

# Varun Patil

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## EDUCATION

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### University of California, Los Angeles

*Ph.D. Candidate, Computer Science (Advisor: Lixia Zhang)*  
*M.S. Computer Science*

California, USA  
*Dec. 2020 – present*  
*Sep. 2020 – Dec. 2021*

### Indian Institute of Technology Bombay

*B.Tech. Mechanical Engineering*  
*Minor in Computer Science and Engineering, Institute Technical Roll of Honour*

Mumbai, India  
*Jun. 2016 – Aug. 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

- **Patil**, Desai, Zhang, 2022. *Kua: A Distributed Object Store over Named Data Networking*. ACM ICN '22
- Moll, **Patil** et al. 2022. *The Evolution of Distributed Dataset Synchronization Solutions in NDN*. ACM ICN '22
- **Patil**, Song, Xiao, Zhang, 2022. *Scaling State Vector Sync*. ACM ICN '22
- Moll, **Patil**, Zhang, Pesavento, 2021. *Resilient Brokerless Publish-Subscribe Over NDN*. IEEE 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

### LabN Consulting, L.L.C.

*Software Engineering Intern – LCPS*

North Bethesda, Maryland  
*Jun. – Sep. 2022*

- Worked on porting a legacy implementation of the RSVP-TE protocol to the FRRouting software suite
- Ported the legacy code and tests to run on 64-bit hardware and implemented shims for integration with FRR

### 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

## SOFTWARE PROJECTS

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**NDN Play** | *Angular, NDNts*

*2021 – 2023*

- Network simulator and visualizer for running NDN experiments completely in the browser
- Features logic for simple packet routing and forwarding, topology manipulation and live traffic visualization
- Includes a code editor with syntax completion to let the user run custom code on the simulated nodes
- Supports integration with Mini-NDN, acting as a web interface to an emulated network topology

**Memories** | *PHP, Vue.js* | 800+ GitHub stars

*2022 – 2023*

- Efficient and feature-rich photo management app for Nextcloud, supporting large media libraries
- First FOSS self-hosted photo manager to have all basic features of commercial alternatives

**Imperials** | *Golang, React*

*2021 – 2022*

- Free (and ad-free) web alternative to the Settlers of Catan board game with beautiful graphics

**InstiApp** | *Django, Angular, Android, Flutter*

*2018 – 2020*

- Open source university student activity platform for events, organizations, news, food, maps, etc.
- Basic functionality covers notifications, a search engine and hierarchical permissions and access control
- More advanced features include event advertisements to targeted groups, users interests, achievements etc.
- The project uses 8+ programming languages, supports all major platforms and has 100% backend test coverage
- I led the original team of 10+ developers, and the IIT Bombay deployment had 8000+ active users in 2020

**Cerium** | *Golang, Angular*

*2019*

- A highly accurate open source clone of Google Forms for custom authentication with OAuth2

**Ferrous** | *ASP.NET, Angular*

*2018*

- Event-management suite for handling attendee accommodation featuring live monitoring and analysis
- Successfully deployed and utilized for managing 5000+ attendees in one day at Mood Indigo 2018

**Mood Indigo 2018 Official Website** | *Vanilla JS*

*2018*

- The official website of Asia's largest college cultural festival, with over 1,000,000 annual pageviews

**MKXP Ports** | *Ruby, C++, GLES, Java, WebAssembly*

*2015 – 2019*

- Eight Windows games ported 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

## 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

- “Great Engineering Hack Award” (YaNFD performance), 13th NDN Hackathon *2022*
- “Most Promising Hack” (NDN Play), 11th NDN Hackathon *2021*
- College winning entry, Microsoft codefundo++ *2019*
- First runner up, Mercari x Top Career Hackathon India *2017*