

# Nathan JARUS

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## EDUCATION

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EXPECTED 2019	Ph.D. in COMPUTER SCIENCE <b>Missouri University of Science and Technology</b> , Rolla, MO (formerly UNIVERSITY OF MISSOURI-ROLLA) Graduate Assistantships in Areas of National Need Doctoral Fellow Advisor: Dr. Sahra SEDIGH SARVESTANI Thesis: MODEL TRANSFORMATION FOR CYBER-PHYSICAL SYSTEMS Completed Qualifying Exam and 21 of 72 credit hours GPA: 4.0/4.0
DECEMBER 2013	B.S. in COMPUTER SCIENCE Minor in MATHEMATICS <b>Missouri University of Science and Technology</b> , Rolla, MO Office for Undergraduate Research Experience Scholar Advisor: Dr. Sriram CHELLAPAN GPA: 3.7/4.0

## RESEARCH INTERESTS

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Type Theory, Abstract Algebra, Critical Infrastructure, Category Theory, Computational Intelligence, Programming Languages, Algorithm Development and Analysis

## HONORS AND AWARDS

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AUG 2015	NSF Science of Security Initiative: Significant Research in Cyber Security Citation
MAR 2015	Institute of Electrical and Electronic Engineers: 13 <sup>th</sup> Int'l. Conference on Pervasive Computing and Communication Travel Grant (\$500)
JAN 2014 - AUG 2015	US Department of Education: Graduate Assistantships in Areas of National Need (GAANN) Fellowship (all educational expenses and need-based stipend)
SEPT 2012 - MAY 2014	Missouri S&T: Office for Undergraduate Research Experience (OURE) Scholarship (\$2000) Access Missouri Scholarship (\$2200)
SEPT 2009 - MAY 2014	Missouri S&T: Bright Flight Scholarship (\$10,000)

SEPT 2009 - | Missouri S&T:  
MAY 2013 | Curators' Scholarship (\$14,000)  
Excellence Scholarship (\$4,000)  
First Robotics Scholarship (\$2,000)  
Miner Alumni Association Silver Scholarship (\$5,000)

SEPT 2009 - | Missouri S&T:  
MAY 2010 | Dean's Scholarship (\$750)  
Computer Science Dept. Scholarship (\$250)

## EXPERIENCE

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JAN 2014 - | Graduate Research Assistant at **Missouri S&T**  
PRESENT | Advisor: Dr. Sahra SEDIGH SARVESTANI  
Carrying out doctoral research on developing models of cyber-physical system dependability attributes.

AUG 2015- | Graduate Teaching Assistant at **Missouri S&T**  
DEC 2015 | Calculus II Laboratory – Math 1215  
Guided groups of freshman and sophomore students through solving problems in an inquiry-based learning environment. Taught three classes of 30 students each. In addition, I provided tutoring assistance to students and proctored and graded exams for the associated lecture.  
These classes are a pilot run of a new calculus laboratory format. I provided input on problem selection and wrote solutions for the exercises.

JAN 2015- | Graduate Instructor at **Missouri S&T**  
MAY 2015 | Digital Network Design – Computer Engineering 5410  
Shared responsibility with Mark WOODARD for instruction and evaluation of a course of 45 senior and graduate students.

AUG 2014- | Grader at **Missouri S&T**  
DEC 2014 | Digital Network Design – Computer Engineering 5410

AUG 2013 - | Software Developer at **Lumate**, Rolla  
JAN 2014 | Designed and developed a platform to facilitate data sharing between large heterogeneous databases.

JAN 2012 - | Undergraduate Research Assistant at **Missouri S&T**  
DEC 2013 | Advisor: Dr. Sahra SEDIGH SARVESTANI  
Researched methods of detecting electrostatic discharge on embedded device peripherals. Modified Linux drivers to gather hardware state information. Developed methods for analyzing state information to statistically determine if a sequence of states demonstrates electrostatic discharge.  
Work resulted in one journal and one conference publication.

JAN 2010 - | System Administrator at **Missouri S&T Information Technology**  
DEC 2013 | Developed a FUSE filesystem wrapper to support advanced Linux filesystem operations on a network filesystem. Developed and integrated a system for real-time 3D visualization of large data sets. Developed software to convert a generic dataset to a specific format for the visualization system. Supported research projects with both hardware and software.  
Administered all on-campus Linux machines. Migrated campus Linux distribution from Red Hat to Ubuntu.

