
EDUCATION

01/2008 – present	University of Wisconsin, Madison	Madison, WI
PhD Student in Electrical and Computer Engineering		
GPA: 4.0 / 4.0	Major Area: Signal Processing	Minor Area: Mathematics
03/2007	University of California, LA	Los Angeles, CA
Master of Science in Electrical Engineering		
GPA: 3.79 / 4.0	Major Area: Communications	Minor Areas: Optimization, Statistics
12/2001	Rice University	Houston, TX
Bachelor of Science in Electrical and Computer Engineering		
GPA: 3.45 / 4.0	Major Area: Computer Engineering	Minor Areas: Signal Processing, Networking

PROJECT EXPERIENCE

Network Inference from Co-occurrences May 2008 – present Developing algorithms for inferring network connectivity structure and information flow from partial signaling information. Applying stochastic routing models and graphical conditional independence models to network inference in applications including network misbehavior detection, natural language processing, and protein signaling networks. Analyzing the stochastic routing model as a representation for shortest-path routing networks.
Community Identification in Social Networks July 2007 – present Studying algorithms for identifying communities in graphs of social networks, which also could be viewed as clustering in graphs. Using multi-resolution analysis to connect community identification and hierarchical graph structure to applications of graph search, information flow prediction, and epidemic flow prediction.
Blind Calibration of Sensor Networks August 2006 – present Developed methods for in-situ calibration involving subspace and state space models. Currently addressing how to calibrate without knowledge of the signal subspace of interest. Investigating techniques for low-rank matrix completion for linear subspaces and techniques for predictive sensor subset selection in the nonlinear case.
Data Integrity in Sensor Networks May 2005 – June 2007 Formulated methods for assessing the accuracy of both data collected by low-cost sensor networks and fusion algorithms on that data. Adapted fault models to address faults seen when deploying newer and less well-understood sensing technologies. Studied a variety of approaches to the general problem of modeling and identifying sensor faults including: sensor lifetime statistics, statistical sensor profiling, knowledge and rule-based methods, dynamical systems and particle filtering, and briefly principal component analysis.
Reputation-Based Robust Sensor Networks February 2005 – June 2006 Evaluated the ability of reputation-based algorithms, based on the beta distribution and density based outlier detection, to be robust to faulty sensor network data. Proved that interval ratings can be used to update the beta distribution reputation so long as the final quantity of interest is the mean reputation.
Packet Ring Layer 2 Algorithm Implementation September 2001-May 2002 Lead implementer of a layer 2 forwarding algorithm for metro area packet ring networks on a Vitesse network processor. Designed the algorithm for fairness, high utilization and QoS.

AWARDS

Innovative Signal Analysis Graduate Scholarship, 2008.
UCLA Electrical Engineering Department Outstanding Masters Degree Award, 2007.
National Science Foundation Graduate Research Fellowship Honorable Mention, 2006.
First place in AMD VLSI contest for design and implementation of "A Bit-Streaming Pipelined Multi-user Detector," 2000.

**WORK
EXPERIENCE**

07/2007 – 12/2007 **École Polytechnic Fédérale de
Lausanne (EPFL) and Nokia** **Lausanne, Switzerland
and Helsinki, Finland**

Visiting Researcher

Researched models of communities in graphs and the related computational methods and algorithms for identifying communities and clusters in networked data. Studied the computational efficiency of the tools used in these techniques, such as Markov clustering and the calculation of edge-betweenness and min-cut, and identified their relative benefits and drawbacks. Collected social network data from the web.

06/2002 – 06/2004 **Applied Signal Technology, Inc.** **Sunnyvale, CA**

Software Developer

Designed, implemented and tested C++ code for various sigint applications. Integrated a large system of applications with hundreds of thousands of lines of code. Interfaced applications between Linux, Sun and VxWorks using CORBA. Mentored and supported several new hires.

06/2001 – 08/2001 **New Focus, Inc.** **San Jose, CA**

Chief Technology Office Systems Intern

Designed an algorithm for detecting mode-hops in tunable lasers. Researched many possible signal processing methods before choosing, testing and defending an algorithm that is based in communications theory.

05/1998 – 08/1998 **IBM** **Kansas City, MO**

Sales and Installation Team Assistant

Assisted a team of salesmen and installation engineers on handling accounts for S/390 Mainframe purchases. Studied the needs of the customers and the offerings of IBM in mainframes and in e-commerce software. Visited companies such as Yellow Freight, Blue Cross, and Walmart and took notes during sales discussions. Assisted in a 3 a.m. mainframe installation by crawling under floors to run wires, double checking the engineer's work, and providing donuts.

**PEER-REVIEWED
TECHNICAL
PUBLICATIONS**

K. Ni, N. Ramanathan, M.N. Hajj Chehade, L. Balzano, S. Nair, S. Zahedi, G. Pottie, M. Hansen, and M. Srivastava, "**Sensor Network Data Fault Types**," To appear in ACM Transactions on Sensor Networks.

S. Ganeriwala, L. Balzano, and M. Srivastava, "**Reputation-based Framework for High Integrity Sensor Networks**," ACM Transactions on Sensor Networks, Volume 4, Issue 3, May 2008.

L. Balzano and R. Nowak, "**Blind Calibration in Sensor Networks**," In the Proceedings of the Conference on Information Processing in Sensor Networks, April 2007.

