Danielle Stewart

CV

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Education

2016–present   **Ph.D. Candidate of Computer Science**, *University of Minnesota*, Minneapolis, MN, USA, Critical Systems Research Group.
Advisors: Dr. M. Heimdahl and Dr. M. W. Whalen

2013–2015   **Master in Mathematics**, *University of Minnesota, Duluth*, Duluth, MN, USA, Thesis: Even Harmonious Labelings of Disconnected Graphs.
Advisor: Dr. J. Gallian

2011–2013   **Bachelor in Mathematics**, *University of Minnesota, Duluth*, Duluth, MN, USA, Thesis: Generation of Pseudoprimes.
Advisor: Dr. J. Greene

2008–2011   **Associate of Arts**, *Lake Superior College*, Duluth, MN, USA.

1998–2002   **High School Diploma**, *Bemidji High School (Homeschooled)*, Bemidji, MN, USA.

Research Interests

Summary of Interests: Safety assessment of critical systems; model based safety analysis; formal verification methods; leveraging SAT-based model checkers to provide safety assessment artifacts.

Details: My research in safety assessment of critical systems has sparked several specific interests. Many of the difficulties of tranditional safety assessment can be addressed by the use of model-based assessment techniques. Such techniques require the unification of system engineering and safety engineering. One of my long term goals is to make meaningful contributions to this merger. More specifically, I have a strong interest in applying formal methods and verification to safety analysis. Formal verification has brought powerful techniques into the modeling world; these methods can be leveraged to provide valuable information about fault models and promise to be a very useful approach to safety assessment.Furthermore, I hope to be able to gather information about the architecture of a model from the model checker and transform that information into usable artifacts that show fault critical information about organization and communications within the model.

Work Experience

Jan 2020 – present   **Co-op Researcher**, *Collins Aerospace, Trusted Systems - Enterprise Engineering*.
Research in Safety Analysis of Critical Systems and Model-Based Safety Engineering/Analysis

July 2018 – May 2019   **Visiting Researcher**, *German Aerospace Center (DLR)*.
Systems and safety engineering for large scale unmanned aircraft

Dec. 2017– present   **Formal Methods Consulting**, *Stottler Henke Associates, Inc.*
Applied compositional analysis verification using AGREE to a critical systems aviation project.

Sept. 2017– June 2018	**Course Development**, *Coursera: Software Engineering*. Assisted in course organization, exams, quizzes, and other course development activities.
Dec. 2016– present	**Research Assistant**, *Critical Systems Group, University of Minnesota*. Research in safety analysis for the NASA AMASE project.
Aug. 2015– May. 2016	**Instructor**, *University of Minnesota, Duluth: Dept. of Maths*. Instructor for Differential Equations, College Algebra, and Algebra I-II.
Aug. 2015– May. 2016	**Teaching Assistant**, *University of Minnesota, Duluth: Dept. of Maths*. Teaching assistant for Elementary Real Analysis, Calculus II, and Approximation & Quadrature.

Publications

[1] Danielle Stewart, Jing (Janet) Liu, Michael Whalen, Darren Cofer, and Michael Peterson. Safety Annex for Architecture Analysis Design and Analysis Language. In *ERTS 2020: 10th European Conference Embedded Real Time Systems*, Jan 2020.

[2] Danielle Stewart, Jing (Janet) Liu, Mats Heimdahl, Michael Whalen, Darren Cofer, and Michael Peterson. Architectural modeling and analysis for safety engineering (AMASE), NASA final report, Sept 2019.

[3] Danielle Stewart, Michael W Whalen, Darren Cofer, and Mats Heimdahl. Architecture modeling and analysis for safety engineering. In *IMBSA2017: 5th International Symposium on Model-Based Safety and Assessment*, 2017.

[4] Joseph A. Gallian and Danielle Stewart. Even harmonious labelings of disjoint graphs with a small component. *AKCE International Journal of Graphs and Combinatorics*, 12(2):204 – 215, 2015.

