

# Tingshan Huang

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- CONTACT INFORMATION** Department of ECE, Drexel University +1 (215) 688-3626  
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Philadelphia, PA 19104, USA http://tingshanhuang.com
- SUMMARY** Extensive background in computer networks, probability, statistics and signal processing. More than four years of research experience in adaptive sampling and data analysis for performance monitoring and anomaly detection in data centers and networks. Proficient in Java, C/C++, MATLAB, Python, HTML, CSS and JavaScript.
- EDUCATION** **Drexel University**, Philadelphia, Pennsylvania, USA  
Ph.D. in Electrical Engineering, December 2015 (expected)  
Advisors: Nagarajan Kandasamy and Harish Sethu  
M.S. in Electrical Engineering, June 2012  
GPA: 3.98/4.0  
**Shanghai Jiao Tong University**, Shanghai, China  
B. Sc. in Electrical Engineering, June 2009  
GPA: 87/100
- PUBLICATIONS** T. Huang, H. Sethu and N. Kandasamy, "A Fast Algorithm for Detecting Anomalous Changes in Network Traffic," to appear in *International Conference on Network and Service Management (CNSM)*, 2015.  
T. Huang, N. Kandasamy and H. Sethu, "Anomaly Detection in Computer Systems using Compressed Measurements," to appear in *IEEE International Symposium on Software Reliability Engineering (ISSRE)*, 2015.  
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," *ACM Conference on Data and Application Security and Privacy (CODASPY)*, 2014. (**Outstanding Poster Award**)  
T. Huang, N. Kandasamy and H. Sethu, "Evaluating Compressive Sampling Strategies for Performance Monitoring of Data Centers," *IEEE/ACM Conference Autonomic Computing (ICAC)*, 2012. (Acceptance ratio: 24%)  
T. Huang, N. Kandasamy and H. Sethu, "Evaluating Compressive Sampling Strategies for Performance Monitoring of Data Centers," *IEEE/IFIP Network Operations and Management (NOMS)*, April 2012. Short paper.  
T. Huang, W. Chen and J. Li, "Dynamic Power Allocation for Multi-Hop Linear Non-Regenerative Relay Networks," *ICST International Conference on Communications and Networking in China (ChinaCom)*, 2009.  
F. She, W. Chen, H. Luo, T. Huang and X. Wang, "Joint Power Allocation and Scheduling of Multi-Antenna OFDM System in Broadcast Channel," *IEEE International Conference on Communications (ICC)*, 2009.
- UNDER REVIEW** T. Huang, N. Kandasamy, H. Sethu, and M. Stamm, "An Efficient Strategy for Online Performance Monitoring of Datacenters via Adaptive Sampling," submitted to *IEEE Transactions on Cloud Computing*. A draft copy is available upon request.

RESEARCH  
EXPERIENCE

**Drexel University**, Philadelphia, Pennsylvania, USA

*Research Assistant*

**October 2009 – present**

Distributed Anomaly Detection in Network Traffic

September 2013 – present

- Characterize normal and anomalous traffic patterns of traffic data (e.g., backbone network traffic, DNS traffic at ISP DNS servers) with principal components of traffic features.
- Propose a real-time anomaly detection algorithm to detect trends and anomalies in the traffic data.
- Implement the distributed anomaly detection algorithm to detect traffic changes in large-scale distributed systems.

Resource-Efficient System Monitoring using Compressive Sampling July 2010 – January 2015

- Collect performance-related measurements from an experimental testbed running IBM Trade6.
- Sample and log signals of interest at adaptive rate using compressive sampling
- Reduce the amount of collected data by 70% while maintaining adequate signal reconstruction quality, compared with constant-rate compressive sampling and random sampling.
- Extensively evaluate the feasibility of compressive sampling in the context of performance monitoring and anomaly detection such as trend detection and threshold-violation detection.

