

Taran Lynn

Specialist in Computer Networks

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EDUCATION

- 2019 BS in Computer Science and Engineering from U.C. Davis (GPA 3.98).
- 2022 MS in Computer Science from U.C. Davis (GPA 3.85).

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

Model Predictive Congestion Control

- New TCP congestion control algorithm providing a smooth RTT signal across dedicated WANs.
- Based on concepts from model predictive control.
- Implementations developed for both the TCP congestion control and qDisc layers in the Linux kernel.

Randomizing Malloc for Security

- Expanded on method to disrupt certain classes of buffer overflow attacks that target malloc metadata.
- Main contribution was randomizing spacing between malloc's allocated memory chunks.

Optimizing HPC Scheduling with LSTM Networks

- Part of a graduate course on deep learning.
- Done in partnership with UC Davis' HPC Core Facilities (HPCCF).
- Used long-short term memory (LSTM) network to predict HPC job runtimes and memory usage, with the eventual goal of optimizing scheduling algorithms in high-performance computing (HPC) centers.

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://secrechronicles.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.