

# Kumar Kshitij Patel | CV

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**Research Goal:** I want to further our understanding of optimization algorithms in practically relevant settings, i.e., with distributed computation, online environments, strategic agents, and non-convexity.

## Education

- **Toyota Technological Institute at Chicago** **Chicago, USA**  
*Ph.D., Expected: June, 2025, Advisors: Nathan Srebro, Lingxiao Wang* *2019–Present*  
*M.S. in Computer Science, Granted in 2021*
- **École Polytechnique Fédérale de Lausanne** **Lausanne, CH**  
*Two Academic Exchange Semesters* *2017–2018*
- **Indian Institute of Technology Kanpur** **Kanpur, IND**  
*B.Tech., Computer Science and Engineering* *2015–2019*

## Publications

- **Patel K. K.**, Saha A., Srebro N., & Wang L. (2022). Distributed online and bandit convex optimization. OPT'22 Workshop, NeurIPS'22. [PDF]
- Yunis D., **Patel K. K.**, Savarese P., Vardi G., Livescu K., & Walter M. (2022). On convexity and linear mode connectivity. OPT'22 Workshop, NeurIPS'22. [PDF]
- **Patel K. K.**, Wang L., Woodworth B., Bullins B. & Srebro N. (2022). Towards optimal communication complexity in distributed non-convex optimization. NeurIPS'22 [Talk][PDF]
- Bullins B.\*, **Patel K. K.\***, Shamir O.\*, Srebro N.\* & Woodworth B.\* (2021). A stochastic newton algorithm for distributed convex optimization. NeurIPS'21. \*Alphabetical ordering [PDF]
- Woodworth B., **Patel K. K.** & Srebro N. (2020). Minibatch vs local SGD for heterogeneous distributed learning. NeurIPS'20. [Talk][PDF]
- Woodworth B., **Patel K. K.**, Stich S.U., Dai Z., Bullins B., McMahan B., Shamir O. & Srebro N. (2020). Is local SGD better than minibatch SGD? ICML'20. [Talk] [PDF]
- Lin T., Stich S.U., **Patel K. K.** & Jaggi M. (2019). Don't use large mini-batches, use local SGD. ICLR'20. [Talk][PDF]
- **Patel K. K.** & Dieuleveut A. (2019). Communication trade-offs for synchronized distributed SGD with large step-size. NeurIPS'19. [PDF]
- Kapoor S., **Patel K. K.** & Kar, P. (2018). Corruption-tolerant bandit learning. Machine Learning Journal, Springer. [Journal][PDF]

## Work Experience

- **Applied Scientist Intern, Amazon AWS** **Seattle, USA**  
*Advisors: Dr. Srinivasan Sengamedu, Dr. Omer Tripp, Codeguru Team* *Jun 2020–Sept 2020*  
Worked on using deep language models: BERT and GPT-2, for detecting leakage of sensitive information in Java code, in symbiosis with program analysis tools. My project significantly advanced the adoption of deep learning to taint analysis in CodeGuru, and helped their customer facing application.

## Awards and Achievements

- Recipient of **Honda Young Engineer and Scientist's (Y-E-S) Fellowship 2017**, awarded to only 14 undergraduates in India for their academic and research work.

- Recipient of **Academic Excellence Award 2015** at IIT Kanpur.
- **Represented India** as a part of the Youth Delegation to Nepal organized by the Govt. of India.
- **All India Rank 200** in JEE-Adv. 2015, and **99.9 %-tile** in JEE-Mains 2015 out of 1.3M students.

## Service and Professional Activities

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### Teaching

- Teaching assistant for the Convex Optimization course at TTIC (Winter'22).
- Teaching assistant and co-organizer for Research at TTIC Colloquium (Fall'20 -Winter'21).

### Reviewing

- For STOC'21, JMLR, TMLR, Springer Machine Learning Journal, ICML'21,22, NeurIPS'21,22, ICLR'22,23, AISTATS'22,23. Several **top reviewer** awards.

### Organization

- Co-organizer of Machine Learning and Optimization reading group at TTIC, Winter'21-Spring'22.
- Co-organized the TTIC Student Workshop 2021.
- Co-started the TTIC/UChicago Student Theory Seminar.
- Scholar award for NeurIPS'22, session chair at ICML'22, volunteer for ICLR'20, and ICML'20.

### Committees

- Student member of the Sexual Misconduct Policy Committee at TTIC (2021).

### Participation

- Participant in the Mathematics of Deep Learning collaboration led by Simons Foundation, UC Berkeley; attending periodic presentations, reading groups, and meetings.
- Attended the Machine Learning Summer School 2020 organized by Max Plank Institute for Intelligent Systems, Tübingen, Germany.

## Relevant Coursework and Skills

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### Machine Learning

- **Theory:** Convex Optimization, Statistical and Computational Learning Theory, Online Learning and Optimization, Bayesian Machine Learning, Information Theory and Coding.
- **Applications:** Topics in Machine Learning Systems, Introduction to Deep Learning, Computer Vision, Natural Language Processing.

### Mathematics and Statistics

- Real Analysis (3-qtr sequence), Measure Theoretic Probability (2-qtr sequence), Numerical Linear Algebra, Time Series Analysis, Applied Stochastic Processes.

### Computer Science

- Algorithms, Theory of Computation, Operating Systems, Database Design, Compiler Design.

### Programming

- **Languages:** Python, C, R,  $\text{\LaTeX}$ , HTML-CSS, C++, Matlab, SQLite, Assembly.
- **Packages:** PyTorch, Keras, Scikit, Gensim, NLTK, XGBoost, CVXPY.

## Other Activities

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- **Mentorship:** Peer Mentor to a first year PhD student at TTIC (2020), mentor to first-year computer science undergraduates for an introductory project on machine learning (2016), and a student guide to six students at the counselling service, at IIT Kanpur (2016).
- **Community Welfare:** Undergraduate head of *Raktarpan* (2016-17), an NGO that works in blood donation. Helped with drafting a plan for solar power generation at IIT Kanpur.