

Faraz Hussain

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Education

- Ph.D. (Computer Science), University of Central Florida, May 2016.
Dissertation: *Techniques for automated parameter estimation in computational models of probabilistic systems*.
Advisor: Sumit K. Jha.
- M.S. (Computer Science), Iowa State University, 2009.
Thesis: *Enhancing a behavioral interface specification language with temporal logic features*.
Advisor: Gary T. Leavens.
- B.E. (Computer Science), Birla Institute of Technology and Science, Pilani, India, 2004.

Research Interests

Validation and synthesis of quantitative models: Formal verification and automated synthesis of probabilistic models, with emphasis on applications in cyberphysical systems and systems biology.

Data mining and analysis: Knowledge discovery and data analysis using high-performance computing, especially by applying statistical verification and multi-objective optimization techniques to address big-data problems.

Formal methods and software engineering: Design of programming languages and reasoning methodologies for high-assurance software engineering.

Computer science education: Teaching heterogeneous programming principles and techniques to computer science and engineering undergraduates and encouraging the adoption of the NSF/IEEE-TCPP Curriculum Initiative on Parallel and Distributed Computing.

Work Experience

- Research internship at SRI International, Menlo Park, CA (May 2012 – August 2012).
- Research internship at the Tata Institute of Fundamental Research, Mumbai, India (July 2003 – December 2003).

Teaching Experience

- Instructor: *Programming Languages I* (COP 4020).
University of Central Florida (Spring 2011).
- Teaching Assistant: *Design and Analysis of Algorithms* (COT 5405).
University of Central Florida (Fall 2015).
- Teaching Assistant: *Programming Languages I* and *Security in Computing*.
University of Central Florida (August 2008 – Dec. 2010).
- Teaching Assistant: *Introduction to Object Oriented Programming, Advanced Programming Techniques, Programming I* and *Projects in Computing & Business Applications*
Iowa State University (August 2005 – May 2008).

Professional Activities

- Program committee member: Big Data Analytic Technology For Bioinformatics and Health Informatics Workshop, 2014.
- Secretary, IEEE Computer Society, Orlando Section (2014-15).
- Conference reviewer: Verified Software: Theories, Tools and Experiments (2012), Conference on Decision and Control (2012), ACM Conference on Bioinformatics, Computational Biology and Health Informatics (2012). IEEE International Symposium on Signal Processing and Information Technology (2014).
- Journal referee: Journal of Object Technology, IEEE/ACM Transactions on Computational Biology and Bioinformatics, Journal of Bioinformatics and Computational Biology, Journal for Information Technology and Software Engineering, BMC Bioinformatics, BMC Genomics, OUP Bioinformatics.
- Member, Graduate Professional Student Senate, Iowa State University (Fall 2006).
- Member, Graduate Advisory Council, Department of Computer Science, Iowa State University (Fall 2006).

Academic Honors

- Best paper award for the paper *Parameter Discovery for Stochastic Computational Models in Systems Biology Using Bayesian Model Checking* presented at the 4th IEEE International Conference on Computational Advances in Bio and Medical Sciences, Miami Beach, Florida (2014).
- Graduate Research Excellence Fellowship, University of Central Florida (2013-15).
- Provost's Graduate Fellowship, University of Central Florida (2008-09).
- Graduate Dean's Dissertation Completion Fellowship, University of Central Florida (Spring 2016).

Professional Affiliations

- Member, IEEE.
- Member, IEEE Computer Society.
- Member, Association for Computer Machinery (ACM).
- Full Member, Sigma Xi: The Scientific Research Society.

Publications

Conference Papers

- [C9] Arvind Ramanathan, Laura Pullum, Faraz Hussain, Dwaipayan Chakraborty, and Sumit Kumar Jha. “Integrating symbolic and statistical methods for testing intelligent systems: Applications to machine learning and computer vision”. In *Design Automation and Test in Europe (DATE)*. Dresden, Germany, Mar. 2016.
- [C8] Faraz Hussain, Zubir Husein, Neslisah Torosdagli, Narsingh Deo, Sumanta N. Patanaik, Chung-Che Chang, and Sumit Kumar Jha. “SANJAY: Automatically synthesizing visualizations of flow cytometry data using decision procedures”. In *Proceedings of the 5th IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2015)*. Miami, FL, USA. IEEE, Oct. 2015, p. 1.
- [C7] Faraz Hussain, Christopher James Langmead, Qi Mi, Joyeeta Dutta-Moscato, Yoram Vodovotz, and Sumit Kumar Jha. “Parameter Discovery for Stochastic Computational Models in Systems Biology Using Bayesian Model Checking”. In *Proceedings of the 4th IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2014)*. Miami, FL. IEEE, June 2014, pp. 1–6.
- [C6] Faraz Hussain, Arvind Ramanathan, Laura L. Pullum, and Sumit Kumar Jha. “EpiSpec: A Formal Specification Language for Parameterized Agent-Based Models against Epidemiological Ground Truth”. In *Proceedings of the 4th IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2014)*. Miami, FL. IEEE, June 2014, pp. 1–6.
- [C5] Faraz Hussain, Alvaro Velasquez, Emily Sassano, and Sumit Kumar Jha. “Putting Humpty-Dumpty Together: Mining Causal Mechanistic Biochemical Models from Big Data”. In *Proceedings of the 4th IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2014)*. Miami, FL. IEEE, June 2014, pp. 1–6.
- [C4] Arup K. Ghosh, Faraz Hussain, Sumit Kumar Jha, Christopher James Langmead, and Susmit Jha. “Decision Procedure Based Discovery of Rare Behaviors in Stochastic Differential Equation Models of Biological Systems”. In *Proceedings of the 2nd IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2012)*. Las Vegas, NV. IEEE Computer Society, Feb. 2012, pp. 1–6.

