

Research Interests

- Empirical Software Engineering
- Highly Configurable Software
- (Secure) API Usage Patterns
- Variability Modeling
- Code Recommender Systems
- Mining Software Repositories
- Software Evolution & Maintenance
- Software Product Lines

Academic Appointments

- July 2016 - Present **Assistant Professor**, *Department of Computing Science*, University of Alberta, Canada.
- Oct. 2014 - June 2016 **Postdoctoral Researcher**, *Computer Science*, Technische Universität Darmstadt, Germany.
Host: Mira Mezini

Education

- 2014 **Ph.D in Computer Science**, *University of Waterloo*, Canada.
Thesis Variability Anomalies in Software Product Lines
Advisor Richard C. Holt
Committee Don Batory, Joanne Atlee, Krzysztof Czarnecki, and Michael W. Godfrey
- 2009 **MMath in Computer Science**, *University of Waterloo*, Canada.
Thesis DRACA: Decision Support for Root Cause Analysis and Change Impact Analysis
Advisor Richard C. Holt
Reviewers Ladan Tahvildari and Michael W. Godfrey
- 2007 **BSc. in Computer Science**, *The American University in Cairo*, Egypt.

Research Experience

- Oct. 2014 - June 2016 **Postdoctoral Researcher**, *Software Technology Group (STG)*, Technische Universität Darmstadt, Germany.
 - Created a configurable system of cryptographic components.
 - Studied new techniques to improve code recommender systems.
 - (Co-)supervised three PhD and seven Masters students.
- May 2010 - Aug. 2014 **Research Assistant**, *Software Architecture Group (SWAG)*, University of Waterloo, Canada.
 - Studied configuration constraints in build systems to detect inconsistencies.
 - Analyzed evolution of such inconsistencies.
 - Reverse-engineered configuration constraints from implementation using static analysis techniques.
- June 2009 - Aug. 2009 **Research Intern**, *CA Labs*, Markham, Canada.
 - Explored the structure of a Configuration Management Database (CMDB).
 - Interviewed developers about their CMDB usage to gather requirements for better root cause analysis and and change impact analysis.

- May 2008 - **Research Assistant**, *Software Architecture Group (SWAG)*, University of Waterloo, Canada.
Dec. 2009
 - Mined data from a CMDB to provide decision support for root cause analysis and change impact analysis in IT management systems.
 - This work was in collaboration with CA Labs Canada.

Industrial Experience

- July 2007 - **Software Engineer**, *ITWorx*, Egypt.
April 2008
 - Used Vignette, a Content Management System, to develop the internal website for a client.
 - Used J2EE, HTML, JavaScript, and Oracle DB during development.

June 2006 - **Software Engineer Intern**, *ITWorx*, Egypt.
July 2006
 - Modified and refactored an existing software tracking tool within the company developed in C#.
 - Used extensive XML parsing and XSLT transformation in the process.

June 2005 - **IT Support Intern**, *Vodafone*, Egypt.
July 2005
 - Installed corporate software for employees.

Recognition

Scholarships

- Sep 2012 **NSERC Alexander Graham Bell Canada Graduate Scholarship-Doctoral (CGS-D)**, University of Waterloo, Canada (\$70,000)
Sep 2012 **University of Waterloo President's Graduate Scholarship**, University of Waterloo, Canada (\$20,000)
May 2012 **Ontario Graduate Scholarship (OGS)**, University of Waterloo, Canada (\$15,000) – declined to accept CGS-D
Feb 2011 **J. Alan George Student Leadership Award**, University of Waterloo, Canada (\$1,000)
Sep 2010 **David R. Cheriton Scholarship**, University of Waterloo, Canada (\$20,000)
May 2010 **University of Waterloo Provost Doctoral Entrance Scholarship for Females** (\$10,000)
May 2008 **University of Waterloo Graduate Entrance Scholarship** (\$3,000)

Honors and Awards

- June 2011 **Software Mining Challenge Award**, PASED summer school
Nov 2009 **Best Paper Award**, CASCON '09
June 2007 **BSc. Summa Cum Laude Honors and highest GPA in the major**
Dec 2006 **Best Computer Science undergraduate group graduation project award.**

