

BRADFORD D. BOYLE

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EDUCATION

- Doctor of Philosophy, Electrical Engineering** June 2015
Drexel University, Philadelphia, PA
Thesis: Achievable Schemes for Cost/Performance Trade-offs in Networks
Areas of Research: Source Coding, Combinatorial Optimization, Multiterminal Information Theory, Networking
- Master of Science, Electrical Engineering** June 2008
Drexel University, Philadelphia, PA
- Bachelor of Science, Electrical Engineering (Summa Cum Laude)** June 2006
Drexel University, Philadelphia, PA

INDUSTRY EXPERIENCE

- Sift Security** Menlo Park, CA
Data Scientist & Developer September 2015 to present
- Stealth mode enterprise security startup combining big data technologies, graph databases, and machine learning
 - Contributed to the development of an ingestion pipeline utilizing Kafka, Spark, and HBase/Cassandra
 - Facilitated the implementation of detection algorithms on a variety of data sources driven by security use-cases
 - Member of a small team of developers in an Agile environment and served as scrum master
 - Engaged with and supported pilot customers in deploying, utilizing, and leveraging our platform
 - Managed company infrastructure using AWS, LDAP, JIRA, GitLab, and Jenkins
- Cisco Systems, Inc** Boxborough, MA
Software Engineer (Graduate Intern) June 2012 to September 2012
- Member of the Software Defined Networking Agent (SDNA) team in the Network Operating Systems Technology Group (NOSTG) that was developing an Openflow agent for NX-OS, IOS, and IOS-XR
 - Designed, deployed, and maintained a development testbed of VMs on a Cisco Unified Computing System (UCS) server
 - Configured and deployed Python, Perl, and PowerShell APIs for developer management of VMs
 - Ported Open vSwitch to the Nexus 7000 line of switches to provide a proof-of-concept Openflow compatible Nexus 7000
 - Developed a POX-based Openflow controller to demonstrate correct handling of flow rules and packet handling on the proof-of-concept Nexus 7000 Openflow agent

PUBLICATIONS

Journals

1. J. Ren, B. D. **Boyle**, G. Ku, S. Weber, and J. M. Walsh, "Overhead performance tradeoffs—A resource allocation perspective," *IEEE Trans. Inf. Theory*, vol. 62, no. 6, Jun. 2016
2. B. D. **Boyle**, J. Ren, J. M. Walsh, and S. Weber, "Interactive scalar quantization for distributed resource allocation," *IEEE Trans. Signal Process.*, vol. 64, no. 5, Mar. 2016

Conferences

1. B. D. **Boyle** and S. Weber, "Primal-dual characterizations of jointly optimal transmission rate and scheme for distributed sources," in *Data Compression Conf. (DCC)*, March 2014
 - Subset of material presented by S. Weber at *Information Theory & Applications (ITA)*, February 2014
2. B. D. **Boyle**, J. M. Walsh, and S. Weber, "Distributed scalar quantizers for subband allocation," in *Conf. Information Sciences and Systems (CISS)*, March 2014
3. J. Hummel, A. McDonald, V. Shah, R. Singh, B. D. **Boyle**, T. Huang, N. Kandasamy, H. Sethu, and S. Weber, "A modular multi-location anonymized traffic monitoring tool for a WiFi network," in *ACM Conf. Data and Application Security and Privacy (CODASPY)*, March 2014, **Outstanding Poster Award**
4. B. D. **Boyle**, J. M. Walsh, and S. Weber, "Channel dependent adaptive modulation and coding without channel state information at the transmitter," in *IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP)*, May 2013

RESEARCH EXPERIENCE

- BIGDATA: Small: DA: Mining Large Graphs Through Subgraph Sampling** Drexel University
Research Assistant October 2013 to August 2015
- *Sponsor*: National Science Foundation (NSF) Program for Big Data Science & Engineering, Award # 1250786
 - *Investigators*: Harish Sethu and Steven Weber
 - Evaluated the use of real-world social networks (e.g., Twitter, Flickr, Foursquare) as representative data sets in developing and analyzing graph sampling algorithms