V. Gambauroza, P. Yuan, L. Balzano, Y. Liu, S. Sheafor, and E. Knightly, "**Design, Analysis, and Implementation of DVSR: A Fair, High Performance Protocol for Packet Rings**," IEEE/ACM Transactions on Networking, Volume 12, Issue 1, Feb 2004.

**OTHER
PUBLICATIONS**

L. Balzano and R. Nowak, "**Blind Calibration of Networks of Sensors: Theory and Applications**," Networked sensing information and control, Venkatesh Saligrama, editor. Springer 2008.

L. Balzano, "**Addressing Fault and Calibration in Sensor Networks**," Masters Thesis under the guidance of Professors Mani Srivastava, Mark Hansen, Greg Pottie and Steven Margulis. March 2007.

N. Ramanathan, L. Balzano, D. Estrin, T. Harmon, M. Hansen, J. Jay, B. Kaiser, and G. Sukhatme. "**Designing Wireless Sensor Networks as a Shared Resource for Sustainable Development**," In the Proceedings of the 1st International Conference on Information and Communication Technologies and Development, April 2006.

**COMMUNITY
EXPERIENCE**

UW Oral History Project, Women in Science and Engineering June 2008 – present
Listen to and digitize interviews of women in science and engineering conducted by the University of Wisconsin Library Archives Oral History Project. Time-stamp and edit summaries of the interviews. My next step will be to conduct interviews myself.

Science Buddies November 2007 – present

Answer questions from students in grade school and high school about their science projects in math and computer science in an online posting board.

LAUSD Science Fair Judge March 2007

Judged middle school projects at the Los Angeles Unified School District Science Fair in the engineering category from poster presentations and interviews of the top candidates. Organized second-day judging of late entries.

UCLA Engineers Without Borders BOOTUP Spring 2007

Worked as a team with another PhD student collecting donated computer equipment for installation in an under-privileged high school in Los Angeles. Helped gather volunteers, plan the installation day, and deliver a computer lab with eight computers and a printer.

LEADERSHIP EXPERIENCE

Leader of the Nonparametric Statistics Reading Group May 2008 – August 2008

Organized a 10-week session for the study and discussion of topics in Nonparametric Statistics. At least thirty people participated, with several students offering to prepare and present lecture material.

Leader of the Data Integrity Group for CENS January 2006 – June 2007

Lead seven or more UCLA students, professors and post-doctoral researchers in a reading, discussion, and learning group for applicable techniques and directions for addressing the problem of data integrity in wireless sensor networks. Wrote and copy-edited text for all project proposals and organized posters during NSF site visits.

Course Assistant for Signals and Systems Courses August 1999 – December 2001

Founded and organized a TA program for undergraduates to assist the introductory engineering classes. Prepared tutorial sessions weekly. Learned to present material in many interesting and exciting ways. Adapted the material so that it became personally relevant to the students.

PRESENTATIONS

CommDSP Seminar: Diffusion Wavelets 3 December 2008

Presentation of recent development of Diffusion Wavelets, a tool for analyzing and describing functions on graphs.

IPAM Seminar: Network Inference from Co-Occurrences 13 November 2008

Presentation to the core group of the Internet Multi-Resolution Analysis program at the Institute for Pure and Applied Mathematics at UCLA.

NMMC: Network Inference from Co-Occurrences 15 July 2008

Presentation of initial work on network inference from tree-shaped co-occurrence measurements at the Network Mapping and Measurement Conference.

CommDSP Seminar: Communities in Social Networks 13 February 2008

Presentation of the work with Matthias Grossglauser regarding the models for communities in social networks and methods for identifying communities from network data.

EPFL Visitor Seminar: Blind Calibration of Sensor Networks 11 July 2007

Visitor seminar presenting my work on blind calibration to the EPFL in Lausanne, Switzerland.

Data Integrity in Sensor Networks 8 May 2007

Lecture to EE 202B, Distributed Embedded Systems, on motivations, problem descriptions and techniques for solving issues of data integrity in sensor networks.

IPSN: Blind Calibration of Sensor Networks 25 April 2007

Presentation of my paper at the conference on Information Processing in Sensor Networks.

CommDSP Visitor Seminar: Blind Calibration of Sensor Networks 16 April 2007

Visitor seminar presenting my work on blind calibration to the Communications and Signal Processing group at University of Wisconsin, Madison.

CENS Seminar: Blind Calibration of Sensor Networks 13 April 2007

Presentation of work on blindly calibrating sensor signals for the weekly seminar at the Center for Embedded Networked Sensing.

EE ARR: Automatic Calibration in Sensor Networks 16 February 2007

Presentation at the Electrical Engineering Annual Research Review of my work on calibrating sensor signals using both adaptive filtering techniques and subspace matching techniques.

Compressed Sensing 30 November 2006

Presentation of recent advances in compressed sensing, a new approach to sampling compressible signals.

REFERENCES

Robert Nowak, Professor of Electrical Engineering at the UW-Madison

Mani Srivastava, Professor of Electrical Engineering at the UC-Los Angeles

Matthias Grossglauser, Director of Internet Research at Nokia

John Treichler, Chief Technology Officer at Applied Signal Technology, Inc.