AUG 2010- DEC 2012	Tutor at <b>Missouri S&amp;T</b> Introduction to C++ – Computer Science 1570 and 1971 Taught programming concepts, answered questions, and provided homework guidance to freshman and sophomore students.
SUMMER 2013	Software Development Engineering Intern at <b>Amazon</b> , Seattle Developed an Identity Broker service to vend temporary resource access credentials to clients based on their identity. Deployed service to production and configured monitoring and alarms.
SUMMER 2012	Software Development Engineering Intern at <b>Amazon</b> , Seattle Deployed to production a self-service scaling web service that reduced developer time spent on new clients. The service also predicted hardware requirements each quarter based on individual client growth estimates. Developed a MapReduce log parsing system to monitor actual service use and provide real-life scaling data for better accuracy.
SUMMER 2011	Software Engineering Intern at <b>Garmin International</b> , Kansas City Modified the map routing algorithm to log better statistical data. Created software to analyze generated routes and determine overall fitness of the routing algorithm. Developed a system to allow other engineers to easily test routing algorithm changes.
SUMMER 2010	Software Engineering Intern at <b>Softtek Solutions Inc.</b> , Kansas City Developed an Android application that queried a REST web interface. Developed an Android library for future company applications.

## PUBLICATIONS

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2015	<b>N. Jarus</b> , M. Woodard, M. Ataei, K. Marashi, J. Lin, A. Faza, P. Maheshwari, and S. Sedigh Sarvestani. “Survey on Modeling and Design of Cyber-Physical Systems”. To be submitted to <i>ACM Transactions on Cyber-Physical Systems</i> in Nov. 2015.  <b>N. Jarus</b> , A. Sabatini, P. Maheshwari, and S. Sedigh Sarvestani. “A Software Method for Detecting Electrostatic Discharge in USB Host Controllers”. Submitted to the <i>IEEE Transactions on Instrumentation and Measurement</i> in Oct. 2015.
2014	M. Albasrawi, <b>N. Jarus</b> , K. Joshi, and S. Sedigh Sarvestani. “Analysis of Reliability and Resilience for Smart Grids”. In <i>Proc. of the 38<sup>th</sup> IEEE Int’l. Computer Software and Applications Conference (COMPSAC), Vasteras, Sweden</i> , pp. 529–534. Selected for inclusion in the 2 <sup>nd</sup> 2015 issue of the <i>NSF Science of Security Index of Significant Research in Cyber Security</i> .
2013	A. Sabatini, <b>N. Jarus</b> , P. Maheshwari, and S. Sedigh Sarvestani. “Software instrumentation for failure analysis of USB host controllers”. In: <i>Proc. of the IEEE Int’l. Instrumentation and Measurement Technology Conference (I<sup>2</sup>MTC), Minneapolis, MN, USA</i> , pp. 1109-1114.
2012	<b>Nathan Jarus</b> . “Old Ideas in a New Age: Descartes’ Influence on Modern Animal Farming”. In: <i>Missouri S&amp;T Undergraduate Research Conference</i> .

## SELECTED COURSEWORK

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NETWORK PERFORMANCE ANALYSIS MARKOV DECISION PROCESSES	Discrete and continuous probability distributions; stochastic modeling using Markov chains and queueing theory with applications in computer network and physical process modeling.
COMPLEX NETWORKED SYSTEMS	Analyzing large system networks using graph theoretical algorithms and metrics.
COMPUTATIONAL INTELLIGENCE EVOLUTIONARY COMPUTING DATA MINING	Neural networks, clustering, reinforcement learning, and swarm intelligence; evolutionary algorithms, multi-objective evolution, and genetic programming; data mining algorithms and techniques.
MODERN ALGEBRA RING THEORY	Theory, properties, and applications of groups and rings from abstract algebra.
FOUNDATIONS OF MATHEMATICS	Axiomatic development of mathematical systems; developing sound mathematical arguments.

## TECHNICAL SKILLS

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LANGUAGES	Ruby, Python, Haskell, Javascript, C++, C, Java, Perl, BASH, SQL, FLEX, YACC, L <sup>A</sup> T <sub>E</sub> X
DEVELOPMENT FRAMEWORKS	Matplotlib, Hadoop, Django, Linux Kernel
SOFTWARE	GNU toolchain, Vim, Git, Eclipse
OPERATING SYSTEMS	Linux (Ubuntu, Arch, Embedded, Red Hat), Windows (7, Vista, XP)

## PROFESSIONAL DEVELOPMENT

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2015	Missouri S&T Mathematics Graduate Teaching Seminar
2014	Presenting Data and Information Workshop by Edward TUFTE Missouri S&T Graduate Teaching Assistant Workshop

## PROFESSIONAL SERVICE AND AFFILIATIONS

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MEMBERSHIPS	Institute of Electrical and Electronic Engineers IEEE Eta Kappa Nu Honors Society Association for Computing Machinery
CONFERENCES	13 <sup>th</sup> IEEE Int'l. Conference on Pervasive Computing and Communication (PERCOM) 2015 – Volunteer
REVIEWING	39 <sup>th</sup> IEEE Int'l. Computers, Software & Applications Conference (COMPSAC) 2015 IEEE Int'l. Conference on Software Quality, Reliability & Security (QRS) 2015 The Int'l. Workshop on Model-Based Design for Cyber-Physical Systems (MB4CP) 2015 (in conjunction with the 45 <sup>th</sup> IEEE Int'l. Conference on Dependable Systems and Networks (DSN)) 16 <sup>th</sup> IEEE Int'l. Conference on Information Reuse and Integration (IRI) 2014