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Tzu-Han Hsu

Research Interests

My research interests include applications of **formal methods** in program **verification**, **synthesis for hyperproperties**, and analysis of **information-flow security.**

Education

Ph.D. Student in Computer Science Engineering   2020–present
Michigan State University, East Lansing, MI, USA
Advisor: Dr. Borzoo Bonakdarpour
GPA: 3.9/4.0

Bachelor of Science in Computer Science   2016–2020
Iowa State University, Ames, IA, USA
GPA: 3.86/4.0

Bachelor of Music in Piano Performance   2013–2017
Iowa State University, Ames, IA, USA
GPA: 3.86/4.0, Outstanding Senior Nomination by the Department of Music

Research Experience

- **Graduate Research Assistant** *Michigan State University*   2020–Present
  Formal Methods, Synthesis of Hyperproperties, Information-flow Security, and Privacy
- **Undergrad Research Assistant** *Iowa State University*   2019–2020
  Model checking and Hyperproperties

Conference Papers

1. <u>Tzu-Han Hsu</u>, Borzoo Bonakdarpour, Eunsuk Kang, and Stavros Tripakis, **"Mapping Synthesis for Hyperproperties"** *In IEEE International Symposium on Computer Security Foundations (CSF'22). To appear.*

2. <u>Tzu-Han Hsu</u>, César Sánchez, and Borzoo Bonakdarpour, **"Bounded Model Checking for Hyperproperties"** *In International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'21), Luxembourg, Luxembourg.*

Preprints

1. <u>Tzu-Han Hsu</u>, Borzoo Bonakdarpour, and César Sánchez, **"HyperQube: A QBF-Based Bounded Model Checker for Hyperproperties"** (2021)

2. <u>Tzu-Han Hsu</u>, Yu Wang, Borzoo Bonakdarpour, Miroslav Pajic, **"Multi-Agent Path Planning with Hyperproperties"** (2020)

Teaching Experience

- **Graduate Teaching Assistant** at Michigan State University — Spring 2020
  Discrete Structures in Computer Science (CSE 260)
- **Undergrad Teaching Assistant** at Iowa State University — Spring 2018, Fall 2018
  Object-Oriented Programming (COM S 227)

Professional Service

- **Student Volunteer**. *International Conference on Computer Aided Verification (CAV)*, 2021.
- **Subreviewer**. *International Symposium on Automated Technology for Verification and Analysis (ATVA)*, 2021.

Fellowships

- University Graduate Research Fellowship, *Michigan State University*, April 2020.

Honors, Awards, and Scholarships

- Nomination of Departmental Outstanding Senior of 2020 — 2020
- Iowa State University College of Liberal Arts and Sciences Dean's List — 2013–2020
- Future Leader Award, Issued by U.S. Ambassador to China Terry Branstad — 2018
- Iowa State University International Student Ambassador Gold Level Scholarship Recipient — 2013–2018
- Iowa State University Music Department Outstanding Student Scholarship Recipient — 2013–2018

Leadership and Volunteer Experiences

- The Society for Collegiate Leadership & Achievement — 2016–2020
- Iowa State University Student Council, Department Representative — 2017–2018
- Iowa Education without Borders (non-profit) Volunteer/Event Coordinator — 2017–2018
- Iowa Youth Leadership Summer Camp Student Volunteer — 2017–2018
- Iowa State University Annual K-12 Computational Thinking Competition — 2020

Music Awards

- Soloist Winner, Fort Dodge Orchestra Young Artists Concerto Competition — 2015
- 1st Prize Winner, Iowa State University Symphony Orchestra Concerto Competition — 2014
- State Winner, Music Teacher National Association (MTNA) Piano Competition — 2014

Industrial Experience

Software Engineer Intern — 2019–2020
Worrell Medical Design Inc., Minneapolis, MN

- Developed a Virtual Reality Environment on Oculus Quest for Human Factor Engineering usability testing.
- Programed well-functioning C# scripts in Unity3D engine with desired behaviors and outcomes.
- Analyzed user feedback and debug/adjust/improve the existing versions of the program with HF engineers.