Saleh M.A. Alnaeli, Ph.D.

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Education

Ph.D. in Computer Science, Kent State University, Kent, Ohio, USA	Aug. 2009 – May 2015
M.S. in Computer science[*] and B.S. in Computer Science[&];	Sep. 1995-June 1999[*], Feb 2004-July 2006[&]

Prior Academic Experience

- *Assistant Professor.* Dept. of Computer Science, University of Wisconsin-Colleges — 08/2015 – 06/2018
- *Graduate Teaching Assistant, Dept.* of Computer Science, Kent State University, Ohio — 08/2012 – 05/2015
- *Graduate Research Assistant, SDML Lab.,* Kent State University, Ohio — 06/2012 – 05/2015
- *Lecturer,* Department of Computer Science, University of Zawia, Libya — 09/2006 – 06/2008
- *Teaching Assistant, Dept.* of Computer Science, University of Zawia, Libya — 09/2000 –07/2003

Industry Experience

- IT Consultant & *Software Engineer*, Libyan Embassy, Prague, Czech Republic — 01/2005 -5/2006
- *College of Applied Science, Registration system Architect. University of Zawia, Libya* — 11/2006 - 8/2008
- *Software Architect and Engineer, Scientific* Center for Computer Services (SCCS), Libya — 11/2000 - 06/2003

Professional Affiliations

- Institute of Electrical and Electronics Engineers (**IEEE**), Professional Member
- International Society for Computers and their Applications (**ISCA**), Professional Member
- Association for Computing Machinery (**ACM**), Professional Member
- ACM Special Interest Group on Computer Science Education (**SIGCSE**)

Research Interests

software security; source code vulnerabilities; software parallelization; Software engineering and evolution; mining software repositories; empirical software engineering; Internet of Things;

Research Statement

My research program focuses on the development and construction of methods and tools for the analysis of large-scale software systems. These tools are applied to support and improve a programmer's ability to understand, develop, and evolve software systems. Their application to the empirical analysis of existing software provides valuable insight into current development trends and helps to design emergent techniques that work to utilize underlying hardware resources more efficiently. Uncovered patterns, trends, and findings are also used to improve effectiveness of software maintenance and to support the future evolution of software systems. Current investigations include:

- *Source Code Parallelization and Transformation.* This research involves assessing the potential of how well a software system, written for a sequential hardware, can potentially take advantage of multi-core platforms. Additionally, this work involves methods to automatically transform parts of the software so that it can be parallelized and unitize the underlying parallel hardware more effectively. This includes static analysis of existing large-scale systems along with transformation methods to automate and/or semi-automate the adaptive maintenance task of parallelizing source code. This work is unique in that it is at the source code level rather than compiler level optimizations. This better facilitates long-term maintenance and optimization of the software systems under consideration. The tools developed for the analysis of large-scale software repositories is applied to study the for-loop parallelizability and its inhibitors in existing open source systems. Results of the studies are incorporated in other methods to propose better recommendations to developers for creating better refactoring plans or optimizations for parallelizing their software systems.

- *Mining Software Repositories (**Security and Quality Context**).* This research includes the analysis of different versions of a system's history to uncover evolutionary patterns related to different maintenance, security, and quality evaluation tasks. The work involves using some of the data mining techniques and other methods used to analyze the source code statically. Many efforts to develop static analysis tools to support the understanding of how large-scale software systems evolve over time are being conducted. The designed tools and techniques have been applied to different problems such as: function side effects detection and elimination; source code security and vulnerability; and software quality and maintainability. Findings can be used to tell if developers are putting effort towards improving the security and quality of their systems. Recommendations are provided accordingly so that developers are educated in good programming practices and secure programming standards to help them improve the quality, robustness, maintainability, parallelizability, security, and evolution of their systems.

- *Internet of Things.* This research focuses on various aspects of IoT. Currently, small-scale projects and applications are being developed. The work involves the development of workshops and frameworks for advancing STEM literacy in K-12 schools. The goal of my research is to enhance student understanding and motivation, and appreciation of science, technology and engineering disciplines via enjoyable projects. Multiple algorithms and projects are being developed including educational smart drones, indoor GPS using Bluetooth devices (e.g., iBeacon), small-scale clusters, and Portable Educational Cosmic Detector.

