# Koosha Marashi

Software/Firmware Engineer · Back-End/Web/Embedded Systems Developer

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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/Firmware 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 to a Linux-powered single-board computer and utilizing optimized algorithms.

**Intellispeak LLC**  *Lawrence, KS*
Full-Stack Development Intern and Co-Op  *May 2015 – May 2016*

- Utilized Bluetooth beacons and constructed an information network to help patients with autism.
- Was responsible for development of server back-end (Python), Android app (Java), database (MySQL), and web interface (HTML, JavaScript, and CSS).

**Kalscott Eng.**  *Lawrence, KS*
Software/Firmware 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 navigation system and sensor fusion algorithm for LynCean mobile robot.
- Made a controller board for Parsa humanoid robot.
- Prototyped an AUTOSAR-compliant engine control unit for Honda GX35 engine.

# 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

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|---|---|---|
| 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

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| 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

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| 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

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| 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

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| 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

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| **Programming Languages** | Python (expert), C/C++ (proficient), SQL (proficient), Java (prior experience), Verilog (prior experience) |
| **Web Technologies** | HTML, JavaScript, CSS, Bottle, RESTful API, Jekyll, Amazon AWS/EC2 |
| **Computer Software** | MATLAB & Simulink, LabVIEW (CLAD certificate, issued 5/13), OrCAD, LaTeX |
| **Data Analysis** | Machine learning, Neural networks, Statistical modeling, Regression, ANOVA, TensorFlow, SAS, JMP |
| **Programmable Devices** | AVR and ARM-based Microcontrollers, FPGA |
| **Communication Protocols** | TCP/IP, 802.03, 802.11, UART, SPI, $I^2C$, ZigBee, Bluetooth |
| **Operating Systems** | Windows, Linux (Ubuntu, Raspbian), Android |
| **Miscellaneous** | Agile development, Git, Digital and analog circuit design, PCB design, Android application development |