[5] Joseph A. Gallian and Danielle Stewart. Properly even harmonious labelings of disconnected graphs. *AKCE International Journal of Graphs and Combinatorics*, 12(2):193 – 203, 2015.

[6] Joseph Gallian and Danielle Stewart. Properly even harmonious labelings of disjoint unions with even sequential graphs. *Journal of Graph Labelings*, 1(1), 2015.

Presentations

- Safety Annex for AADL, ERTS 2020, January 2020, Toulouse, France
- Critical Systems Research, Code Freeze, January 2020, Minneapolis, MN, USA
- The Safety Annex and the Safety Assessment Process, Adventium Labs, October 2019, Minneapolis, MN, USA
- AMASE Project Final Year-end Presentation 2019, September, NASA Langley, USA
- The Safety Annex for AADL, German Aerospace Center (DLR), November 2018, Braunschweig, Germany
- AMASE Project Second Year-end Presentation 2018, September, NASA Langley, USA
- Critical Systems Research, Code Freeze, January 2018, Minneapolis, MN, USA
- AMASE Project First Year-end Presentation 2017, September, NASA Langley, USA
- Architectural Modeling and Analysis for Safety Engineering, IMBSA 2017, Trento, Italy
- Properly Even Harmonious Graphs, IWOCA 2014, October, Duluth, MN, USA

Honors and Awards

2016	Awarded College of Science and Engineering Graduate Fellowship, University of Minnesota
2015	SCSE Outstanding Teaching Assistant Award, University of Minnesota, Duluth
2016	UMD Mathematics Departmental Teaching Assistant Award, University of Minnesota, Duluth
2014	Summer Research Fellowship, Dept. of Mathematics, University of Minnesota, Duluth
2013	Undergraduate Research Opportunities Grant, University of Minnesota, Duluth
2013	Duane E. Anderson Memorial Fellowship, University of Minnesota, Duluth
2012–2014	Pi Mu Epsilon Honor Society, University of Minnesota, Duluth: Dept. of Mathematics
2011–2012	Martha Lahti Scholarship, University of Minnesota, Duluth
2010	Student of the Year Award, Lake Superior College, Duluth, MN
2009	Student of the Year, Biology Dept. Award, Lake Superior College, Duluth, MN

Professional Activities

Peer Reviewer

- FM 2018: International Symposium on Formal Methods
- NFM 2018: 10th NASA Formal Methods Symposium
- ASE 2017: 32nd IEEE/ACM International Conference on Automated Software Engineering
- SETTA 2017: 3rd Symposium on Dependable Software Engineering
- MEMOCODE 2017: 15th International Conference on Formal Methods and Models for System Design

Service

- Graduate Council Student Representative, University of Minnesota, Duluth: 2014-2015

Selected Course Projects

- Sequent Calculus Proof Checker (OCaml)
  - Topics in Computation and Deduction, 2016
- Device Driver for Linux OS
  - Operating Systems Course, 2016
- Phishing Detection Using Natural Language Processing Techniques
  - Computer Security Course, 2016
- Lexer, Parser, Evaluator, and Type-Checker for Imperative Language in OCaml
  - Programming Languages Course, 2014

Computer skills

Programming Languages	Java, Perl, OCaml, Python, C++, LaTex, Prolog, MIPS Assembly

Modeling Languages	AADL, Lustre
Tools	AGREE, Safety Annex, Eclipse Environment, Osate Environment

References

- Mats Heimdahl
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    - Tel: +1-612-625-2068
- Michael W. Whalen
  - Department of Computer Sience & Engineering, University of Minnesota, MN, USA.
    - Email: whalen@cs.umn.edu
    - Tel: +1-612-624-5130
- Joseph Gallian
  - Deptartment of Mathematics, University of Minnesota Duluth, MN, USA.
    - Email: jgallian@d.umn.edu
    - Tel: +1 (218) 726 7576