I believe in creating opportunities to both graduate and undergraduate students, across all disciplines, to engage in and facilitate student participation, and to promote research in a way that works with their background and interest. I am accomplishing this by mentoring, engaging, preparing, and involving undergraduate students in research at early stages, and exposing them to national and international research communities and protocols. I believe that interested students should always be encouraged to make important connections in the research community and gain skills to prepare them for future research.

Publications
*Note: Student authors are **underlined & in Bold**.*

✓ ***Conference Proceedings (International and Regional)***

1. **Jens Carter,** Saleh Alnaeli, and Warren Vaz, "Empirically Examining the Quality of Source Code in Engineering Software Systems" in the IEEE International Conference on Electro Information Technology (**IEEE/EIT 2018**)., Rochester, MI 48309, USA, 2018.

2. **Jens Carter**, Saleh Alnaeli, Warren Vaz, and David Juckem, "A portable cosmic ray detector for engineering, IoT, and science research" in the IEEE International Conference on Electro Information Technology (**IEEE/EIT 18**)., Oakland University, Rochester, Michigan, USA, 2018.

3. **Zachary M. Blasczyk**, **Yanting Liang**, **Keith Ecker**, **Melissa Sarnowski**, Saleh M. Alnaeli and Mark Hall, "On the Prevalence of Indirect Function Calls in Middleware Software Systems", in 16th Annual *IEEE International Conference on Electro Information Technology (IEEE/EIT)*, 2017, Lincoln, Nebraska, USA, 2017.

4. Saleh Alnaeli, **Amanda AliTaha,** and **Tyler Timm**, "On the prevalence of function side effects in general purpose open source software systems," in *2016 **IEEE** 14th International Conference on Software Engineering Research, Management and Applications (**IEEE**/SERA)*, 2016, pp. 141-148. Towson, Maryland, USA

5. Saleh M. Alnaeli, **Melissa Sarnowski, Md Sayedul Aman**, Ahmed Abdelgawad, and Kumar Yelamarthi "On the Evolution of Mobile Computing Software Systems and C/C++ Vulnerable Code", in *the 7th **IEEE** Annual Ubiquitous Computing, Electronics & Mobile Communication Conference* (**IEEE**/UEMCON 2016), New York City, USA, 2016.

6. Saleh Alnaeli, **Amanda AliTaha**, and **Sam Binder**, "Middleware and multicore architecture: Challenges and potential enhancements from software engineering perspective," in *2016 **IEEE** International Conference on Electro Information Technology (**IEEE**/EIT)*, 2016, pp. 0700-0706., Grand Forks, North Dakota, USA, 2016.

7. **Melissa Sarnowski, Derrek Larson**, Saleh M. Alnaeli and Mohamed K. Sarrab, "*A Study on the Usage of Unsafe Functions in gcc Compared to Mobile Software Systems*", in 16th Annual ***IEEE** International Conference on Electro Information Technology (**IEEE**/EIT)*, 2017, Lincoln, Nebraska, USA, 2017.

8. Saleh M. Alnaeli**, Md Sayedul Aman**, Ahmed Abdelgawad, and Kumar Yelamarthi, *The International **IEEE** World Forum on Internet of Things*, 12-14 DECEMBER 2016 // RESTON, VA, USA, "Parallelization in Software Systems Used in Wireless Sensor Networks and Internet of Things"

9. Saleh M.Alnaeli, Alali, A., Maletic, J. I., (2012), "Empirically Examining the Parallelizability of Open Source Software Systems", in the Proceedings of *the **IEEE** International Working Conference on Reverse Engineering (**IEEE**/WCRE'12)*, Kingston, Ontario, Canada, October 15 – 18, pp. 377-386.