Teaching Experience

Instructor

- Winter 2017 **CMPUT 201 Practical Programming Methodology**, University of Alberta, Canada
Fall 2016 **CMPUT 663 Software Product Lines: Implementation, Analysis, and Maintenance**, University of Alberta, Canada
Winter 2015 **Software Product Lines Seminar**, Technische Universität Darmstadt, Germany

Graduate Teaching Assistant

- Winter 2011 **CS 246: Software Abstraction and Specification**, University of Waterloo, Canada
Fall 2010 **CS 446: Software Design and Architecture**, University of Waterloo, Canada
Fall 2009 **CS 446: Software Design and Architecture**, University of Waterloo, Canada
Spring 2009 **CS 246: Software Abstraction and Specification**, University of Waterloo, Canada

- Fall 2008 **CS 446: Software Design and Architecture**, University of Waterloo, Canada
Spring 2008 **CS 134: Principles of Computer Science**, University of Waterloo, Canada
Fall 2007 **CS 321: Object Oriented Programming in C++**, The American University in Cairo, Egypt

Undergraduate Teaching Assistant

- Spring 2007 **CS 316: Programming in Java**, The American University in Cairo, Egypt

Students

Supervised Students (TU Darmstadt)

- PhD **Sebastian Proksch**, *Capturing Enriched Event Streams: Towards a General Platform for In-IDE Experiments* (expected June 2017) – co-supervised with Mira Mezini
- PhD **Sven Amann**, *API Misuse Detection* (expected August 2018) – co-supervised with Mira Mezini
- PhD **Ervina Cergani**, *Machine Learning for Code Recommenders* (expected December 2018) – co-supervised with Mira Mezini
- Masters **Marco Radavelli**, *Simplifying Boolean Constraints from Highly Configurable Software* (Sep. 2016) – co-supervised with Angelo Gargantini (University of Bergamo)
- Masters **Hamza Zulfiqar**, *Detecting Unintended Feature Interactions* (June 2016)
- Masters **Riadh Chtara**, *Feedback Driven Development of Cloud Applications* (Oct. 2015) – external student co-supervised with Anis Charfi (SAP)
- Masters **Irfan Musa**, *Modeling of Cryptographic Components using Clafer* (Sept. 2015)
- Research Assistant **Ram Kammath**, *Implementing a Clafer Configurator for Cryptography Components* (May-Dec. 2015)
- Masters **David Dahlen**, *Identification of High-Quality Answers Containing Code Snippets on Stack Overflow* (July 2015) – co-supervised with Sebastian Proksch and Sven Amman

External Co-Supervised Students

- Masters **Daniel Jonsson**, Chalmers University of Technology. *A Case Study of Interactive Conflict-Resolution Support* (June 2016) – co-supervised with Thorsten Berger
- Masters **Isak Eriksson & Patrick Wallgren**, Chalmers University of Technology. *A Study of Merge-Conflict Resolutions in Open-Source Software* (June 2016) – co-supervised with Thorsten Berger and Julia Rubin

Publications

(Co-)supervised student names are underlined.

Refereed Journal Papers (4 total, 1 invited)

- TSE '17 to appear Guido Salvaneschi, Sebastian Proksch, Sven Amann, **Sarah Nadi**, and Mira Mezini. “On the Positive Effect of Reactive Programming on Software Comprehension: An Empirical Study”. In: *IEEE Transactions on Software Engineering* (2017).
- TSE '15 **Sarah Nadi**, Thorsten Berger, Christian Kästner, and Krzysztof Czarnecki. “Where do Configuration Constraints Stem From? An Extraction Approach and an Empirical Study”. In: *IEEE Transactions on Software Engineering* 41.8 (2015), pp. 820–841.
- JSEP '14 invited **Sarah Nadi** and Richard C. Holt. “The Linux Kernel: A Case Study of Build System Variability”. In: *Journal of Software: Evolution and Process* 26.8 (2014), pp. 730–746. DOI: 10.1002/smr.1595. (Early online version: April 2013).

IJCSNS '08 Sherif G. Aly, **Sarah Nadi**, and Karim Hamdan. "A Java-Based Programming Language Support of Location Management in Pervasive Systems". In: *International Journal of Computer Science and Network Security* 8.6 (2008), pp. 329–336.

