

Yun Chen TSAI

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SUMMARY

I am a Year 4 undergraduate student at HKUST, major in applied Mathematics. Experienced in academic research and various research projects have been carried out under the supervision of professor Shing Yu LEUNG, Amir GOHARSHADY and Jean-François RASKIN, the research projects focus on different aspects of scientific computation, algorithm design, formal methods and complexity theory. My research interest falls generally in the large area of formal methods, automata theory and complexity theory, in particular I am interesting in combining the use of different mathematical tools for improving the algorithm and prove interesting result in the above area.

EDUCATION

Hong Kong University of Science and Technology (HKUST)

BSc in Applied Mathematics

Expected Graduation: June 2024

PUBLICATION

- G. K. Conrado, A. K. Goharshady, K. Kochev, Y. C. Tsai, A. K. Zaher (2023). *Exploiting the Sparseness of Control-flow and Call Graphs for Efficient and On-demand Algebraic Program Analysis*. ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications, OOPSLA 2023.
- Y. C. Tsai, S. Y. Leung (2023). *Local Trajectory Variation Exponent (LTVE) for Visualizing Dynamical Systems*. Submitted to Communication in Computational Physics, CiCP.

RESEARCH PROJECT

Project title	Supervisor
Efficient algorithm on Visualizing Dynamical Surface	Dr. Shing Yu LEUNG
◦ In this project we particularly focus on developing efficient methods for visualizing the Lagrangian Coherent Structure. Several approaches have been studied including the traditional Finite time Lyapunov Exponent, Clustering approach and also comparison between local trajectories.	
Parameterized Algorithms in Static Program Analysis	Dr. Amir GOHARSHADY
◦ This project is focusing on improving the existing algorithm for static program analysis through parameterization. The major motivation behind is that many of the problems in the field are proven to be at least NP-hard in general, but the practical use-case might exhibit special structures or carry small parameters. We look into problems like Algebraic program analysis and probabilistic model checking and looks for potentially useful parameterization for the problems.	
Automata Learning and Program Synthesis	Dr. Jean-François RASKIN
◦ This project aims to study the use of automata learning to program synthesis problem. In particular we looked into the problems of example-guided synthesis, we focus on the case when a stochastic environment input is involved and attempt to formulate a way to generate a set of optimal realizable examples of system trace with respect to a certain cost/reward function.	

Scholarship

- Chern Class Talent Scholarship
- HKSAR Government Scholarship Fund - Reaching Out Award

Reference

Please contact the following professors for letter of recommendation.

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