The Seventeenth Annual

High Confidence Software and Systems Conference

Call for Presentations

INTRODUCTION

The seventeenth annual HCSS Conference will be held May 8-11, 2017 at the Historic Inns of Annapolis in Annapolis, Maryland. You are invited to submit a proposal to present a talk at this year's conference. As in previous years, you are also invited to participate in a poster session. See details below for more information.

BACKGROUND

Our security, safety, privacy, and well-being are all increasingly dependent upon the correctness, reliability, resilience, and integrity of software-intensive systems of all kinds, including cyber-physical systems (CPS). These systems must be capable of interacting correctly, safely, and securely with humans, with diverse other systems, and with the physical world even while they operate in changing, difficult-to-predict, and possibly malicious environments. New foundations in science, technology, and methodology continue to be needed. Moreover, these methods and tools have to be transitioned into mainstream use to build and assure these systems--and to move towards more effective models for acceptance and certification.

CONFERENCE SCOPE, GOALS, AND VISION

The High Confidence Software and Systems (HCSS) Conference, now in its second decade, draws together researchers, practitioners, and management leaders from government, universities, and industry. The conference provides a forum for dialogue centered upon the development of scientific foundations for the assured engineering of software-intensive complex computing systems and the transition of science into practice. The technical emphasis of the HCSS conference is on mathematically-based tools and techniques, scientific foundations supporting evidence creation, systems assurance, and security. The HCSS vision is one of engaging and growing a community--including researchers and skilled practitioners--that is focused around the creation of dependable systems that are capable, efficient, and responsive; that can work in dangerous or
inaccessible environments; that can support large-scale, distributed coordination; that augment human capabilities; that can advance the mission of national security; and that enhance quality of life, safety, and security.

CONFERENCE THEMES

We invite submissions on any topic related to high-confidence software and systems that align with the conference scope and goals listed above. In addition, the 2017 HCSS Conference will highlight the following themes:

* **Privacy**: Personal privacy is a core American value, and there are diverse legal frameworks that are designed to protect personal information for individuals. These include privacy policies, breach disclosure requirements, and liability exposures. System requirements therefore increasingly include provisions related to the protection of privacy. These requirements are often conflated with security requirements, in part as a consequence of the difficulty of defining and reasoning about semantic concepts related to privacy. Indeed, modern attempts to protect privacy have often focused only on protecting information based on its type, origin, or mechanism of production. This has resulted in actionable policies, particularly for health data, financial services and consumer data, and education data. But more progress is needed to create clear semantic frameworks for modeling and reasoning about privacy and personal data. This topic is focused on the pursuit of scientifically-grounded technology for privacy. What models are useful to express privacy policies, and how can we reason about policies -- what is the meta-theory of privacy? What static and dynamic mechanisms can be employed to assure that implementations adhere to privacy policies? Example mechanisms could include (but are not limited to) tagging and metadata, formal policy models and reasoning, and models related to risks and disclosure impact.

* **Assurance for AI**: With the emergence of big data analysis, AI and machine learning systems play an increasingly critical role in decision making and scientific inquiry. Unfortunately, assurance judgments for such systems are difficult to make. Many modern machine learning and AI-based algorithms provide little or no evidence to support their conclusions, they are heavily influenced by the choice of training data, and new data causes results to change over time. This topic is focused on the pursuit of new techniques for assuring AI-based systems. What does correctness mean for machine learning systems? What are appropriate forms of specification? How do existing assurance techniques apply? What are engineering techniques for developing "assurable" AI-based systems? What new techniques and research directions should be pursued?

* **Industrialization of Formal Methods**: Our dependence on computer systems continues to increase, and systems with requirements for high levels of assurance are rapidly emerging into the mainstream. These systems include autonomous vehicles, diverse devices on the internet of things, and pervasive electronic commerce. Correctness requirements encompass security, safety, privacy, availability, and other quality attributes. Confident assurance judgments require a diversity of technical methods including mathematically-based formal approaches,
and all of these methods must be improved to support scale, composition, and usability by engineers and evaluators. How can high-assurance approaches be better integrated into the engineering and evaluation processes for a broader range of systems -- and in other ways be made more routine? This topic is focused on industrialization and assembly line application of formal techniques. How do formal methods scale to the system-level? What new tools and techniques are promising and should be pursued? What scalability opportunities arise with new advances in computational models, hardware, and software? How do we combine diverse formal techniques to analyze larger systems? Are there good examples and case studies of industrial-strength formal techniques?