Refereed Full Conference Papers (13 total, 1 best paper)

SANER '17 Sebastian Proksch, **Sarah Nadi**, Sven Amann, and Mira Mezini. "Enriching In-IDE Process Information with Fine-grained Source Code History". In: *Proceedings of the 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER '17)*. 2017. (Acceptance Ratio: 34/140 = 24%).

SANER '16 Sven Amann, Sebastian Proksch, **Sarah Nadi**, and Mira Mezini. "A Study of Visual Studio Usage in Practice". In: *Proceedings of the 23rd IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER '16)*. 2016. (Acceptance Ratio: 52/140 = 37%).

ASE '16 Sebastian Proksch, Sven Amann, **Sarah Nadi**, and Mira Mezini. "Evaluating the Evaluations of Code Recommender Systems: A Reality Check". In: *Proceedings of the 31st IEEE/ACM International Conference on Automated Software Engineering (ASE '16)*. 2016. (Acceptance Ratio: 57/298 = 19%).

ICSE '16 **Sarah Nadi**, Stefan Krüger, Mira Mezini, and Eric Bodden. "'Jumping Through Hoops' Why do Java Developers Struggle with Cryptography APIs?" In: *Proceedings of the 38th International Conference on Software Engineering (ICSE '16)*. 2016. (Acceptance Ratio: 101/530 = 19%).

ONWARD! '15 Steven Arzt, **Sarah Nadi**, Karim Ali, Eric Bodden, Sebastian Erdweg, and Mira Mezini. "Towards Secure Integration of Cryptographic Software". In: *Proceedings of the 14th SIGPLAN Symposium on New Ideas in Programming and Reflections on Software at SPLASH (ONWARD '15)*. 2015, pp. 1–13. (Acceptance Ratio: 17/48 = 35%).

ECOOP '15 incl. artifact Flávio Medeiros, Christian Kästner, Márcio Ribeiro, **Sarah Nadi**, and Rohit Gheyi. "The Love/Hate Relationship with the C Preprocessor: An Interview Study". In: *Proceedings of the 29th European Conference on Object-Oriented Programming (ECOOP '15)*. 2015, pp. 495–518. (Acceptance Ratio: 31/136 = 23%).

ICSE '14 **Sarah Nadi**, Thorsten Berger, Christian Kästner, and Krzysztof Czarnecki. "Mining Configuration Constraints: Static Analyses and Empirical Results". In: *Proceedings of the 36th International Conference on Software Engineering (ICSE '14)*. 2014, pp. 140–151. (Acceptance Ratio: 99/495 = 20%).

MSR '13a **Sarah Nadi**, Christian Dietrich, Reinhard Tartler, Richard C. Holt, and Daniel Lohmann. "Linux Variability Anomalies: What Causes them and How do They Get Fixed?" In: *Proceedings of the 10th Working Conference on Mining Software Repositories (MSR '13)*. 2013, pp. 111–120. (Acceptance Ratio: 31/81 = 38%).

MSR '13b Hadi Hemmati, **Sarah Nadi**, Olga Baysal, Oleksii Kononenko, Wei Wang, Reid Holmes, and Michael W. Godfrey. "The MSR Cookbook: Mining a Decade of Research". In: *Proceedings of the 10th Working Conference on Mining Software Repositories (MSR '13)*. 2013, pp. 343–352. (Acceptance Ratio: 31/81 = 38%).

CSMR '12 **Sarah Nadi** and Richard C. Holt. "Mining Kbuild to Detect Variability Anomalies in Linux". In: *Proceedings of the 16th European Conference on Software Maintenance and Reengineering (CSMR '12)*. 2012, pp. 107–116. (Acceptance Ratio: 30/108 = 27%) **Invited for a special issue of JSEP**.

WCRE '11 **Sarah Nadi** and Richard C. Holt. "Make it or Break it: Mining Anomalies from Linux Kbuild". In: *Proceedings of the 18th Working Conference on Reverse Engineering (WCRE '11)*. 2011, pp. 315–324. (Acceptance Ratio: 27/104 = 26%).

