Ahmed Khaled

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Homepage
Scholar Profile

Education

Jan 2022 - Present **Ph.D. Electrical and Computer Engineering**, *Princeton University*, Princeton, New Jersey.
Anticipated graduation: December 2026.

Oct 2015 – Aug 2020 **B.Sc. Computer Engineering**, *Cairo University*, Egypt.
GPA: Distinction with Honors (91.3%). Rank: 3rd/64.

Work Experience

Jun–Oct 2020 **Research Intern**, *King Abdullah University of Science and Technology*, Saudi Arabia.
Remote research intern in the group of Professor Peter Richtárik. Worked on federated and convex composite optimization.

Jun–Sep 2019 **Research Intern**, *King Abdullah University of Science and Technology*, Saudi Arabia.
Worked in the group of Professor Peter Richtárik on stochastic optimization. Analyzed algorithms for distributed and non-convex optimization.

Aug–Sep 2018 **Undergraduate Research Assistant**, *Cairo University*, Egypt.
Worked with Professor Amir Atiya and Professor Ahmed Abdel-Gawad on fast matrix multiplication algorithms. Wrote code in CUDA C.

Jun–Aug 2016 **Nafham**, *Intern*.
Recorded more than 40 educational videos on high school mathematics and tutored multiple students in Arabic. Also wrote web pages in HTML, JavaScript, & CSS, and PHP with Bootstrap and Laravel.
Aug–Sep 2017

Awards

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 at the 2020 INFORMS annual meeting.

Sep 2019 **Mentor Achievement Award**, *Learn IT, Girl 4th Edition*.
Awarded for successfully mentoring Natalia Grzywalska over March–June 2019 in learning IT.

Papers

Conference papers

(1) Konstantin Mishchenko, **A. Khaled**, and Peter Richtárik - Proximal and Federated Random Reshuffling - ICML 2022.

(2) Elnur Gasanov, **A. Khaled**, Samuel Horváth, and Peter Richtárik - FLIX: A Simple and Communication-Efficient Alternative to Local Methods in Federated Learning - AISTATS 2022.

(3) Konstantin Mishchenko, **A. Khaled**, and Peter Richtárik - Random Reshuffling: Simple Analysis with Vast Improvements - NeurIPS 2020.

(4) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - Tighter Theory for Local SGD on Identical and Heterogeneous Data - AISTATS 2020.

(5) **A. Khaled**, Amir F. Atiya, Ahmed H. Abdelgawad - Applying Fast Matrix Multiplication to Neural Networks - ACM SAC 2020.

Workshop papers

(1) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - Better Communication Complexity for Local SGD - *Oral presentation* at the NeurIPS 2019 Federated Learning Workshop.

(2) **A. Khaled** and Peter Richtárik - Gradient descent with Compressed Iterates - Poster at the NeurIPS 2019 Federated Learning Workshop.

(3) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - First Analysis of Local GD on Heterogeneous Data - Poster at the NeurIPS 2019 Federated Learning Workshop.

Preprints

(1) 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).

(2) **A. Khaled**, Othmane Sebbouh, Nicolas Loizou, Robert M. Gower, and Peter Richtárik - Unified Analysis of Stochastic Gradient Methods for Composite Convex and Smooth Optimization - arXiv:2006.11573 (2020).

(3) **A. Khaled** and Peter Richtárik - Better Theory for SGD in the Nonconvex World - arXiv:2002.03329 (2020).

(4) Sélim Chraibi, **A. Khaled**, Dmitry Kovalev, Peter Richtárik, Adil Salim, and Matrin Takáč - Distributed Fixed Points Methods with Compressed Iterates - arXiv:1912.09925 (2019).

Skills

Technical: Python, C/C++, LaTeX, Git.

Languages: English (fluent) and Arabic (native).

Software & course projects

These projects involved implementing research papers from scratch.

- Image Processing: Implemented Elad and Milanfar's Style-Transfer via Texture-Synthesis paper in Python using OpenCV, scikit-learn and NumPy. Code, Report.
- Multimedia: Implemented a gated neural nets algorithm (PAQ7) for compression in C++. Won 1st place out of 15 teams over the department for the best compression ratio on an Arabic text dataset. Report.
- Pattern Recognition: 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.