

# Mo Tiwari

[mohittiwari@stanford.edu](mailto:mohittiwari@stanford.edu) | (415) 234 – 3187  
[motiwari.com](http://motiwari.com) | U.S. Citizen

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## EDUCATION:

<b>Stanford University</b> , Stanford, CA <u>Ph.D.</u> in Computer Science <i>Thesis: "Accelerating Machine Learning Algorithms with Adaptive Sampling"</i> <i>Areas: deep learning, multi-armed bandits, randomized algorithms</i> <i>Advisors: Sebastian Thrun and Chris Piech</i> <i>Received over <b>\$800,000</b> in fellowships</i>	<b>GPA: 4.2+</b>	2017 – 2023
<u>M.S.</u> in Computer Science (completed during Ph.D.)	<b>GPA: 4.2+</b>	June 2019
<b>California Institute of Technology</b> , Pasadena, CA <i>Top 5% of Graduating Class (Top 15 students)</i>	<b>GPA: 4.0+</b>	2010 – 2013
<u>B.S.</u> in Mathematics with Honors	<b>GPA: 4.0+</b>	June 2013
<u>B.S.</u> in Physics with Honors	<b>GPA: 4.0+</b>	June 2013
<b>Columbia University – Columbia College</b> , New York, NY	<b>GPA: 4.0+</b>	2009 – 2010

## RECENT INDUSTRY EXPERIENCE:

<b>MEMBER OF TECHNICAL STAFF – OPENAI, INC.</b> <ul style="list-style-type: none"><li>Under NDA. Sorry!</li></ul>	2024 – Present
<b>SOFTWARE ENGINEER, TECHNICAL LEAD – FACEBOOK, INC.</b> <ul style="list-style-type: none"><li>Technical lead of the team building ThreatExchange, Facebook's platform for sharing cybersecurity information</li><li>Led product and feature development through 5 major releases that grew the number of enterprise customers from 92 to 500+</li><li>Managed 3 interns who received and accepted fulltime offers</li></ul>	2015 – 2017
<b>SECURITY RESEARCH SCIENTIST – EXPANSE, INC. (acquired for \$800MM)</b> <ul style="list-style-type: none"><li>As the fifth fulltime employee, performed the first systematic, continuous, and Internet-scale capture and analysis of device data and security vulnerabilities</li><li>Built backend and frontend infrastructure to help analysts understand terabytes of prostitution advertisements and uncover human trafficking</li><li>Work indirectly led to arrests of dozens of human traffickers and rescue of victims</li></ul>	2014 – 2015

## SELECTED PUBLICATIONS:

- **Mo Tiwari**, Ryan Kang\*, Je-Yong Lee\*, Luke Lee\*, Chris Piech, Ilan Shomorony, Sebastian Thrun, Martin Zhang. “Faster Maximum Inner Product Search in High Dimensions.” [International Conference on Machine Learning \(ICML\)](#) 2024.
- **Mo Tiwari\***, Colin Sullivan\*, Sebastian Thrun. “MAPTree: Beating ‘Optimal’ Decision Trees with Bayesian Decision Trees.” [AAAI Conference on Artificial Intelligence \(AAAI\)](#) 2024.  
**Selected for Oral Presentation: top 9.5% / 2.3% of accepted / submitted papers**
- **Mo Tiwari**, Ryan Kang, Luke Lee, Sebastian Thrun, Ilan Shomorony, Martin Zhang. “BanditPAM++: Faster  $k$ -medoids Clustering.” [Neural Information Processing Systems \(NeurIPS\)](#) 2023.
- **Mo Tiwari\***, Guy Blanc\*, Jane Lange\*, Chirag Pabbaraju\*, Colin Sullivan\*, Li-Yang Tan\* (listed alphabetically). “Harnessing the Power of Choices in Decision Tree Learning.” [Neural Information Processing Systems \(NeurIPS\)](#) 2023.
- Aarohi Srivastava, ..., **Mo Tiwari**, ..., Ziyi Wu (444 authors, listed alphabetically). “Beyond the Imitation Game: Quantifying and Extrapolating the Capabilities of Language Models.” [Transactions on Machine Learning Research \(TMLR\)](#) 2023.
- Yoshua Bengio\*, Salem Lahlou\*, Tristan Deleu\*, Edward Hu, **Mo Tiwari**, Emmanuel Bengio. “GFlowNet Foundations.” [Journal of Machine Learning Research \(JMLR\)](#) 2023.
- Kausthubh D. Dhole, ..., **Mo Tiwari**, ..., Yue Zhang (122 authors). “NL-Augmenter: A Framework for Task-Sensitive Natural Language Augmentation.” [Northern European Journal of Language Technology \(NEJLT\)](#) 2023.
- **Mo Tiwari**, Ryan Kang, Je-Yong Lee, Chris Piech, Ilan Shomorony, Sebastian Thrun, Martin Zhang. “MABSplit: Faster Forest Training Using Multi-Armed Bandits.” [Neural Information Processing Systems \(NeurIPS\)](#) 2022.
- Qi Liu, ..., **Mo Tiwari**, ..., Shiew-Mei Huang (13 authors). “Landscape Analysis of the Application of Artificial Intelligence and Machine Learning in Regulatory Submissions for Drug Development from 2016 to 2021.” [Clinical Pharmacology and Therapeutics](#) 2022.
- **Mo Tiwari**, Martin Zhang, James Mayclin, Sebastian Thrun, Chris Piech, Ilan Shomorony. “BanditPAM: Almost Linear Time  $k$ -medoids Clustering via Multi-Armed Bandits.” [Neural Information Processing Systems \(NeurIPS\)](#) 2020.
- **Mo Tiwari**, ..., Charles C. Lin (13 authors). “Differentiation of Active Corneal Infections from Healed Scars Using Deep Learning.” Journal paper in [Ophthalmology](#). **Best Poster Award at associated conference, American Academy of Ophthalmology (AAO)** 2020.
- Serhat Arslan, **Mo Tiwari**, Chris Piech. “Using Google Search Trends to Estimate Global Patterns in Learning.” [ACM Learning @ Scale \(L@S\)](#) 2020.