* Technology and Model Cross-over: This topic explores the possibility of "hybrid vigor" arising from heterogeneous combinations of approaches to familiar hard problems. The concept of "centaur," for example, refers to teams that meld the complementary strengths of humans and machines, for example to address challenges in cybersecurity. These approaches can draw on research in AI and human-machine teaming, where humans partnered with AI systems might possibly achieve a level of proficiency that neither humans nor machines can attain individually. Other crossover examples include the use of chaotic attractors for intrusion detection and the application of quantum molecular orbital theory to develop an iso-identity contour model for measurement and attestation. This "out of the box" topic focuses on these and other examples of such domain crossovers.

CONFERENCE PRESENTATIONS

The conference program features invited speakers, panel discussions, poster presentations, and a technical track of contributed talks.

Technical Track Presentations

The technical track features two kinds of talks:

* Experience reports. These talks inform participants about how emerging HCSS and CPS techniques play out in real-world applications, focusing especially on lessons learned and insights gained. While experience reports do not have to be highly technical, they should emphasize substantive reflection on all aspects of experience, building on data and direct experience. Experience reports can focus on topics such as transitioning science into practice, architecture and requirements, use of advanced languages and tools, evaluation and assessment, team practice and tooling, supply-chain issues, and so on.

* Technical talks. These talks highlight state-of-the-art techniques and methods for high-confidence software systems with an emphasis on how those techniques and methods can be used in practice. Presenters of these talks should strive to make their material accessible to the broader HCSS community even as they discuss deep technical results in areas as diverse as concurrency analysis, hybrid reasoning approaches, theorem proving, separation logic, analysis, synthesis, analytics, various modeling techniques etc.
If you are interested in offering a talk--or nominating someone else to be invited to do so--please upload an abstract of one page or less for your proposed talk or a one paragraph description of your nominee’s proposed talk by Monday, February 20, 2017 February 27, 2017 to http://cps-vo.org/hcss17/presentation/cfp. Abstracts and nomination paragraphs should clearly indicate why the talk would be relevant to HCSS and which, if any, of this year’s themes the talk would address. Notifications of accepted talks will be made by Monday, March 13, 2017.

POSTER PRESENTATIONS

If you are interested in participating in the poster session, please upload an abstract of your proposed poster theme with title by Monday, February 20, 2017 February 27, 2017 to http://cps-vo.org/hcss17/poster/cfp. Abstracts should clearly indicate why the poster is relevant to HCSS and which, if any, of this year’s themes the poster would address. Only a limited number of posters will be accepted due to space availability. The maximum size for all posters for display is 30" x 40". Notifications of accepted posters will be made by Monday, March 13, 2017.

The conference organizers will print posters free of charge if design content is electronically submitted by Friday, April 28, 2017. After April 28, poster session participants will be responsible for the printing and delivery of their own posters. Content designs of accepted posters can be submitted electronically in PDF format. The conference organizers will provide easels, foam boards, and tacs for all poster displays. Poster session participants should contact the conference organizers in advance if additional materials or props are desired.

ADDITIONAL INFORMATION

Further instructions for electronically submitting camera-ready abstracts, final slide presentations of accepted talks and poster designs will be provided in the notification message that will be sent on Monday, March 13, 2017. Abstracts of accepted talks and posters will be printed in the 2017 HCSS Conference proceedings.

IMPORTANT DATES

Monday, February 20, 2017 February 27, 2017 - Abstracts of proposed talks and poster topics submission deadline
Monday, March 13, 2017 - Notifications of acceptance/rejection
Friday, March 31, 2017 - Camera-Ready abstracts due
Friday, April 28, 2017 - Poster files due
Sunday, May 7, 2017 - Presentation files due
May 8-11, 2017 - HCSS Conference

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