Koosha Marashi

Software/Hardware/Firmware Engineer

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Education

Missouri University of Science and Technology (Missouri S&T) — *Rolla, MO*

Ph.D. in Computer Engineering — *Aug. 2012 – July 2017*

- **Dissertation:** Quantitative Dependability and Interdependency Models for Cyber-Physical Systems
- **Advisor:** Dr. Sahra Sedigh Sarvestani
- **GPA:** 3.8/4.0

Isfahan University of Technology (IUT) — *Isfahan, Iran*

B.S. in Electrical Engineering — *Sep. 2006 – Feb. 2011*

- **GPA:** 15.61/20.00

Work Experience

Missouri S&T, Department of Electrical and Computer Engineering — *Rolla, MO*

Graduate Research Assistant — *Aug. 2012 – Present*

- Developed reliability and interdependency models for smart grids. These analytical models help in identifying vulnerabilities and reducing service interruptions in modern electrical grid.
- Made an ultra-low-power VLF signal detector for underwater communications extending battery life of transceivers by a factor of 40.

Kalscott Eng. — *Lawrence, KS*

Software/Hardware Development Intern — *May 2016 – Aug. 2016*

- Reduced power consumption of a UAV navigation system to one thirtieth of its original value and improved its performance by 40% by migrating real-time applications to a Linux-powered single-board computer and utilizing optimized algorithms.

Intellispeak LLC — *Lawrence, KS*

Software/Firmware Development Co-Op — *May 2015 – May 2016*

- Utilized Bluetooth beacons and constructed an information network to help patients with autism.
- Responsible for developing and testing an embedded firmware application for a GPS tracker with secure communications.

Kalscott Eng. — *Lawrence, KS*

Software/Hardware Development Intern — *May 2014 – Aug. 2014*

- Developed an automated air-band radio for UAVs. This system is able to predict intent of UAVs with 98% accuracy and inform nearby traffic.

Beh-Azmoon — *Isfahan, Iran*

Firmware Engineer — *Dec. 2011 – Jun. 2012*

- Created a wireless digital crack monitoring system for structural health monitoring. This system is to replace the traditional crack gauges eliminating the need for constant surveillance.

IUT, Department of Electrical and Computer Engineering — *Isfahan, Iran*

Research Assistant — *Feb. 2006 – Nov. 2011*

- Made a multi-functional stand-alone data logger.
- Developed motor controller board, navigation system, and sensor fusion algorithm for LynCean mobile robot.
- Made a modular I^2C-based system for hardware control and sensor data integration on mobile robots.
- Made a controller board for Parsa humanoid robot.
- Prototyped an AUTOSAR-compliant engine control unit for Honda GX35 engine based on STM32 microcontrollers.

Leadership Activities

Eta Kappa Nu Honor Society - Gamma Theta Chapter — *Rolla, MO*

Active Member — *Mar. 2014 – Present*

- Attended regular meetings and helped in voluntary services.

Super-mileage Car Student Design Team — *Isfahan, Iran*

Hardware Development Leader — *Oct. 2009 – Aug. 2010*

- Communicated status and issues to cross-functional teams and senior manager.
- Coordinated resources using Microsoft Project.

Rescue Robot Student Design Team — *Isfahan, Iran*

Team Leader — *Sep. 2008 – Apr. 2009*

- Mentored students, helping them to solve problems and make decisions.

Honors and Awards

2013	**National University Transportation Center Fellowship**, US Department of Transportation	*Rolla, MO*
2013	**Travel Scholarship**, Trustworthy Cyber Infrastructure for the Power Grid	*Urbana, IL*
2012	**Vice-Provost for Graduate Studies Fellowship**, Missouri S&T	*Rolla, MO*
2010	**Gold Medal**, 38th Geneva Invention Exhibition	*Geneva, Switzerland*
2010	**Best Invention Award**, Russian Incubator of Inventions	*Geneva, Switzerland*
2009	**Outstanding Undergraduate Researcher Award**, IUT	*Isfahan, Iran*

Publications

Journal Papers

- **K. Marashi**, S. Sedigh, and A. Hurson, "Identification of Interdependencies and Prediction of Fault Propagation for Cyber-Physical Systems," *Reliability Engineering & System Safety*, submitted.
- M. Woodard, **K. Marashi**, and S. Sedigh, "Survivability Evaluation and Importance Analysis for Complex Networked Systems," *IEEE Transactions on Network Science and Engineering*, submitted.
- N. Jarus, M. Woodard, **K. Marashi**, A. Faza, J. Lin, P. Maheshwari, and S. Sedigh, "Survey on Modeling and Design of Cyber-Physical Systems," *ACM Transactions on Cyber-Physical Systems*, submitted.
- **K. Marashi**, S. Sedigh, and A. Hurson, "Consideration of Cyber-Physical Interdependencies in Reliability Modeling of Smart Grids," *IEEE Transactions on Sustainable Computing*, under review.
- **K. Marashi**, M. Woodard, S. Sedigh, and A. Hurson, "Quantitative Reliability Analysis for Intelligent Water Distribution Networks," *Transactions of the American Nuclear Society*, 2014.