- Implemented several algorithms for estimating graph properties from sampled subgraphs and compared the performance of these different algorithms across families of randomly generated graphs and real-world social networks

TTP: Medium: Securing the Wireless Philadelphia Network

Research Assistant

Drexel University
September 2012 to August 2015

- *Sponsor:* National Science Foundation (NSF) Program for Secure & Trustworthy Cyberspace, Award # 1228847
- *Investigators:* Steven Weber, Kapil Dandekar, Spiros Mancoridis, and Harish Sethu
- Applied state measurement and aggregation techniques to both the host-based and network anomaly detection problems
- Advised a senior design team in developing a traffic monitoring tool for Wi-Fi networks
- Researched the impact of network capacity constraints on Slepian-Wolf source coding rate region
- Demonstrated a connection between conditional independence relationships amongst a set of sources and the complexity of linear programs over the feasible rate region

Overhead-Performance Tradeoffs in Distributed Wireless Networks

Research Assistant

Drexel University
May 2012 to May 2015

- *Sponsor:* Air Force Office of Scientific Research (AFOSR) Complex Networks Program, Award # FA9550-12-1-0086
- *Investigators:* John MacLaren Walsh, Steven Weber, Leonard J. Cimini, and Javier Garcia-Frias
- Studied the tradeoff between collaboration information overhead and bandwidth/energy efficiency of wireless networks
- Investigate the capacity loss for an optimized channel dependent adaptive modulation & coding (AMC) without channel state information (CSI) at the transmitter as compared to an omniscient transmitter
- Designed an low complexity achievable scheme for user feedback in resource allocation problems based on scalar quantization and demonstrated performance close to rate-distortion function for certain classes of sources

ACIN Cognitive Networking

Research Assistant

Drexel University
September 2010 to May 2012

- *Sponsor:* U.S. Army Communications and Electronics Command (CECOM)
- *Investigators:* Steven Weber and Kapil Dandekar
- Researched the applicability of cognitive networking for wireless networks by implementing and simulating standard ad hoc network and representative “cognitive” routing protocols
- Compared cross-layer cognitive designs that integrate state information for joint use at the PHY, MAC, and NET layers to standard and cognitive routing protocols
- Provided a preliminary implementation of backpressure routing in Linux for ad-hoc wireless networks

ACIN CREW Network Centric Operations

Research Assistant

Drexel University
June 2008 to September 2010

- *Sponsor:* U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC)
- *Investigators:* Moshe Kam and Kapil Dandekar
- Developed a system to automatically detect and classify radio frequency signals
- Investigated the effects of time windows on correct detection and false alarm rates
- Created graphical user interfaces for hardware radios

ACIN Situation-Aware Protocols in Edge Network Technologies (SAPIENT)

Research Assistant

Drexel University
September 2006 to June 2008

- *Sponsors:* DARPA and Lockheed Martin Advanced Technology Labs (ATL)
- *Investigators:* Moshe Kam and Spiros Mancoridis
- Sustained application usability by seamlessly intercepting traffic and adapting protocols to match the network conditions
- Researched and developed methods for control of multiple application resource allocation

HONORS, MEMBERSHIPS & DISTINCTIONS

- Allen Rothwarf Award (AY2013–2014)
- Drexel University Dean’s Fellowship
- Eta Kappa Nu (National ECE Honor Society)
- The Military Order of the World Wars Reserve Officers’ Training Corps (ROTC) Award of Merit
- Thomas W. Moore Endowed Fund
- National Society of Collegiate Scholars
- Boy Scouts of America, Eagle Scout

SKILLS AND ASSETS

- Operating Systems: Windows XP/Vista/7/8/10, Mac OS X, Linux (CentOS, Debian, & Arch)
- Software: \LaTeX , Microsoft Office Suite, MATLAB, Databases (MySQL & similar, Cassandra), Elasticsearch, Logstash
- Hardware: Atmel AVR, Texas Instruments MSP430, Arduino, Raspberry Pi, BeagleBone Black
- Programming & Scripting: Python, Scala, Java, C/C++, JavaScript, HTML/CSS
- Licensed Amateur Radio Operator—Amateur Extra Class (AB3MD)