technology, Cambridge, MA