10. Saleh M. Alnaeli, **Melissa Sarnowski, Md Sayedul Aman**, Ahmed Abdelgawad, and Kumar Yelamarthi, *The International **IEEE** World Forum on Internet of Things*, 12-14 DECEMBER 2016 // RESTON, VA, USA, "Vulnerable C/C++ Code Usage in IoT Software Systems"

11. **Melissa Sarnowski, Keith Ecker, Zachary Blasczyk, Derrek Larson,** Saleh M. Alnaeli, and Mark Hall, "On the Use of Vulnerable Code in Chromium, the Base of Google Chrome: A Case Study"; in *The Midwest Instruction and Computing Symposium (MICS),* La Crosse (UW-L) in La Crosse, Wisconsin, 2017.

12. Mohamed Sarrab, Zuhoor Al-Khanjari, Saleh Alnaeli, and Hadj Bourdoucen, "*Human Factors Considerations in Mobile Learning Management Systems*", in 2017 10th International Conference on Computer and Electrical Engineering (ICCEE 2017), Edmonton, Canada.

13. **Melissa Sarnowski** and Saleh M. Alnaeli, "Prevalence of Vulnerable Code Among Scientific Software Systems", in *the 26th International Conference on Software Engineering and Data Engineering (SEDE 2017)*, San Diego, California, USA., USA, 2016.

14. **Jens K. Carter**, Warren S. Vaz, and Saleh M. Alnaeli, "Study of the Vulnerabilities of Open Source Engineering Software Packages: OpenFOAM 2011- 2017 ", the Wisconsin Space Conference (WSGC 2017) Conference, La Crosse Wisconsin, August 2017

15. Saleh M. Alnaeli, **Melissa Sarnowski, Calvin Meier**, and Mark Hall "Empirically Identifying the Challenges in Parallelizing Scientific Software ", in *the 25th International Conference on Software Engineering and Data Engineering (SEDE 2016)*, Denver, Colorado, USA, 2016.

16. Saleh Alnaeli, and **Melissa Sarnowski** " Examining the Prevalence and The Historical Trends of Indirect Function Calls in Open Source Systems: A Case Study, gcc 2001-2011" in *The Midwest Instruction and Computing Symposium (MICS)*, Cedar Falls, Iowa, USA, 2016.

✓ ***Book Chapters and Journals***

17. Saleh. Alnaeli, J. I. Maletic, and M. L. Collard, "An empirical examination of the prevalence of inhibitors to the parallelizability of open source software systems," *Empirical Software Engineering Journal*, vol. 21, pp. 1272-1301, 2016.

18. M. Sarrab, M. Elbasir, and Saleh Alnaeli, "Towards a quality model of technical aspects for mobile learning services," *Journal of Computers in Human Behavior.*, vol. 55, pp. 100-112, 2016.

19. Saleh M. Alnaeli, **Melissa M. Sarnowski**[1], **Calvin Meier**, and Mark Hall, " Evolution of the Multicore Adaptability of Scientific Software Systems", *International Journal of Computers and Their Applications*, *IJCA Journal Vol 24-1, pp, 40-49, Mar 2017*.

20. Saleh M. Alnaeli, **Melissa Sarnowski**, and **Zachary Blasczyk**, "On the Usage of Recursive Function Calls In C/C++ General Purpose Software Systems", *Journal of Computing Sciences in Colleges*, 33, 1, October 2017.

21. Saleh M. Alnaeli, **Melissa Sarnowski**, **Md Sayedul Aman**, Ahmed Abdelgawad, and Kumar Yelamarthi, " Source Code Vulnerabilities in IoT Software Systems", *Advances in Science, Technology and Engineering Systems Journal*, 2017.

22. Saleh Alnaeli, **Amanda Taha,** and **Tyler Timm**, "On the Prevalence of Function Side Effects in General Purpose Open Source Software Systems," in *Journal of Computer and Information Science*, R. Lee, Ed., ed Cham: Springer International Publishing, 2016, pp. 149-166. (Book Chapter).

23. **Melissa Sarnowski**, **Calvin Meier**, Saleh M. Alnaeli, Mark Hall, "On the parallelizability of scientific software systems", *Journal of Computing Sciences in Colleges*, Volume 32 Issue 1, October 2016, Pages 79-80, work in progress.

✓ ***Thesis and Desertation***

24. Saleh M. Alnaeli, "*Empirically Examining the Roadblocks to the Automatic Parallelization and Analysis of Open Source Software Systems*", Ph.D. Dissertation, Department of Computer Science, Kent State University, Kent, Ohio, USA, 2015.

