

Taran Lynn

Specialist in Computer Networks

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EDUCATION

- 2019 BS in Computer Science and Engineering from U.C. Davis (GPA 3.985).
- MS in Computer Science from U.C. Davis expected by end of June 2022.

IMPORTANT SITES

Personal <http://lambda-11235.github.io/>
GitHub <https://github.com/lambda-11235/>
LinkedIn <https://www.linkedin.com/in/taran-lynn/>

SPECIALTY

I specialize in computer network infrastructure. My previous work has focused on researching TCP congestion control algorithms and AQM, with a focus on reducing end-to-end tail latency. Now my focus has shifted to applying these methods to cloud based networks. I have also briefly worked on optimizing HPC systems with deep learning.

SKILLS

Programming Languages C • C++ • Python • Haskell • Scala • Java

Experience With Networking • TCP Congestion Control • AQM • AWS (IoT & Lambda) • OpenStack
• Control Systems • Deep Learning • Tensorflow • PyTorch • Docker • HPC • Slurm

PAPERS

- Taran Lynn, Dipak Ghosal, and Nathan Hanford. *Model Predictive Congestion Control for TCP Endpoints*. 2020. arXiv: 2002.09825 [cs.NI]
- Taran Lynn and Dipak Ghosal. *TCP D*: A Low Latency First Congestion Control Algorithm*. 2020. DOI: 10.48550/ARXIV.2012.14996. URL: <https://arxiv.org/abs/2012.14996>

PRESENTATIONS

Impact of Buffer Size on a Congestion Control Algorithm Based on Model Predictive Control

Presented at the 2019 Workshop on Buffer Sizing at Stanford, Ca.

<http://buffer-workshop.stanford.edu/papers/paper14.pdf>

<http://buffer-workshop.stanford.edu/slides/mpc.pdf>

UNIVERSITY PROJECTS

Needs to be streamlined

Model Predictive Congestion Control This is a research project whose aim is to develop a new TCP congestion control algorithm that provides a smooth signal across dedicated WANs. To do this the algorithm employs concepts from model predictive control theory. The algorithm also allows users to dynamically set pacing rates on a per flow basis. Implementations have been developed for both the TCP congestion control and qDisc layers in the Linux kernel.

Randomizing Malloc for Security This project aimed to disrupt certain classes of buffer overflow attacks that target malloc metadata. Such attacks require malloc to allocate memory chunks in a contiguous, predictable order. To counteract this we randomized the spacing between the chunks, which also had the effect of randomizing allocation order in some cases. We submitted a paper detailing the modification to the Hawaii International Conference on System Sciences (HICSS) in Spring of 2019.

Optimizing HPC Scheduling with LSTM Networks As part of a graduate course on deep learning I worked on a team project with the goal of optimizing scheduling algorithms in high-performance computing (HPC) centers. This project was done in partnership with UC Davis' HPC Core Facilities (HPCCF). The eventual outcome was the development of a long-short term memory (LSTM) network to predict job runtimes and memory usage. I am continuing this work beyond the graduate course, in order to extend the LSTM network into a recommendation system.

OPEN SOURCE CONTRIBUTIONS

Idris I wrote documentation on the codata keyword.

See <https://github.com/idris-lang/Idris-dev/pull/3094/>.

NixOS I maintain several packages in their repository.

See <https://github.com/NixOS/nixpkgs/>.

The Secret Chronicles of Dr. M I helped port the game from SDL to SFML.

See <https://secretchronicles.org/en/>.

Red Eclipse I contributed custom content to their community repository.

See <https://www.redeclipse.net/>.

Personal Open Source Repositories

TTyped A dependently typed language directly based off of Coquand's Calculus of Constructions.

debtTools A command line python program to help users track and calculate payments for compound interest debt. Also includes a paper that derives key formulas from first assumptions.

Markov's Password A random password generator based off of the XKCD comic "Password Strength" (<https://www.xkcd.com/936/>). It uses a variation of Markov chains to generate a sequence of random, made up, and pronounceable words. A version that uses a Hidden Markov Model is also being worked on.

FarRP A library for functional reactive programming that leverages dependent types in the Idris. It is based on Neil Sculthorpe and Henrik Nilsson's paper "Safe Functional Reactive Programming through Dependent Types."

CGDS A library that uses C macros to provide generic, type safe, unobtrusive data structures.

AWARDS

- Received 2019 U.C. Davis Computer Science Departmental Citation.

FELLOWSHIPS AND GRANTS

- Received the Towards Outstanding Postgraduate Students (TOPS) Award. This is an internal award provided by the College of Engineering at UC Davis.

NOTABLE COURSES TAKEN

Algorithm Design • Circuits I/II • Computer Architecture • Embedded Systems • Machine Learning
• Operating Systems • Parallel Architectures • Deep Learning

REFERENCES

References can be provided upon request.