Conference and Workshop Papers

- **K. Marashi**, S. Sedigh, and A. Hurson, "Quantification and Analysis of Interdependency in Cyber-Physical Systems," *In Proceedings of the 3rd International Workshop on Reliability and Security Aspects for Critical Infrastructure Protection (ReSA4CI '16)*, Toulouse, France, Jun. 2016.
- **K. Marashi** and S. Sedigh, "Towards Comprehensive Modeling of Reliability for Smart Grids: Requirements and Challenges," *In Proceedings of the 15th IEEE International Symposium on High-Assurance Systems Engineering (HASE)*, pp. 105-112, Miami, FL, Jan. 2014. Selected for appearing in 2nd issue of 2015 Science of Security Newsletter.
- **K. Marashi**, M. Woodard, S. Sedigh, and A. Hurson, "Quantitative Reliability Analysis for Intelligent Water Distribution Networks," *In Proceedings of the Embedded Topical Meeting on Risk Management for Complex Socio-Technical Systems*, Washington, D.C., Nov. 2013.

Patents

2014 **Wireless Temperature Monitoring System for Centrifugal Casting**, Pat. No. IR-81750
2010 **2D Wireless Structural Crack Monitoring System**, Pat. No. IR-62181
2010 **Handheld Data Logger for Agricultural Applications**, Pat. No. IR-61142
2009 **Life Detector Robot with Adjustable Functionality**, Pat. No. IR-60845
2009 **Extendable DC Motor Controller System**, Pat. No. IR-60839
2009 **An Innovative Co-Axial Rotation Mechanism**, Pat. No. IR-60847
2009 **Robust Track Mechanism for Locomotion of Mobile Robots**, Pat. No. IR-60849
2009 **Lightweight Robust Platform for Mobile Robots**, Pat. No. IR-60848

Professional Activities

2016 **Reviewer**, Journal of Mathematics and Computer Science
2016 **Reviewer**, IEEE International Computers, Software & Applications Conference (COMPSAC)
2015 **Reviewer**, IEEE International Computers, Software & Applications Conference (COMPSAC)
2014 **Reviewer**, IEEE International Green Computing Conference (IGCC)
2014 **Reviewer**, IEEE International Symposium on High Assurance Systems Engineering (HASE)
2014 **Reviewer**, IEEE International Conference on Software Security and Reliability (SERE)
2013 **Reviewer**, IEEE International Conference on Software Security and Reliability (SERE)

Professional Development

2017 **Student Leadership Conference**, Missouri S&T *Rolla, MO*
2014 **Graduate Teaching Assistant Workshop**, Missouri S&T *Rolla, MO*
2014 **Research & Technology Development Conference**, Missouri S&T *Rolla, MO*
2014 **Transportation Infrastructure Conference**, Missouri S&T *Rolla, MO*
2014 **IEEE/Ameren Lean Fundamentals Workshop**, Ameren *St. Louis, MO*
2014 **Presenting Data and Information by Edward Tufte**, Fairmont Chicago *Chicago, IL*
2013 **IEEE Seminar on Modeling Cyber Attack-Defense Interactions**, Missouri S&T *Rolla, MO*
2013 **Engineering Management & Systems Engineering Seminar on Applications and Future Directions of Computational Intelligence**, Missouri S&T *Rolla, MO*
2013 **Transportation Infrastructure Conference**, Capitol Plaza Hotel *Jefferson City, MO*
2013 **Trustworthy Cyber Infrastructure for the Power Grid (TCIPG) Summer School**, Q Center *St. Charles, IL*

Professional Society Membership

Since 2015 **Student Member**, National Society of Professional Engineers
Since 2015 **Member**, ACM - SIGMETRICS
Since 2015 **Student Member**, ACM
Since 2014 **Member**, IEEE - Eta Kappa Nu
Since 2013 **Student Member**, IEEE

Technical Skills

Programming Languages	Python (expert), C/C++ (proficient), SQL (proficient), Java (prior experience), Verilog (prior experience)
Computer Software	OrCAD, LabVIEW (CLAD certificate, issued 5/13), MATLAB & Simulink, LaTeX, SAS, JMP
Development Tools	IAR Embedded Workbench, Atmel Studio, Keil, MPLAB, Eclipse, PyCharm, Android Studio
Programmable Devices	AVR and ARM-based Microcontrollers, FPGA
Test Equipment	Logic Analyzer, Spectrum Analyzer, Oscilloscope, Signal Generator
Communication Protocols	UART, SPI, I^2C, USB, TCP/IP, 802.03, 802.11, ZigBee, Bluetooth
Web Technologies	HTML, JavaScript, CSS, Jekyll, Amazon AWS/EC2
Operating Systems	Windows, Linux (Ubuntu, Red Hat, Raspbian), Android
Miscellaneous	Agile development, Digital and analog circuit design, PCB design, Git, Android app development