Shih-Hao Tseng

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Professional Summary

- Self-motivated and experienced network research professional specialized in software-defined networking (SDN).
- Published papers on time-aware network scheduling, network stability, and inter-datacenter network coding in prestigious networking conferences/journal.
- Sophisticated system engineer with open-sourced projects on GPU parallel acceleration, multithreaded distributed system, controller synthesis framework in CUDA, C++, and Python.
- Full-stack system working knowledge from low-level hardware architecture to high-level software optimization.

Education

Cornell University (CU), Ithaca, NY, U.S.A. Aug. 2013 - Dec. 2018
PhD in Electrical and Computer Engineering (Advisor: Dr. A. Tang)
- Dissertation: Orchestrating Inter-Datacenter Bulk Transfers with CodedBulk

National Taiwan University (NTU), Taipei, Taiwan Sept. 2008 - June 2012
Bachelor of Science in Engineering (minor in Economics)
- GPA: 92.20/100.00; ranking 2nd in a class of 226

Skills

Programming Languages: Proficient in C, C++, Python and Verilog; working knowledge of Basic, HTML, Java, JavaScript, MySQL, and PHP.
Programming Skills: Working knowledge of Linux based C++ socket, kernel scheduler, GPU parallelization, and multithreaded programming.
Simulation Tools: Proficient in control system (MATLAB) and network simulations (NS-3).
Languages: Fluent in English; native in Mandarin Chinese and Taiwanese Hokkien.

Experience

California Institute of Technology, Pasadena, CA, U.S.A. Oct. 2018 - Present
Posdoctoral Scholar Research Associate
- Lead the project of freshness-driven network control.
- Mentor graduate students on parallel model predictive control and formal test-case generation.
- Derived realization-stability lemma that unifies existing controller synthesis methods.
- Investigated the controller deployment architecture for cyber-physical systems.

Cornell University, Ithaca, NY, U.S.A. Aug. 2014 - Aug. 2018
Graduate Research Assistant/Teaching Assistant
- Built CodedBulk to boost the throughput of inter-datacenter bulk transfers using network coding.
- Studied time-aware network management under software-defined networking.
- Helped teach Introduction to Probability and Inference for Random Signals and Systems.

The Chinese University of Hong Kong, Shatin, NT, Hong Kong June 2017 - Aug. 2017
Research Assistant
- Developed efficient scheduling algorithms for hybrid packet/circuit networks.

AT&T, Middletown, NJ, U.S.A. June 2016 - Aug. 2016
Student Intern - Technical II
- Developed routing algorithms to stabilize carrier-grade hybrid software-defined networks.

Awards

Winner of the AT&T SDN Network Design Challenge 2016
- Awarded to the top team providing the most efficient and cost effective routing solution to carrier-grade networks.

Outstanding Project Award 2011
- Awarded to the top 10 teams of Cross-Strait Finals of 2011 Innovate Asia Competition (FPGA design).

Selected Projects and Publications

In-Network Processing

- **S.-H. Tseng**, S. Han, and A. Wierman, "In-Network Freshness Control: Trading Throughput for Freshness," submitted to.*IEEE/ACM Trans. Netw*
- **S.-H. Tseng**, S. Agarwal, R. Agarwal, H. Ballani, and A. Tang, "CodedBulk: Inter-Datacenter Bulk Transfers using Network Coding," in *Proc. USENIX NSDI*, 2021.

This is some test

Open-Sourced Controller Synthesis Tools

- **S.-H. Tseng** and J. S. Li, "SLSpy: Python-Based System-Level Controller Synthesis Framework," in submission, [Online] arXiv:2004.12565.
- C. Amo Alonso and **S.-H. Tseng**, "Effective GPU Parallelization of Distributed and Localized Model Predictive Control," submitted to Proc. IEEE CDC.
- **S.-H. Tseng**, "A Generic Solver for Unconstrained Control Problems with Integral Functional Objectives," in *Proc. IEEE ACC*, 2020.

Network Stability

- **S.-H. Tseng**, "Perseverance-Aware Traffic Engineering in Rate-Adaptive Networks with Reconfiguration Delay," in *Proc. IEEE ICNP*, 2019.
- **S.-H. Tseng**, A. Tang, G. Choudury, and S. Tse, "Routing Stability in Hybrid Software-Defined Networks," in *IEEE/ACM Trans. Netw.*, 2019.

Time-Aware Network Scheduling

- **S.-H. Tseng**, B. Bai, and J. C. S. Lui, "Hybrid Circuit/Packet Network Scheduling with Multiple Composite Paths," in *Proc. IEEE INFOCOM*, 2018.
- A. Gushchin, **S.-H. Tseng**, and A. Tang, "Optimization-Based Network Flow Deadline Scheduling," in *Proc. IEEE ICNP*, 2016.