- CSMR '10 **Sarah Nadi**, Richard C. Holt, and Serge Mankovskii. "Does the Past Say it All? Using History to Predict Change Sets in a CMDB". In: *Proceedings of the 14th European Conference on Software Maintenance and Reengineering (CSMR '10)*. 2010, pp. 97–106. (Acceptance Ratio: $21/80 = 26\%$).
- CASCON '09 **Sarah Nadi**, Richard C. Holt, Ian Davis, and Serge Mankovskii. "DRACA: Decision Support for Root Cause Analysis and Change Impact Analysis for CMDBs". In: *Proceedings of the 2009 Conference of the Center for Advanced Studies on Collaborative Research (CASCON '09)*. 2009, pp. 1–11. (Acceptance Ratio: $22/88 = 25\%$). **Best Paper Award**.

Refereed Workshop and Short Conference Papers (8 total)

- ICPC '16 Sven Amann, Sebastian Proksch, and **Sarah Nadi**. "FeedBaG: An Interaction Tracker for Visual Studio". In: *Proceedings of the 24th International Conference on Program Comprehension – Tool Track (ICPC '16)*. 2016.
- MSR '16 Sebastian Proksch, Sven Amann, **Sarah Nadi**, and Mira Mezini. "A Dataset of Simplified Syntax Trees for C#". In: *Proceedings of the 13th International Conference on Mining Software Repositories – Data Showcase Track (MSR '16)*. 2016.
- SWAN '16 Ervina Cergani, Sebastian Proksch, **Sarah Nadi**, and Mira Mezini. "Addressing Scalability in API Method Call Analytics". In: *2nd International Workshop on Software Analytics (SWAN '16)*. 2016.
- MSR '16 Sven Amann, **Sarah Nadi**, Hoan A. Nguyen, Tien N. Nguyen, and Mira Mezini. "MUBench: A Benchmark for API-Misuse Detectors". In: *Proceedings of the 13th International Conference on Mining Software Repositories – Data Showcase Track (MSR '16)*. 2016.
- VaMoS '16 **Sarah Nadi** and Stefan Krüger. "Variability Modeling of Cryptographic Components (Clafer Experience Report)". In: *Proceedings of the 10th International Workshop on Variability Modeling of Software-intensive Systems (VaMoS '16)*. 2016.
- SE '15 Thorsten Berger and **Sarah Nadi**. "Variability Models in Large-scale Systems: A Study and a Reverse-engineering Technique". In: *Proceedings of the German Software Engineering Conference (SE '15)*. 2015.
- RELENG '15 Shuirui Zhou, Jafar Al-Kofahi, Tien N. Nguyen, Christian Kästner, and **Sarah Nadi**. "Extracting Configuration Knowledge from Build Files with Symbolic Analysis". In: *Proceedings of the 3rd International Workshop on Release Engineering (RELENG '15)*. 2015.
- ICSE '13 **Sarah Nadi**. "A Study of Variability Spaces in Open Source Software". In: *Proceedings of the 35th International Conference on Software Engineering (ICSE '13), Doctoral Symposium*. 2013, pp. 1353–1356.

Research Demonstrations

- May 2010 **Sarah Nadi**, Richard C. Holt, and Serge Mankovskii. *Change Set Detection*. Las Vegas, USA: CA World, 2010.
- Nov. 2008 Ian Davis and **Sarah Nadi**. *CMDB Visualization and Root Cause Analysis*. Las Vegas, USA: CA World, 2008.

Additional Talks

Invited Talks

- Jan.–April 2016 **Sarah Nadi**. "From the Linux Kernel to Cryptography APIs: Supporting and Leveraging Software Product Lines". University of Alabama, University of Houston, University of Alberta, Concordia University, Rochester Institute of Technology, Iowa State University, University of Colorado Boulder, Colorado State University, George Mason University, McGill University. 2016.
- Nov. 2015 **Sarah Nadi**. "Towards Configurable Security: Bridging the Gap Between Application Developers and Cryptography Experts". University of Alberta. Edmonton, Canada, 2015.

- March 2015 **Sarah Nadi**. “Variability is the Law of Life: Extracting Configuration Constraints and Detecting Variability Anomalies”. McGill University, University of Lethbridge. 2015.
- Dec. 2013 **Sarah Nadi**. “Automatically Extracting Configuration Constraints”. Product Line Engineering Workshop. University of Waterloo, Canada, 2013.

