Varun Patil

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Education

University of California, Los Angeles — California, USA
Ph.D. Computer Science — *Jan. 2022 onward*
M.S. Computer Science — *Sep. 2020 – Dec. 2021*

Indian Institute of Technology Bombay — Mumbai, India
B.Tech. Mechanical Engineering — *Jun. 2016 – Aug. 2020*
Minor in Computer Science and Engineering, Institute Technical Roll of Honour

Experience

UCLA — Los Angeles, California
Graduate Student Researcher – Internet Research Laboratory — *Apr. 2021 – Present*

- Conducting research on Named Data Networking with focus on distributed data synchronization protocols
  Publications
  - Moll, **Patil**, Zhang, Pesavento, 2021. *Resilient Brokerless Publish-Subscribe Over NDN.* MILCOM '21
  - **Patil**, Moll, Zhang, 2021. *Supporting Pub/Sub over NDN Sync.* ACM ICN '21
  - Moll, **Patil**, Sabharwal, Zhang, 2021. *A Brief Introduction to State Vector Sync.* TR-NDN-0073
- Authored the reference implementation of the State Vector Sync protocol and a demonstrative chat application
- Implemented a network and security simulator-visualizer (NDN-Play) for running experiments in the browser

IIT Bombay — Mumbai, India
Software Architect & Developer – Single Sign On, Computer Centre — *Sep. 2019 – Sep. 2020*

- Drafted a policy framework for enforcing multi-factor authentication on a diverse 10000+ organization
- Implemented an OAuth2/OIDC/SAML provider for authorization over LDAP-TOTP-FIDO authentication
- Implemented a very high performance geolocation provider (GeoIPNS) for suspicious activity detection
- Authored popular open source plugins for migrating Nextcloud and Roundcube webmail to OpenID Connect
- Conceptualized and developed Android and iOS clients for secure user-initiated passwordless authentication
- Integrated authentication with SAML federated identity for Azure Active Directory and Google Workspace
- Developed a secondary authentication protocol for legacy IMAP/SMTP clients for Dovecot/Postfix

Institute System Administrator – Hostel Affairs Council — *Apr. 2019 – Jun. 2020*

- Led a 12-member sysadmin team as the interface between Computer Centre and all students in the institute
- Administered the student datacenter hardware infrastructure and migrated from virtualization to LXC
- Performed multiple on-site machine failure investigations and resolutions including hardware procurement

Overall Coordinator – Developers' Community — *Apr. 2019 – Jun. 2020*

- Led the community of software developers at the institute comprising of a 3-tier technical student team
- Developed a secure solution to digitize workflows in a decades-old system in emergency response to COVID-19
- Mentored a group of freshmen for writing maintainable production quality code and performing deployments

Undergraduate Researcher – 5G Core Testbed — *Aug. 2019 – Jan. 2020*

- Built and deployed an automated software testing framework within Jenkins for a 5G packet core
- Refactored a manual testing framework into an automated test suite with full containerization and diagnostics
- Dockerized all components with multi-stage optimized image building for deployment in production

Undergraduate Researcher – Natural Language Processing — *May – Jul. 2018*

- Worked on data processing and neural net architecture for correcting grammatical errors with deep learning
- Trained and deployed the model on Google's Tensor Processing Units (TPUs) over Google Cloud Platform

Teaching Assistant – CS101, Student Support Services — *Jun. – Nov. 2018*

- Volunteered for conducting doubt-solving and additional learning sessions for 100+ freshmen in CS 101

Instructor – Web Development, Technical Summer School — *Jun. 2018*

- Conducted a 6-day summer course on web development with 50+ UG/PG students from diverse backgrounds
- Covered topics including networking, HTML/CSS/JS, REST APIs, best practices etc. in 18 hours of lecture time

Mercari, Inc. Tokyo, Japan

Backend Software Engineering Intern – Product Catalog *Jul. 2019*

- Worked in an agile team to develop an industry-grade management tool for an arbitrarily large dataset
- Set up continuous integration and deployment over Kubernetes using CircleCI and Terraform
- Achieved 99% automated test coverage on the API through unit testing with Golang's testing framework
- Ideated and deployed a Redis in-memory full text search solution after risk analysis against alternative