## OPEN SOURCE CONTRIBUTIONS:

- **BanditPAM**: <https://github.com/motiwari/BanditPAM>. **Primary author, 600+ stars.**  
A high-performance Python package, written in C++, that implements the algorithm from our NeurIPS 2020 paper and is pip-installable via `pip install banditpam`.

## **TEACHING AND MENTORSHIP:**

- **Course Assistant for Client-Side Internet Technologies (CS 193C):** Graded assignments, provided feedback, and answered questions for over 100 students each quarter during the summers of 2020 and 2021. Recruited top students for research projects.
- **EDGE Mentor:** Mentored three early Ph.D. students in Computer Science at Stanford University through a formal, funded appointment.
- **Ph.D. Student Mentor:** Managed over a dozen undergraduate, M.S., and junior Ph.D. students at Stanford University. Upward reviews available upon request.

## **ADDITIONAL RESEARCH EXPERIENCE:**

### **RESEARCHER – JOHN PRESKILL GROUP**

2011 – 2012

- With Prof. John Preskill, Dr. Spiros Michalakis, Dr. Jeongwan Haah at Caltech, proved that a certain class of quantum systems would never function as a form of quantum storage, eliminating their viability in a quantum computer

### **RESEARCHER – LARGE HADRON COLLIDER (LHC)**

Summer 2010

- Analyzed the first data from the Compact Muon Solenoid (CMS) experiment at the LHC, where the Higgs Boson was later discovered
- Discovered and corrected experimental defects by analyzing Missing Transverse Energy to calibrate experimental setups
- Later received admission to the Ph.D. program in Physics at MIT to continue research on this experiment

### **RESEARCHER – YORKTOWN HIGH SCHOOL**

2007 – 2009

- Developed an assistive aid to help patients with physical disabilities complete exercises
- Device led to an 80% increase in patients' exercise completion rate and a 34% decrease in recovery time
- Won third place in category internationally at Intel ISEF 2009

## **INVITED TALKS:**

- **Highlights of Algorithms 2021 (HALG21) Conference:** "BanditPAM: Almost Linear Time  $k$ -Medoids Clustering via Multi-Armed Bandits."
- **U.S. Food and Drug Administration:** "An Introduction to Clustering, Multi-armed Bandits, and BanditPAM."
- **Twitch:** "Novel Data Augmentation, Multi-Armed Bandits, and more: New Machine Learning Techniques for Twitch Safety."
- **C3.ai:** " $k$ -medoids Clustering and Multimodal Data Augmentation."
- **Facebook:** "ThreatExchange v2.8 Webinar." Joint presentation. [Youtube](#).
- **Microsoft Security Research Alliance:** "Tracking Advanced Persistent Threats with ThreatExchange." Joint presentation.

## **ACADEMIC HONORS:**

- Stanford Data Science Scholarship 2022 – 2024
  - 1 of 16 graduate student awardees, University-wide, in cohort
  - 1 of 71 awardees since award inception in 2018
- Stanford Center for Open and Reproducible Science Innovator Prize 2021
  - 1 of 2 University-wide inaugural awardees
- Stanford Interdisciplinary Graduate Fellowship (SIGF) 2020 – 2023
  - Full funding for the Ph.D. for 3 years
  - 1 of 33 graduate student awardees, University-wide, in cohort
  - 1 of 295 awardees since award inception in 2008
- J.P. Morgan AI Research Ph.D. Fellowship 2020
- Oak Ridge Institute for Science and Education (ORISE) Fellowship 2019 – Present
- UnifyID Fellow (Declined) 2018
- Pear VC Fellow 2017 – Present
- NSF Graduate Research Fellowship Program Honorable Mention 2013
- Caltech Summer Undergraduate Research Fellowship (SURF) 2011, 2012
- IBM T.J. Watson Memorial Scholarship 2009 – 2012
- Caltech - San Pietro Travel Prize Recipient 2011
- I. I. Rabi Scholarship 2009 – 2010
- Intel International Science and Engineering Fair (ISEF) - Third place 2009