

Ahmed Abdelkader

CONTACT	<i>E-mail:</i> ahmadabdolkader at gmail.com	<i>WWW:</i> https://akader.netlify.app
ABOUT ME	My research tackles fundamental challenges in geometry acquisition and modeling, drawing upon deep theoretical insights to devise novel data representations with a track-record of top-tier publications. I thrive in fast-paced multidisciplinary teams, and have a passion for education and mentoring.	
RESEARCH	Computational Geometry, 3D Modeling, Computational Photography, Machine Learning.	
CURRENT APPOINTMENT	Google Research , Mountain View, CA Research Scientist – Face Authentication	Jun 2022 - now
	End-to-end ownership of geometry-based spoof detectors. Independently research and deliver novel ML models and critical analyses for next-gen devices. Lead data collection and tooling.	
PROFESSIONAL EXPERIENCE (SELECTED)	University of Texas , Austin, TX <i>Postdoctoral Fellow</i> – The Oden Institute for Computational Engineering & Sciences	Sep 2020 - May 2022
	Independently researched and published in computational geometry and machine learning.	
	Sandia National Laboratories , Albuquerque, NM <i>Visiting Researcher</i> – Computer Science Research Institute	2015 ~ 2019
	Designed and delivered thorough theoretical analysis of a first-of-kind meshing algorithm: VoroCrust.	
	Nezal Entertainment , Alexandria, Egypt <i>Part-time Game Developer</i>	2011 ~ 2012
	Delivered i18n and physics effects for Crowds. Prototyped story-panel gaming with rich animations.	
	Google Inc. , Mountain View, CA <i>Intern Site Reliability Engineer</i> – GMail SRE	Jun – Oct 2011
	Delivered advanced statistical monitoring of staging servers, and diurnal analyses for load balancing.	
	Google Switzerland GmbH , Zürich, Switzerland <i>Intern Software Engineer</i> – GMail Spam, Abuse and Delivery	Jul – Sep 2010
	Delivered core engine for advanced bot detection, which now serves billions of QpS across platforms.	
	Microsoft Corporation , Redmond, WA <i>Intern Software Design Engineer in Test</i> – Core Operating System Division	Jun – Sep 2008
	Prototyped physical key-press tests, and experimented with input parameter inference for fuzz testing.	
EDUCATION	Ph.D. in Computer Science University of Maryland, College Park, MD	Fall 2013 – Summer 2020
	<ul style="list-style-type: none">Thesis: Adaptive Sampling for Geometric Approximation	
	M.Sc. in Engineering Mathematics Alexandria University, Alexandria, Egypt	Spring 2010 – Summer 2013
	<ul style="list-style-type: none">Thesis: Optimization Problems in Visual Surveillance	
	B.Sc. in Computer Engineering Alexandria University, Alexandria, Egypt	Fall 2004 – Spring 2009
	<ul style="list-style-type: none">Thesis: Device-free Passive Localization in Wi-Fi Networks	

The Intrinsic Dimension of Images and Its Impact on Learning

Int. Conf. on Learning Representations (ICLR), 2021

Phillip Pope, Chen Zhu, A. A., Micah Goldblum, Tom Goldstein

Detection as Regression: Certified Object Detection by Median Smoothing

Advances in Neural Inf. Proc. Sys. (NeurIPS), 2020

Ping-yeh Chiang, Michael Curry, A. A., Aounon Kumar, John Dickerson, Tom Goldstein