Seminars and Meetings

- Oct. 2016 **Sarah Nadi**. “From the Linux Kernel to Cryptography APIs: Supporting and Leveraging Software Product Lines”. Consortium for Software Engineering Research (CSER 2016). Markham, Canada, 2016.
- May 2015 **Sarah Nadi**. “Variability Modeling of Cryptographic Components”. Feature Oriented Software Development (FOSD) meeting. Traunkirchen, Austria, 2015.
- May 2014 **Sarah Nadi**. “What Lies Beneath Configuration Constraints?” Feature Oriented Software Development (FOSD) meeting, Dagstuhl Seminar 14193. Germany, 2014.
- Nov. 2012 **Sarah Nadi**. “A Study of Variability Spaces in Open Source Software”. Consortium for Software Engineering (CSER 2012). Markham, Canada, 2012.
- Nov. 2009 **Sarah Nadi** and Richard C. Holt. “RACE (Runtime Automated Engineering)”. CA Research Connection Workshop. Markham, Canada, 2009.
- Apr. 2009 **Sarah Nadi** and Richard C. Holt. “Mining Data from a CMDB to Perform Root Cause Analysis”. Consortium for Software Engineering (CSER 2009). Montreal, Canada, 2009.
- Apr. 2009 **Sarah Nadi** and Richard C. Holt. “What is Happening in a Changing World? Temporal Issues in Root Cause Analysis and Change Impact Analysis in a CMDB”. Consortium for Software Engineering (CSER 2009). Montreal, QC, Canada, 2009.

Professional Service

Organizing Committee Member

- WAPI '17 Co-organizer of the 1st International Workshop on API Usage and Evolution, co-located with ICSE '17
- SANER '17 Poster Session Co-Chair at the 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering
- CSER '17 Organizing Co-Chair of the Spring 2017 Consortium of Software Engineering Research (CSER) workshop

Program Committee Member

- OOPSLA '17 ACM/SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications
- ICSME '17 33rd IEEE International Conference on Software Maintenance and Evolution
- MSR '17 14th International Conference on Mining Software Repositories
- SPLC '17 21th International Systems and Software Product Line Conference
- GPCE '17 ACM/SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications
- ICPC '17 25th International Conference on Program Comprehension. The International Conference on Program Comprehension – Tool Demo Track
- SANER '17 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering – Early Research Achievements Track
- VaMoS '17 11th International Workshop on Variability Modelling of Software-intensive Systems
- SWAN '16 2nd International Workshop on Software Analytics
- MSR '16 13th International Conference on Mining Software Repositories – Mining Challenge
- CSED '16 1st International Workshop on Continuous Software Evolution and Delivery

MODULARITY '16 15th International Conference on Modularity – Visions Track
RELENG '15 3rd International Workshop on Release Engineering
RELENG '14 2nd International Workshop on Release Engineering
MSR '14 11th Working Conference on Mining Software Repositories - Mining Challenge
MUD '13 3rd Workshop on Mining Unstructured Data
RELENG '13 1st International Workshop on Release Engineering

Reviewer

IEEE SW IEEE Software (2016)
TSE IEEE Transactions on Software Engineering (2016)
CompJournal The Computer Journal (2015)
JSS Journal of Systems and Software (2015)
IEEE SWSI IEEE Software Special Issue on Release Engineering (2014)

Editorial Team Member

IEEE S/W IEEE Software Magazine Blog (Associate Editor)

Additional Reviewer

FSE '15 10th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering
ICSE '15 37th International Conference on Software Engineering
SANER '15 22nd International Conference on Software Analysis, Evolution, and Reengineering - Early Research Achievements
VAMOS '14 8th International Workshop on Variability Modeling of Software-intensive Systems
MSR '12 9th Working Conference on Mining Software Repositories

Student Volunteer

ICSE '14 36th International Conference on Software Engineering

Software

FARCE Extracting configuration constraints from C code with `#ifdef` variability
<https://bitbucket.org/snadi/farce>
Makex Linux Kbuild configuration constraint extractor
<http://bitbucket.org/snadi/makex>