Matthew **Pugh**

Researcher · Team Lead

Danville, California

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"You do not rise to the level of your goals. You fall to the level of your systems." -James Clear

Summary

Insightful engineer who leverages a breadth of expertise to solve complex problems. Applies strong analytical skills to develop novel algorithms and system architectures to address critical DOE issues. Utilizes strong communication and leadership abilities to lead projects and R&D efforts in multiple disciplines. Operates with a strong focus on meeting and exceeding all of the customers' requirements.

Work Experience

Sandia National Laboratories

Livermore, CA

Principal Member of the Technical Staff

August 2011 - Current

- Component lead of a multi-disciplinary team of 20 engineers to execute and delivery on a $200M critical laboratory program. Execution included design, testing, qualification, procurement, quality, production, scheduling and budgeting as well as design and qualification of production hardware testers. The final product included mechanical housings, analog and digital circuitry and firmware.
- Lead multiple R&D research programs ranging from $2.5M to $5M responsible for developing solutions to DOE and DOD problems. One of these project became the aforementioned $200M program.
- Investigated and analyzed error correcting codes under asymmetric channel models with applications to free-space optical communication.
- Led a 3-year $1.5M R&D program investigating the use of compressed sensing for compression of telemetry data. Research included applications of dictionary learning to find optimal data representations as well as using auto-encoders for sparse feature extraction.
- Led a 2-year $250K early-career R&D effort investigating jam resistant communications via modulation design focusing on lattice-based techniques.
- Analyzed and developed probabilistic models for intrusion detection problems. Performed optimization on these models to develop sensor fusion algorithms.
- Performed Monte Carlo modeling for SNR analysis of short range mid-UV communications channels.

Northrop Grumman

San Diego, CA

Systems Engineering Intern

June 2010 - April 2011

- Developed RF signal direction finding algorithm incorporating real-time and off-line digital signal processing written in MATLAB and LabView
- Built functional prototype hardware for RF signal detection system
- Designed antenna interface unit for prototype system including microwave electronics

Qualcomm

San Diego, CA

Systems Engineering Intern

June 2006 - December 2006

- Developed end-to-end rate adaption algorithm for uplink and downlink mobile-to-mobile real-time video transfer
- Implemented cellular network simulations in C++ and MATLAB
- Implemented video QoS simulations in MATLAB

Publications

A Minimax Approach to Sensor Fusion for Intrusion Detection — *IEEE*

Pugh, M. — *March 2015*

Sensor Applications Symposium

Sensor Fusion for Intrusion Detection Under False Alarm Constraints — *IEEE*

Pugh, M., Kvam, J. and Brewer, J. — *March 2015*

Sensor Applications Symposium

The Proportional Fair Sharing Algorithm under i.i.d. Models — *IEEE*

Pugh, M. — *November 2012*

46th Asilomar Conference on Signals, Systems, and Computers

Diffuse Mid-UV Communication in the Presence of Obscurants — *IEEE*
Young, D., Brewer, J., Chang, J., Chou, T., Kvam, J., and **Pugh, M.** — *November 2012*
46th Asilomar Conference on Signals, Systems, and Computers

Feedback Reduction by Thresholding in Multi-User Broadcast Channels: Design and Limits — *IEEE*
Pugh, M. and Rao, B.D. — *November 2011*
45th Asilomar Conference on Signals, Systems, and Computers

Feedback Reduction in Multiuser MIMO Broadcast Channels — *University of California, San Diego*
Pugh, M. — *April 2011*
Ph.D. Thesis: Advisor - Bhaskar D. Rao

Distributed Quantization of Order Statistics with Applications to CSI Feedback — *IEEE*
Pugh, M. and Rao, B.D. — *April 2011*
Data Compression Conference

Reduced Feedback Schemes Using Random Beamforming in MIMO Broadcast Channels — *IEEE*
Pugh, M. and Rao, B.D. — *March 2010*
IEEE Transactions on Signal Processing

Feedback Reduction in MIMO Broadcast Channels with LMMSE Receivers — *IEEE*
Pugh, M. and Rao, B.D. — *March 2010*
International Conference on Acoustics, Speech and Signal Processing

On the Capacity of MIMO Broadcast Channels with Reduced Feedback by Antenna Selection — *IEEE*
Pugh, M. and Rao, B.D. — *November 2008*
42nd Asilomar Conference on Signals, Systems, and Computers

Education

University of California, San Diego — *June. 2008 - April 2011*
Ph.D. in Electrical and Computer Engineering
- Specializing in Communication Theory and Systems

University of California, San Diego — *Sept. 2005 - June 2008*
M.S. in Electrical and Computer Engineering

University of California, Los Angeles — *Sept. 2001 - June 2005*
B.S. in Electrical Engineering

University of California, Los Angeles — *Sept. 2001 - June 2005*
B.S. in Applied Mathematics

Miscellaneous

2012 - 2013	**Vice-Chairman,** IEEE Oakland East Bay Signal Processing Society
2013, 2014	**Member of the Technical Program Committee,** Globecom
2013	**Member of the Technical Program Committee,** International Conference on Connected Vehicles & Expo