Certified Defenses for Adversarial Patches

Int. Conf. on Learning Representations (ICLR), 2020

Ping-yeh Chiang*, Renkun Ni*, A. A., Chen Zhu, Chris Studor, Tom Goldstein

Headless Horseman: Adversarial Attacks on Transfer Learning Models

IEEE Conf. on Acoustics, Speech, and Signal Processing (ICASSP), 2020

A. A., M. Curry, L. Fowl, T. Goldstein, A. Schwarzschild, M. Shu, C. Studer, C. Zhu

SHAPE MODELING

VoroCrust: Voronoi Meshing without Clipping

ACM Trans. on Graphics (ToG) & SIGGRAPH 2020

A. A., C. Bajaj, M. Ebeida, A. Mahmoud, S. Mitchell, J. Owens, A. Rushdi

Sampling Conditions for Conforming Voronoi Meshing by the VoroCrust Algorithm

Symp. on Computational Geometry (SoCG), 2018

A. A., C. Bajaj, M. Ebeida, A. Mahmoud, S. Mitchell, J. Owens, A. Rushdi

A Constrained Resampling Strategy for Mesh Improvement

Symp. on Geometry Processing (SGP), 2017

A. A.*, Ahmed Mahmoud*, Ahmad Rushdi, Scott Mitchell, John Owens, Mohamed Ebeida

CYBER-PHYSICAL SYSTEMS

Argus: Realistic Target Coverage by Drones

ACM/IEEE Int. Conf. on Information Processing in Sensor Networks (IPSN), 2017

Ahmed Saeed, A. A., Azin Neishaboori, Mouhyemen Khan, Khaled Harras, Amr Mohamed

– Full version in the ACM Trans. on Sensor Networks (TOSN), 2019

Visibility Induction for Discretized Pursuit-Evasion Games

AAAI Conf. on Artificial Intelligence (AAAI), 2012

A. A., Hazem El-Alfy

Analysis of a Device-free Passive Tracking System in Typical Wireless Environments

Int. Conf. on New Technologies, Mobility and Security (NTMS), 2009

Ahmed Kosba, A. A., Moustafa Youssef

APPROXIMATION ALGORITHMS

Convex Approximation and the Hilbert Geometry

SIAM Symp. on Simplicity in Algorithms (SOSA), 2024

A. A., David M. Mount

Smooth Distance Approximation

European Symp. on Algorithms (ESA), 2023

A. A., David M. Mount

Approximate Nearest-Neighbor Search for Line Segments

Symp. on Computational Geometry (SoCG), 2021

A. A., David M. Mount

Approximate Nearest Neighbor Searching with Non-Euclidean and Weighted Distances

ACM-SIAM Symp. on Discrete Algorithms (SODA), 2019

A. A., Sunil Arya, Guilherme da Fonseca, David M. Mount

HONOURS
& AWARDS

Peter O'Donnel, Jr. Postdoctoral Fellowship, University of Texas, Austin, 2020-2022.
Ann G. Wylie Dissertation Fellowship, University of Maryland, College Park, 2019.
Dean's Fellowship, University of Maryland, College Park, 2013-2014.
Honorable Mention, The ACM International Collegiate Programming Contest - World Finals, 2011.
Bronze medal, Egyptian Olympiad in Informatics, 2006.

SERVICE
(SELECTED)

Conference Reviewer/Sub-reviewer

- Annual Conf. on Neural Info. Proc. Systems (NeurIPS)
- Int. Conf. on Learning Representations (ICLR)
- Int. Conf. on Machine Learning (ICML)
- IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)
- IEEE Int. Conf. on Robotics and Automation (ICRA)
- IEEE Int. Conf. on Advanced Robotics (ICAR)
- IEEE Int. Conf. on Automation Science and Engineering (CASE)
- High-Performance Graphics (HPG)
- ACM-SIAM Symp. on Discrete Algorithms (SODA)
- Symp. on Computational Geometry (SoCG)
- Int. Symp. on Algorithms and Computation (ISAAC)
- Canadian Conf. on Computational Geometry (CCCG)

Journal Reviewer/Sub-reviewer

- Algorithmica (ALGO)
- Mathematics of Computation
- The Visual Computer (TVCJ)
- Computers & Graphics
- IEEE Access
- Language Resources and Evaluation (LREV)
- Robotics and Automation Letters (RA-L)
- Computational Geometry Theory and Applications (CGTA)

TEACHING

University of Maryland, College Park, MD
Teaching Assistant

Fall 2013 – Fall 2016

CMSC 754: Computational Geometry (Fall 2016)
CMSC 351: Algorithms (Summer 2016)
CMSC 425: Game Programming (Spring 2016)
CMSC 451: Design and Analysis of Computer Algorithms (Fall 2015)
CMSC 250: Discrete Structures (Fall 2013, Spring 2014)

Alexandria University, Alexandria, Egypt
Teaching Assistant

Fall 2009 – Spring 2013

Calculus, Differential Equations, Numerical Methods, Probability, Linear Algebra, C Programming, Object Oriented Programming, Data Structures, Algorithms, Machine Learning, Automata Theory.

MISC

Course project for ugrad CG: a 3D extension of World of Goo; see the report and demo video.