

# Varun Patil

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## EDUCATION

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### University of California, Los Angeles

*M.S. Computer Science*

California, USA

2020 – Present

### Indian Institute of Technology Bombay

*B.Tech, Mechanical Engineering*

*Minor in Computer Science and Engineering, Institute Technical Roll of Honour*

Mumbai, India

2016 – 2020

## EXPERIENCE

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### UCLA

*Graduate Student Researcher – Internet Research Laboratory*

Los Angeles, California

*Apr. 2021 – Present*

- Conducting research on Named Data Networking with focus on distributed data synchronization protocols

#### Publications

– 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

*Software Architect & Developer – Single Sign On, Computer Centre*

Mumbai, India

*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

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**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

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**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

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### 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*