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[1] Names of student authors are shown in **bold and underline**.

Invited Talks and Presentations (Selected 2016-2018)

- **The IEEE Northeastern Wisconsin** meeting in Wisconsin. "Automatic parallelization and Multi-core programming", November 3rd, 2016, (with my students, **Yanting Liang,** and **Melissa Sarnowski**)
- Community Outreach and Interdisciplinary Research Workshop, "Practical Tips on How to Efficiently and Effectively Meet Your Students, Institution, Discipline, and Community Expectations", The Sabratah University, Libya, 2017
- *The 16th Annual UW System Symposium for Undergraduate Research and Creative Activity,* University of Wisconsin–Stevens Point, April 21, 2017, Stevens Point, Wisconsin, USA. (With my student, **Keith Ecker**)
- Service and Undergraduate Research Workshop, "How to meet their expectations? Students, Department, Institution, Discipline, and Community", The Sabratah University, Libya, 2017
- The International IEEE World Forum on Internet of Things, DECEMBER 13th, 2016 // RESTON, VA, USA.
- The ACM/SIGCSE Consortium for Computing Science in Colleges (CCSC:MW 2016), Taylor University, Upland, Indiana., USA, 2016. (with my students, **Yanting Liang, Melissa Sarnowski,** and **Zachary Blasczyk**)

Committees and Services (Selected)

- 2018 CCSC:MW Conference Committee, Authors. September 2018, Ball State University, Indiana.
- Works-In-Progress Chair and Authors Co-Chair, Conference Committee. The 24th Consortium for Computing Sciences and Colleges (CCSC:MW 2017), Calvin College, in Grand Rapids, Michigan, USA
- Session Chair, Software Engineering. The 26th International Conference on Software Engineering and Data Engineering (SEDE-2017), October 2-4, 2016, San Diego, California.
- Session Chair, Software Engineering II. The 25th International Conference on Software Engineering and Data Engineering (SEDE-2016), September 27, 2016, Colorado, Denver, USA.
- Coaching the University of Wisconsin-Colleges ACM Programming teams. October 28th, Madison, Wisconsin.
- Staffing and Prioritization Committee, University of Wisconsin-Fox Valley
- Cultural Engagement Committee, University of Wisconsin-Fox Valley
- Academic advisor for computer science students, University of Wisconsin-Fox Valley
- Evaluation Committee, CSEPA Department, University of Wisconsin-Colleges
- Professional Development Committee, CSEPA Department, University of Wisconsin-Colleges
- Computer science Committee, University of Wisconsin-Colleges
- Computer science representative, University of Wisconsin-Fox Valley
- NEW ERA IT Task Force, Steering and Technical Committee, NE Wisconsin
- Judge for the ACM North Central North America Regional Programming Contest, 2015 and 2016
- Coaching Programming Teams (ACM/IBM, CCSC, and MICS), University of Wisconsin-Fox Valley and Colleagues.
- Principal Advisor, Computer Club, University of Wisconsin-Fox Valley

- Principal Advisor of the Computer and Engineering Research Group (UWFOXCS), University of Wisconsin-Fox Valley
- Computer science Committee, University of Zawia, Libya. 9/2006 – 08/2008
- Curriculum and Assessment Committees, University of Zawia, Libya. 9/2006 – 08/2008
- Appointments Committee, University of Zawia, Libya. 9/2006 – 08/2008
- Advisor for Computer Science Undergraduate Students, University of Zawia, Libya. 9/2006 – 08/2008
- Registration System and IT Committee, College of Applied Science, University of Zawia, Libya. 9/2006 – 08/2008

Training and Professional Development Activities (2015-2017)

