

Education

- 2022–present **University of North Carolina at Chapel Hill,**
Ph.D. Computer Science, advisor: Benjamin Berg
- 2018–2022 **University of North Carolina at Chapel Hill,**
B.S. Computer Science, B.S. Mathematics

Research Interests

Stochastic Modeling, Queueing Theory, Scheduling, Caching, Pricing

Research Experience

- 08.2022–
Present **Graduate Research Assistant, advised by Benjamin Berg**
- Analyzing delay of low-complexity and throughput-optimal virtual machine scheduling algorithms.
 - Development of Lyapunov drift arguments to analyze stability and delay in virtual machine scheduling algorithms.
 - Create discrete event simulations to evaluate throughput and delay under various scheduling policies.
 - Also studied resource allocation in open-source ClickHouse database.
- 08.2021–
05.2022 **Undergraduate Honors Thesis, advised by Praneeth Chakravarthula**
- Implemented numerical methods in deep neural networks to reason dynamical systems from limited observations.
 - Experimented with GAN for physics-aware video interpolation and extrapolation.
 - Coded physical simulators to generate dataset for learning.
 - Experimented with object detection networks (i.e. Detectron2, YOLO) to extract features for physics-aware learning.
- 01.2021–
06.2021 **Undergraduate Research Assistant, advised by Henry Fuchs under UNC Graphics & VR Group**
- Worked on reconstructing novel views from a single facial image input.
 - Implemented differentiable renderer and mesh fitting with PyTorch3d.
 - Contributed an variational autoencoder and texture decoder to reconstruct texture maps for novel views.
 - Identified the bottleneck, optimized the training pipeline, and fixed memory leaks. Prebuilt and prefetched the dataset and made training 10x faster.
- 08.2020–
12.2020 **Mentored Research, advised by Jasleen Kaur**
- Congestion Control: Past, Present and Future (Final Report)
- Generalized the limitations and contributions of the congestion control algorithms.
 - Dived into the theory that converts congestion control into a socially concave game.
 - Researched fairness and scavenger protocol in congestion control.

Teaching Experience

- Undergraduate Teaching Assistant COMP 572 Computational Photography, COMP 524 Programming Languages, COMP 521 Databases and COMP 411 Computer Organization.

Class Projects

- 08.2020–
12.2020 **Lisp Interpreter, COMP 524 Programming Languages**
- Coded a lisp interpreter in Java.
 - Implemented basic S-expression primitives, lists, atoms, logical operators and conditionals.
 - Implemented lambda function expressions, recursions, curry, and stringify.

01.2020– **64-bit JOS Kernel**, *COMP 790 OS Implementation*

- 05.2020 ○ Adapted from MIT 6.828, but in 64-bit version.
- Implemented page translation, context switch, trap handler.
- Implemented cooperative multitasking, Copy on Write (CoW), and Inter-Process Communication (IPC).
- Supported pipe, redirection and basic shell functions.
- Coded a network driver based on the Intel 82540EM chip.

01.2020– **Distributed Systems**, *COMP 533 Distributed Systems*

- 05.2020 ○ Used Java RMI, asynchronous RPC library, and NIO to enable process communication across multiple computers.
- Implemented Paxos consensus algorithm to ensure consistency.
- Connected to GUI to showcase state synchronization.

08.2019– **Basic Graphics Engine**, *COMP 475 Computer Graphics*

- 12.2019 ○ Implemented a C++ library that provides efficient APIs for geometric primitives, scan conversion, clipping, transformations, compositing, texture sampling, gradients, antialiasing, filtering, parametric curves, and geometric stroking.
- Used Intel MMX features to accelerate vector operations.

Programming Languages

Imperative C/C++, Rust, Java

Functional Haskell, Lisp

Scripting Python, JavaScript, Shell (and variants)

Others \LaTeX , HTML5/CSS3, Matlab, Mathematica