- [C3] Faraz Hussain, Raj Gautam Dutta, Sumit Kumar Jha, Christopher James Langmead, and Susmit Jha. “Parameter Discovery for Stochastic Biological Models against Temporal Behavioral Specifications using an SPRT based Metric for Simulated Annealing”. In *Proceedings of the 2nd IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2012)*. Las Vegas, NV. IEEE Computer Society, Feb. 2012, pp. 1–6.
- [C2] Aditya Reddy Kolli, Frank Sommerhage, Peter Molnar, Jonathan E. Hood, Jerry J. Jenkins, Faraz Hussain, Arup K. Ghosh, Sumit Kumar Jha, and James J. Hickman. “A Computational Metabolic Model of the NG108-15 cell for High Content Drug Screening with Electrophysiological Readout”. In *Proceedings of the ACM International Conference on Bioinformatics, Computational Biology and Biomedicine (ACMBCB 2012)*. Orlando, FL. ACM, Oct. 2012, pp. 530–532.
- [C1] Faraz Hussain and Gary T. Leavens. “temporaljmlc: A JML Runtime Assertion Checker Extension for Specification and Checking of Temporal Properties”. In *Proceedings of the 8th IEEE International Conference on Software Engineering and Formal Methods (SEFM 2010)*. Pisa, Italy. IEEE Computer Society, Sept. 2010, pp. 63–72.

Journal Articles

- [J3] Faraz Hussain, Christopher J. Langmead, Qi Mi, Joyeeta Dutta-Moscato, Yoram Vodovotz, and Sumit K. Jha. “Automated parameter estimation for biological models using Bayesian statistical model checking”. *BMC Bioinformatics* 16(Suppl 17):S8 (2015), pp. 1–14. ISSN: 1471-2105.
- [J2] Arup Kumar Ghosh, Faraz Hussain, Susmit Jha, Christopher James Langmead, and Sumit Kumar Jha. “Discovering rare behaviours in stochastic differential equations using decision procedures: applications to a minimal cell cycle model”. *International Journal of Bioinformatics Research and Applications* 10:4/5 (2014), pp. 540–558.
- [J1] Faraz Hussain, Sumit Kumar Jha, Susmit Jha, and Christopher James Langmead. “Parameter discovery in stochastic biological models using simulated annealing and statistical model checking”. *International Journal of Bioinformatics Research and Applications* 10:4/5 (2014), pp. 519–539.

Workshop Papers

- [W4] Faraz Hussain, Narsingh Deo, and Sumit K. Jha. “Early Adoption: High Performance Computing for Big Data: Introducing parallel programming and big data in the core algorithms curriculum”. In *Proceedings of the 4th NSF/TCPP Workshop on Parallel and Distributed Computing Education (EduPar 2014)*. Phoenix, AZ, May 2014.
- [W3] Faraz Hussain, Alvaro Velasquez, and Sumit K. Jha. “Exploiting heterogeneous parallel programming for developing an educational neuromorphic computing simulator”. In *Proceedings of the NSF/TCPP Workshop on Education for High-Performance Computing (EduHPC 2014)*. New Orleans, LA, Nov. 2014.

- [W2] Narsingh Deo, Sumit K. Jha, Faraz Hussain, and Mahadevan Vasudevan. “Introducing parallel programming across the undergraduate curriculum through an interdisciplinary course on computational modeling”. In *Proceedings of the 3rd NSF/TCPP Workshop on Parallel and Distributed Computing Education (EduPar 2013)*. Boston, MA, May 2013.
- [W1] Ghaith Haddad, Faraz Hussain, and Gary T. Leavens. “The Design of SafeJML, a Specification Language for SCJ with Support for WCET Specification”. In *Proceedings of the 8th International Workshop on Java Technologies for Real-Time and Embedded Systems (JTRES 2010)*. Prague, Czech Republic. ACM, Aug. 2010, pp. 155–163.

Theses

- [T2] Faraz Hussain. “Techniques for automated parameter estimation in computational models of probabilistic systems”. PhD thesis. University of Central Florida, 2016.
- [T1] Faraz Hussain. “Enhancing a behavioral interface specification language with temporal logic features”. ISU Graduate Theses and Dissertations. Paper 10342. Master’s thesis. Ames, IA. Iowa State University, 2009.

References

Available upon request.