NFM 2016

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The 8th NASA Formal Methods Symposium (NFM 2016)

McNamara Alumni Center | University of Minnesota | 200 Oak Street S.E., Minneapolis, MN 55455

Theme of the Symposium

The widespread use and increasing complexity of mission-critical and safety-critical systems at NASA and the aerospace industry requires advanced techniques that address their specification, design, verification, validation, and certification requirements. The NASA Formal Methods Symposium is a forum to foster collaboration between theoreticians and practitioners from NASA, academia, and the industry, with the goal of identifying challenges and providing solutions towards achieving assurance for such critical systems.

New developments and emerging applications like autonomous on-board software for Unmanned Aerial Systems (UAS), UAS Traffic Management (UTM), advanced separation assurance algorithms for aircraft, and the need for system-wide fault detection, diagnosis, and prognostics provide new challenges for system specification, development, and verification approaches. Similar challenges need to be addressed during development and deployment of on-board software for spacecraft ranging from small and inexpensive CubeSat systems to manned spacecraft like Orion, as well as for ground systems.

The focus of the symposium will be on formal techniques and other approaches for software assurance, their theory, current capabilities and limitations, as well as their potential application to aerospace, robotics, and other NASA-relevant safety-critical systems during all stages of the software life-cycle.

Topics of interest include but are not limited to

- Model checking
- Theorem proving
- SAT and SMT solving
- Symbolic execution
- Static analysis
- Model-based development
- Runtime verification

- Software and system testing
- Safety assurance
- Fault tolerance
- Compositional verification
- Security and intrusion detection
- Design for verification and correct-by-design techniques
- Techniques for scaling formal methods
- Applications of formal methods in the development of:
    - autonomous systems
    - safety-critical artificial intelligence systems
    - cyber-physical, embedded, and hybrid systems
    - fault-detection, diagnostics, and prognostics systems
- Use of formal methods in:
    - assurance cases
    - human-machine interaction analysis
    - requirements generation, specification, and validation
    - automated testing and verification

Location

The symposium will take place at McNamara Alumni Center, University of Minnesota.

Registration is required but is free of charge.

Organizing Committee

- Michael Lowry, NASA Ames Research Center, USA (NASA Liaison)
- Johann Schumann, SGT, Inc./NASA Ames Research Center, USA (General Chair)
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- Sanjai Rayadurgam, University of Minnesota, USA (PC Chair)
- Mike Whalen, University of Minnesota, USA (Financial Chair)
- Mats Heimdahl, University of Minnesota, USA (Local Arrangements Chair)

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- Rajeev Joshi, NASA Jet Propulsion Laboratory, USA
- Dejan Jovanovic, SRI International, USA
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- Charles Pecheur, Universite catholique de Louvain, Belgium
- Lee Pike, Galois, Inc., USA
- Andreas Podelski, University of Freiburg, Germany
- Pavithra Prabhakar, Kansas State University, USA
- Venkatesh Prasad Ranganath, Kansas State University, USA
- Franco Raimondi, Middlesex University, UK
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- Virginie Wiels, ONERA / DTIM, France
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Steering Committee

- Julia Badger, NASA Johnson Space Center, USA
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- Johann Schumann, SGT, Inc./NASA Ames Research Center, USA

Location: Minneapolis, MN
URL: http://crisys.cs.umn.edu/nfm2016

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