Projects

NDN-Play | *Angular, NDNts* *May 2021 – Present*

- Developed a network simulator and visualizer for running NDN experiments completely in the browser
- Created logic for simple packet routing and forwarding, and added topology, security and trust visualization
- Integrated a text editor with syntax completion to let the user run arbitrary code on the simulated nodes

InstiApp | *Django, Angular, Android, Flutter* *Jan. 2018 – Jun. 2020*

- Led a team of 20+ developers in developing a FOSS student activity platform stack with 8000+ active users
- Implemented a non-linear model to map real-time geolocation coordinates to an artistic isometric projection

Cerium Forms | *Golang, Angular, MongoDB* *Jun. 2019*

- Developed a highly accurate open-source Google Forms clone for self-defined authorization with OAuth2
- Designed a high performance indexed data structure for response collection and querying with MongoDB

Mood Indigo Ferrous | *ASP.NET Core, Angular, Postgres* *Jan. – Dec. 2018*

- Ideated and developed a system for distributing accommodation efficiently to 5000+ people in one day
- Developed a live monitoring and statistical analysis dashboard with a SignalR WebSocket implementation

Mood Indigo 2018 Official Website | *CSS3, JavaScript, React* *Sep. 2018*

- Developed the official website of Asia's largest college cultural festival, with over 1,000,000 pageviews
- Designed the responsive layout, performed SEO tasks and automated optimization and deployment over CI

Cross-Platform Aveyond | *Ruby, C++, GLES, Java, WebAssembly* *2015 – 2019*

- Ported eight Windows games to Linux, macOS and Android using a popular open source engine
- Ported the GLES game engine to the web with Emscripten and adapted for asynchronous asset loading

Course Projects

Concurrent Kernel Execution with CUDA | CS259 | *CUDA* *May – Jun. 2021*

- Evaluated performance improvements by executing multiple kernels concurrently over NVIDIA CUDA
- Analyzed and compared serial and concurrent execution on real-world kernels to demonstrate speedups

Collaborative Video Stitching with Spark | CS219 | *PySpark, OpenCV* *Jan. – Mar. 2021*

- Designed a simple system for image-stitching multiple video sources over a distributed computing system

Gaming Accelerator for LTE | CS211 | *Java, Android NDK* *Oct. – Dec. 2020*

- Designed a daemon application for latency reduction over LTE leveraging predicatable traffic patterns
- Evaluated various approaches for ultra-low latency communication between processes and native code

Reviving ChronoChat | CS217A | *C++, NDN* *Nov. – Dec. 2020*

- Refactored an old code base to restore a Qt chat application built over NDN's ChronoSync protocol

Project Golden Snitch | ME423 | *MSC ADAMS, SolidWorks, MATLAB* *Aug. – Nov. 2019*

- Designed and fabricated a working scale model of a fiber micro-ornithopter with a team of 10 peers
- Analyzed, modified and implemented models from existing research work for the wing flapping mechanism

Force and Surface characteristics in High Speed Microgrinding | ME338 | *GNU Octave* *Nov. 2018*

- Carried out CNC-driven high speed slot microgrinding with varying parameters on a Zirconia slab
- Processed the signal data for bias and noise removal using Fast Fourier Transforms and analyzed the results

Cats vs Dogs using Transfer Learning | CS403 | *Python, TensorFlow* *Dec. 2017*

- Applied various Convolutional Neural Network models to the classical binary classification problem
- Compared the results after applying transfer learning with AlexNet by retraining the prediction layer

Achievements & Awards

Honors

- Awarded the Institute Technical Roll of Honour, the highest student award of IIT Bombay *2020*
- Awarded the Institute Technical Colour for exceptional contributions to the student community *2019*
- Awarded the prestigious National Talent Search Examination Scholarship by the Government of India *2014*

Achievements

- All India Rank 1021 in JEE Advanced among 150,000 candidates for entrance into IITs *2016*
- All India Rank 519 in JEE Main among 1.2 million candidates *2016*
- All India Rank 276 in Kishore Vaigyanik Protsahan Yojana (KVPY), SX stream *2015*
- Qualified within top 1 percentile for Indian National Physics Olympiad *2015*
- Cleared the Maharashtra Talent Search Examination with State Ranks 8, 11 & 7 *2012 – 2014*

Prizes

- Most Promising Hack, 11th NDN Hackathon *2021*
- College winning entry, Microsoft codefundo++ *2019*
- First runner up, Mercari x Top Career Hackathon India *2017*