- Faculty Development Institute Workshop, January 19, 2017, the Center for the Advancement of Teaching and Learning, University of Wisconsin-Green Bay, WI, USA.
- Project Management (PM) & Design for Six Sigma (DFSS), IEEE/EIT 2017, University of Nebraska, Lincoln, NE, USA, May 2017.
- University of Wisconsin Colleges Colloquium, May 24, 2017, UW-Fox Valley, Menasha, WI, USA.
- Faculty College 2016" Professional & Instructional Development, May 31-June 3, 2016, UW-Richland, Richland Center, WI. (Organized by Office of Professional and Instructional Development (OPID))
- "Incorporating Active Learning into University Courses – Practical Tips and Techniques", Workshop, IEEE/EIT 2016, University of North Dakota, Grand Forks, North Dakota, USA, 2016
- Opening Workshop for New STEM Educators, Inclusive Teaching Methods, Great Wolf Lodge
- Wisconsin Dells, Wisconsin, USA, 2016
- NEW ERA Faculty Dialogue Group Professional Development Workshop, Fox Valley Technical College, Appleton, Wisconsin, USA, October 30, 2015
- Opening Workshop for New STEM Educators, "Inclusive Teaching Methods ", Wisconsin Dells, Wisconsin, USA, October 1-2, 2015
- "Introduction to Design for 6 Sigma" Workshop, IEEE/EIT 2016, North Dakota, USA, 2016.

Awards, Funding, and Other Support

- Best Paper Award Finalist (Second Place), 25th International Conference on Software Engineering and Data Engineering (SEDE 2016), Denver, Colorado, USA.
- Arthur M. Kaplan Award for the 2016-2017 academic year. For outstanding innovation in instruction and service to students.
- Recipient of 2017 UW Colleges Summer Research Grant.
- Best Undergraduate Paper, 3rd Place. **My students** won the award under my supervision. The Midwest Instruction and Computing Symposium (MICS 2017), La Crosse, Wisconsin, USA.
- Nominated for the Faculty of the Year award 2016-2017. University of Wisconsin-Fox Valley.

- Nominated by the Computer Science, Engineering, Physics, and Astronomy for the Chancellor's Award for Excellence in Teaching 2017.
- Recipient of 2016 UW Colleges Summer Research Grant. Awarded (4000$).
- Awarded Ph.D.60-month scholarship (full coverage). 2008-2014.
- Awarded MSc 36-Month Scholarship (full coverage), 2003-2006.

Teaching Interests

Computer Security; Secure Programming; Parallel Programming; Software Engineering & Evolution; Data Structures and Algorithms; Introduction to Programming and Problem Solving (C/C++, Java); Web Design and Programming; Advanced Programming (C/C++, Java, Python, C#, VB.Net.); Operating Systems; Undergraduate Research Seminar;

Teaching Experience

Course Title	Term Taught	Institution
Computer Science II. CS-145	Fall 2018	University of Wisconsin-Stout
Operating Systems. CS-442		
Computer Science I. CS-144		
Computer Science I: Object-Oriented Programming in JAVA	Fall 2015 to Fall 2018	University of Wisconsin-Colleges (Face to Face and via a variety of distance education modes)
Computer Science II: Objects and Data Abstraction		
Computer Science III: Algorithms and Data Structures		
Problem Solving and Programming Techniques in C++		
Introduction to Programming, VB.NET		
Software Evolution, Independent Study in Computer Science		
Web Page Development		
Computer Science I, Lab. Programming & Problem-Solving in C++.	Fall 2012 to Spring 2015	Kent State University
Database Management Systems	Fall 2006 to Spring 2008	University of Zawia
Internet and Web design		
Programming with Delphi		
Systems Programming		
Digital Systems and Electrons		
Microprocessor and Assembly Language		
Programming Basics with Turbo Pascal, Lab	Spring 2000 to Spring 2003	University of Zawia
Programming and Problem-Solving in C, Lab		
Computer Applications (MS-DOS, Windows OS, and MS-Office		
Systems Programming (Assembly and C), Lab		
Introduction to Assembly Language		
Programming Basics and Pascal Language	Fall 2000 to Spring 2003 & Fall 2007 to Spring 2008	*Adjunct faculty,* Computer Science Department, Regdalin Institute of Technology
Systems Programming		
Advanced Visual Basic and ADO.Net Technology		
Computer Applications (Window OS, MS-Word, MS- Excel, MS-Power Point and the Internet Technology)	Spring 2007 to Spring 2008	Adjunct faculty, Higher Institute of Health Care, Aljmail, Libya