Game-Theoretic Analysis of Location Privacy

April 2011 – June 2011

- Implement pseudonym-based techniques and anonymity measurements for location privacy protection in location-aware applications.
- Analyze the achievable gain in anonymity by a non-cooperative location privacy protocol using game theory.

Detection of Transient Signals based on Compressed Sampling

October 2009 – June 2010

- Design basis to represent transient signal in power system due to proliferation of nonlinear loads and harmonic pollution.
- Compare the frequency detection result with Pronys method, a traditional and efficient way of analyzing transient signals in power system.

**Shanghai Jiao Tong University**, Shanghai, China

*Research Assistant*

**July 2008 – June 2009**

Multi-hop Relayed Communication System

July 2008 – June 2009

- Analyze end-to-end signal to noise ratio in the multi-hop linear relay system.
- Develop power allocation algorithm to maximize signal to noise ratio in the system.

Power Allocation in Multi-node Cooperative Communication System using Distributed Space-Time Coding

November 2008 – June 2009

- Analyze system performance in terms of pairwise error probability and diversity.
- Develop power allocation scheme to reduce pairwise error probability.

HONORS AND  
AWARDS

Recipient of Travel Subsidy, Office of Graduate Studies, Drexel University, Philadelphia, Pennsylvania, USA, April 2012.

Dean's Fellowship, Electrical & Computer Engineering Department, Drexel University, Philadelphia, Pennsylvania, USA, 2010–2011.

Excellent Academic Scholarship, Shanghai Jiao Tong University, Shanghai, China, 2005–2008.

SKILLS

Operating Systems

Windows, Linux

Programming, Scripting and Tools

Java, C/C++, Python (pycrypto), HTML, CSS, JavaScript, R, MATLAB, Eclipse, ns-2, Wireshark, LaTeX

**COURSES TAKEN**

Graduate courses taken at Drexel University:

Principles of Computer Networking (ECE-C631), Grade: A+  
Performance Analysis of Computer Networks (ECE-C632), Grade: A+  
Advanced Topics in Computer Networks (ECE-C633), Grade: A  
Probability and Random Variables (ECE-S521), Grade: A  
Random Process and Spectral Analysis (ECE-S522), Grade: A  
Detection and Estimation Theory (ECE-S523), Grade: A  
Fundamentals of Deterministic Digital Signal Processing (ECE-S631), Grade: A  
Fundamentals of Statistical Digital Signal Processing (ECE-S632), Grade: A+  
Fundamentals of Image Processing (ECE-S682), Grade: A  
Optimization Methods for Engineering Design (ECE-S811), Grade: A  
Data Structures and Algorithms I (CS-521), Grade: A  
Data Structures and Algorithms II (CS-522), Grade: A  
Linear Algebra and Matrix Analysis (MATH-504), Grade: A+  
Special Topics on Numerical Linear Algebra (MATH-680), Grade: A

**TEACHING  
EXPERIENCE**

**Drexel University**, Philadelphia, Pennsylvania, USA

*Teaching Assistant*

**October 2009 – present**

Programming for Engineers (ECE-203): Winter 2010, Winter 2012.  
Advanced Programming for Engineers (ECE-C301): Fall 2010, Spring 2010.  
Principles of Computer Networking (ECE-C631): Fall 2012.  
Advanced Topics in Computer Networks (ECE-C633): Spring 2011.  
Web Security (ECE-C690): Fall and Winter 2013.  
Digital Signal Processing for Sound and Hearing (ECE-S558): Fall 2009.  
Fundamentals of Deterministic Digital Signal Processing (ECE-S631): Fall 2011.  
Digital Logic Design (ECE-200): Spring 2012.  
ECE Laboratory II (ECE-L302): Winter 2009.  
Dynamic Engineering Systems (ENGR-232): Summer 2010, Winter and Summer 2011.

**REFERENCES**

Dr. Nagarajan Kandasamy

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Dr. Harish Sethu

Associate Professor  
Department of ECE, Drexel University  
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Philadelphia, PA 19104-2875  
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*Phone:* +1 (215) 895-5876