

Curtis Madsen

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WORK EXPERIENCE

Postdoctoral Researcher, Prof. Douglas Densmore and Prof. Calin Belta, Boston University (Nov. 2015-Present)

Contributed to the development of **Phoenix**, a tool that assists users in an iterative, hierarchical design-build-test cycle for constructing genetic circuits.

Formulated several metrics for computing the distance between two STL formulae.

Developed **STL#**, an extension to signal temporal logic (STL) that includes syntax and semantics for composition of formulae.

Lectured on topics including stochastic and statistical model checking, modeling, and simulation in classes of about 20 students.

Research Associate, Prof. Anil Wipat and Dr. Paolo Zuliani, Newcastle University (Dec. 2013-Oct. 2015)

Developed the **SBOL Stack**, a Sesame RDF repository for storing and publishing synthetic biology designs.

Developed **BioPSy**, a tool for performing parameter synthesis on systems and synthetic biology models.

Implemented a robustness checker that utilizes statistical model checking approaches to determine the robustness of a system given a temporal logic property.

Designed an architecture for bringing together modules for multi-scale models in the Newcastle University Frontiers in Engineering Biology (NUFEB) project.

Lectured on topics including bio-inspired computing and stochastic methods in classes of about 20 students.

Provided one-on-one assistance to master's students with questions on Python.

Research Assistant, Prof. Chris J. Myers, University of Utah (Jan. 2006-Aug. 2013)

Designed and contributed to the development of **iBioSim**, a tool for biochemical reaction network model analysis.

Designed the incremental stochastic simulation algorithm (iSSA).

Developed a methodology for abstracting a genetic circuit into a logical model.

Applied stochastic model checking techniques to these logical models.

Intern, Jasmin Fisher, Microsoft Research Cambridge, (Sept. 2012-Dec. 2012)

Developed probabilistic qualitative networks, an extension to both probabilistic boolean networks and qualitative networks.

Teaching Assistant, Prof. Joseph L. Zachary, University of Utah, (Aug. 2011-Dec. 2011)

Led labs of 10-30 students on software engineering topics.

Provided one-on-one assistance to students with questions.

Graded exams and homework assignments.

Intern, Onyx Graphics, (June 2003-Aug. 2003)

Assisted the engineering division in editing software for translation into other languages.

EDUCATION

University of Utah, Salt Lake City, UT, Ph.D., Computer Science, Aug. 2013 (GPA: 4.0)

Dissertation: Stochastic Analysis of Synthetic Genetic Circuits

University of Utah, Salt Lake City, UT, B.S., Computer Science, *Magna Cum Laude*, Dec. 2009 (GPA: 3.992)

Thesis: Representing Genetic Networks as Labeled Hybrid Petri Nets for State Space Exploration and Markov Chain Analysis

SKILLS

Knowledge of algorithms, compilers, computational biology, computer-aided design, cyber-physical systems, formal verification, and synthetic biology.

Proficient in Java, Python, C#, C, C++, F#, and Javascript.

AWARDS & PROFESSIONAL ACTIVITIES

Editor, *Synthetic Biology Open Language* (SBOL), August 2017-Present

Organizer, *COMBINE Forum*, October 2018 and *Towards Programmable Biology* (ToProB), Satellite Workshop at ECAL 2015

Program Committee Member, *IWBDA*, August 2017 and 2018

Recipient, 3rd Annual Allan Kuchinsky *IWBDA* Scholarship, August 2017

Chair, Machine-Learning Session at *IWBDA*, August 2018, Modeling Session at *IWBDA*, August 2017, and Synthetic Biology Session at *COMBINE Forum*, September 2016

Guest Editor, *Programmable Biology* Special Issue, ACS Synthetic Biology, Volume 5, Issue 8, August 19, 2016

Reviewer, *CIBCB* 2014-2015, *CMSB* 2016, *IET Systems Biology* 2017, and *TCBB* 2017