

## Education

- Jan 2022 – Present **Ph.D. Electrical and Computer Engineering**, *Princeton University*, New Jersey, United States.  
Advisor: Professor [Chi Jin](#). GPA: 3.96/4.0.
- Oct 2015 – Aug 2020 **B.Sc. Computer Engineering**, *Cairo University*, Egypt.  
GPA: Distinction with Honors (91.3%). Rank: 3<sup>rd</sup>/64.

## Work Experience

- May–Sep 2023 **Research Scientist Intern**, *Meta*, New York City, New York, United States.  
Research scientist intern at the Fundamental AI Research Team at Meta working with [Aaron Defazio](#). Worked on adaptive optimization.
- Jun–Oct 2020 **Research Intern**, *KAUST*, Saudi Arabia.
- Jun–Sep 2019 Research intern in the group of Professor [Peter Richtárik](#). Worked on federated learning and optimization.
- Aug–Sep 2018 **Undergraduate Research Assistant**, *Cairo University*, Egypt.  
Worked with Professors [Amir Atiya](#) and [Ahmed Abdel-Gawad](#) on fast matrix multiplication algorithms. Wrote code in CUDA C.
- Jun–Aug 2016/2017 **Nafham**, *Intern*.  
Recorded more than 40 educational videos on high school mathematics and wrote web pages in HTML, JavaScript, & CSS, and PHP with Bootstrap and Laravel.

## Awards

- 2023 **School of Engineering and Applied Sciences (SEAS) Travel Grant**, *Princeton University*.  
Awarded a travel grant worth used towards going to ICLR 2023.
- 2020/2022 **Top reviewer**, *various conferences*.  
One of the top 10% of reviewers for ICML 2022 (awarded free registration, July 2022), [AISTATS 2022](#) (awarded Feb. 2022) and NeurIPS 2020 (awarded free registration, Oct. 2020).
- Oct 2020 **INFORMS Undergraduate Operations Research Prize Finalist**, *Institute for Operations Research and the Management Sciences (INFORMS)*.  
One of ten finalists selected to give a presentation on outstanding research done as an undergraduate.
- Jan 2020 **SIGAPP Student Travel Award**, *ACM*, (Declined).  
Travel award worth \$700 used towards going to the ACM SAC 2020 conference. Declined due to Covid.
- Sep 2019 **Mentor Achievement Award**, *Learn IT, Girl 4th Edition*.  
Awarded for successfully mentoring Natalia Grzywalska over March–June 2019 in learning IT.
- Feb 2021 **UW College of Engineering Dean's Fellowship**, *UWashington*, (Declined).  
Four-year fellowship offered to the top incoming doctoral applicants at the University of Washington.
- 2015–2020 **Cairo University Excellence Award**.  
Awarded for obtaining overall distinction grade in every semester.

## Papers

### Conference papers

- (1) **A. Khaled**, Chi Jin - [Tuning-Free Stochastic Optimization](#) - arXiv:2402.07793 (2024), To appear in ICML 2024.
- (2) **A. Khaled**, Konstantin Mishchenko, and Chi Jin - [DoWG Unleashed: An Efficient Universal Parameter-Free Gradient Descent Method](#) - NeurIPS 2023.
- (3) **A. Khaled** and Chi Jin - [Faster federated optimization under second-order similarity](#) - ICLR 2023.

- (4) Konstantin Mishchenko, **A. Khaled**, and Peter Richtárik - [Proximal and Federated Random Reshuffling](#) - ICML 2022.
- (5) Elnur Gasanov, **A. Khaled**, Samuel Horváth, and Peter Richtárik - [FLIX: A Simple and Communication-Efficient Alternative to Local Methods in Federated Learning](#) - AISTATS 2022.
- (6) Konstantin Mishchenko, **A. Khaled**, and Peter Richtárik - [Random Reshuffling: Simple Analysis with Vast Improvements](#) - NeurIPS 2020.
- (7) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - [Tighter Theory for Local SGD on Identical and Heterogeneous Data](#) - AISTATS 2020.
- (8) **A. Khaled**, Amir F. Atiya, Ahmed H. Abdelgawad - [Applying Fast Matrix Multiplication to Neural Networks](#) - ACM SAC 2020.

#### Journal papers

- (9) **A. Khaled**, Othmane Sebbouh, Nicolas Loizou, Robert M. Gower, and Peter Richtárik - [Unified Analysis of Stochastic Gradient Methods for Composite Convex and Smooth Optimization](#) - Journal of Optimization Theory and Applications (JOTA) 2023.
- (10) **A. Khaled** and Peter Richtárik - [Better Theory for SGD in the Nonconvex World](#) - Transactions of Machine Learning Research (TMLR) 2023.

#### Preprints

- (11) Aaron Mishkin\*, **A. Khaled\***, Yuanhao Wang, Aaron Defazio, and Robert M. Gower - [Directional Smoothness and Gradient Methods: Convergence and Adaptivity](#) - arXiv:2403.04081 (2024).
- (12) Abdurakhmon Sadiev, Grigory Malinovsky, Eduard Gorbunov, Igor Sokolov, **A. Khaled**, Konstantin Burlachenko and Peter Richtárik - [Federated Optimization Algorithms with Random Reshuffling and Gradient Compression](#) - arXiv:2206.07021 (2022).
- (13) Sélim Chraïbi, **A. Khaled**, Dmitry Kovalev, Peter Richtárik, Adil Salim, and Matrin Takáč - [Distributed Fixed Points Methods with Compressed Iterates](#) - arXiv:1912.09925 (2019).

#### Workshop papers

- (14) Aaron Mishkin\*, **A. Khaled\***, Aaron Defazio, and Robert M. Gower - [A novel analysis of gradient descent under directional smoothness](#) - Poster at the NeurIPS 2023 Optimization for ML workshop.
- (15) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - [Better Communication Complexity for Local SGD](#) - **Oral presentation** at the NeurIPS 2019 Federated Learning workshop.
- (16) **A. Khaled** and Peter Richtárik - [Gradient descent with Compressed Iterates](#) - Poster at the NeurIPS 2019 Federated Learning workshop.
- (17) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - [First Analysis of Local GD on Heterogeneous Data](#) - Poster at the NeurIPS 2019 Federated Learning workshop.

*Note: \* indicates joint first authorship.*

## Skills

Technical Python, C/C++,  $\LaTeX$ , Git.  
Languages English (fluent) and Arabic (native).

## Programming projects

- Style Transfer (Image Processing course project): Implemented Elad and Milanfar's Style-Transfer via Texture-Synthesis paper in Python using OpenCV, scikit-learn and NumPy. [Code](#), [Report](#).
- Gated Neural Networks (Multimedia course project): Implemented a gated neural nets algorithm (PAQ7) for compression in C++. Won 1<sup>st</sup> place out of 15 teams in a department-wide text compression contest. [Report](#).
- GoSlayer (Machine Intelligence course project): Led a team of sixteen people in implementing an AI agent that plays Go based on Monte-Carlo Tree Search and various heuristics. [Code](#), [Report](#).
- Arabic OCR (Pattern Recognition course project): Implemented Nashwan et al.'s A Holistic Technique for an Arabic OCR System paper in Python using OpenCV, scikit-learn, and NumPy, in addition to multiple other papers. [Code](#), [Report](#).
- PacMan (Microprocessors course project): Wrote a multiplayer PacMan-like game in pure x86 assembly with search-based AI. [Code](#).

## Teaching

- May 2024 **Optimization Short Course**, *MLx Fundamentals*, Oxford Machine Learning Summer School (OxML).  
Teaching assistant for a lecture on optimization at the MLx Fundamentals Oxford Machine Learning Summer School.
- Spring 2023 **ECE539/COS512**, *Princeton University*.  
Teaching assistant for ECE539: Optimization for Machine Learning. Graduate course on optimization.

## Volunteering

- October 2023 – **Mentor**, *Minds Matter New York City*.
- May 2024 Served as a mentor to students from underrepresented backgrounds in the NYC school system. Actively participated in weekly sessions and communicated regularly to support and inspire their academic and personal growth.