Ahmed H. Mahmoud
Curriculum Vitae

https://ahdhn.github.io
D475-32 Vassar Street
Cambridge, MA 02139
ahdhn@mit.edu
a.has.mahmoud@gmail.com
(530)-574-0901

RESEARCH EXPERIENCE

Massachusetts Institute of Technology, CSAIL　　　　　　　*September 2024–present*
Postdoctoral Associate

Autodesk Research, Toronto, Canada　　　　　　　*November 2020–May 2024*
Senior Research Scientist

University of California, Davis　　　　　　　*Spring 2016–October 2020*
Graduate Student Researcher

Autodesk Research, Toronto, Canada　　　　　　　*June–December 2019, July–November 2020*
Intern, Numerical Analysis Research

Shenzhen University, China　　　　　　　*June–September 2018*
Research intern at the Visual Computing Research Center

EDUCATION

University of California, Davis　　　　　　　*Spring 2024*
Ph.D. in Electrical and Computer Engineering

- Advisor: Prof. John D. Owens
- Dissertation: Unstructured Geometric Data Processing on the GPU: Data Structures & Programming Models

University of California, Davis　　　　　　　*Fall 2020*
M.Sc. in Electrical and Computer Engineering

Alexandria University, Egypt　　　　　　　*Spring 2013*
B.S. in Marine Engineering and Naval Architecture

- Very good with honors—ranked first

PUBLICATIONS

[1] *Low-Rank Adaptation of Neural Fields*
Anh Truong, **Ahmed H. Mahmoud**, Mina Konaković Luković, and Justin Solomon.
To appear in ACM Transactions on Graphics (SIGGRAPH Asia 2025).

[2] *Locality-Aware Automatic Differentiation on the GPU for Mesh-Based Computations*
Ahmed H. Mahmoud, Jonathan Ragan-Kelley, and Justin Solomon.
In submission

[3] *Dynamic Mesh Processing on the GPU*
Ahmed H. Mahmoud, Serban D. Porumbescu, and John D. Owens.
ACM Transactions on Graphics (SIGGRAPH 2021).

[4] *Disaggregated Design for GPU-Based Volumetric Data Structures*
Massimiliano Meneghin and **Ahmed H. Mahmoud**.
European Conference on Parallel and Distributed Computing (EuroPar 2025)

[5] *Optimized GPU implementation of grid refinement in lattice Boltzmann method*
Ahmed H. Mahmoud, Hesam Salehipour, and Massimiliano Meneghin
International Parallel and Distributed Processing Symposium (IPDPS 2024)

[6] *Neon: A Multi-GPU Programming Model for Grid-based Computations*
Massimiliano Meneghin[†], **Ahmed H. Mahmoud**[†], Pradeep Kumar Jayaraman, and Nigel J. W. Morris.
International Parallel and Distributed Processing Symposium (IPDPS 2022)
[†] joint first author

[7] *RXMesh: A GPU Mesh Data Structure*
Ahmed H. Mahmoud, Serban D. Porumbescu, and John D. Owens
ACM Transactions on Graphics (SIGGRAPH 2021)

[8] *VoroCrust: Voronoi Meshing Without Clipping*
Ahmed Abdelkader, Chandrajit L. Bajaj, Mohamed S. Ebeida, **Ahmed H. Mahmoud**, Scott A. Mitchell, John D. Owens and Ahmad A. Rushdi
ACM Transactions on Graphics (SIGGRAPH 2020)

[9] *Sampling Conditions for Conforming Voronoi Meshing by the VoroCrust Algorithm*
Ahmed Abdelkader, Chandrajit L. Bajaj, Mohamed S. Ebeida, **Ahmed H. Mahmoud**, Scott A. Mitchell, John D. Owens and Ahmad A. Rushdi
International Symposium on Computational Geometry (SoCG 2018)

[10] *A Constrained Resampling Strategy for Mesh Improvement*
Ahmed Abdelkader[†], **Ahmed H. Mahmoud**[†] Ahmad A. Rushdi, Scott A. Mitchell, John D. Owens, and Mohamed S. Ebeida
Computer Graphics Forum (presented at ACM/Eurographics Symposium on Geometry Processing SGP 2017)
[†] joint first author

[11] *All-Quad Meshing without Cleanup*
Ahmad A. Rushdi, Scott A. Mitchell, **Ahmed H. Mahmoud**, Chandrajit L. Bajaj, and Mohamed S. Ebeida
Computer-Aided Design (CAD 2017)

[12] *Disk Density Tuning of a Maximal Random Packing*
Mohamed S. Ebeida, Ahmad A. Rushdi, Muhammad A. Awad, **Ahmed H. Mahmoud**, Dongming Yan, Shawn English, John D. Owens, Chandrajit L. Bajaj, and Scott A. Mitchell
Computer Graphics Forum (presented at ACM/Eurographics Symposium on Geometry Processing SGP 2016)

[13] *Exercises in High-Dimensional Sampling: Maximal Poisson-disk Sampling and k-d Darts*
Mohamed S. Ebeida, Scott A. Mitchell, Anjul Patney, Andrew A. Davidson, Stanley Tzeng, Muhammad A. Awad, **Ahmed H. Mahmoud**, and John D. Owens
Book chapter in Topological and Statistical Methods for Complex Data: Tackling Large-Scale, High-Dimensional, and Multivariate Data Spaces (2014)

[14] *Delaunay Quadrangulation by Two-coloring Vertices*
Scott A. Mitchell, Mohammed A. Mohammed, **Ahmed H. Mahmoud** and Mohamed S. Ebeida
International Meshing Roundtable (IMR 2014)

[15] *Improving Spatial Coverage while Preserving the Blue Noise of Point Sets*
Mohamed S. Ebeida, Muhammad A. Awad, Xiaoyin Ge, **Ahmed H. Mahmoud**, Scott A. Mitchell, Patrick M. Knupp, and Li-Yi Wei
SIAM Conference on Geometric and Physical Modeling (SIAM GD/SPM13)

[16] *Sifted Disks*
Mohamed S. Ebeida, **Ahmed H. Mahmoud**, Muhammad A. Awad, Mohammed A. Mohammed, Scott A. Mitchell, Alex Rand, and John D. Owens
Eurographics 2013.

FUNDING

[1] *OAC Core: OAC Core Projects: GPU Geometric Data Processing*
National Science Foundation (Award # OAC-2403239)
PI. Jonathan Ragan-Kelley, co-PI. Justin Solomon.
Amount: $600,000
July 1, 2024–June 30, 2027
Note: I am the primary author of the technical description of this grant

[2] *Efficient GPU Sparse Automatic Differentiation for Scientific Computing*
MIT Generative AI Impact Consortium (MGAIC)
PI. Justin Solomon, co-PI. Jonathan Ragan-Kelley
Amount: $150,000
June 1, 2025–May 31, 2026
Note: I am the primary author of the technical description of this grant

PATENTS

[1] *Optimized GPU Implementation of Grid Refinement in the Lattice Boltzmann Method*
Ahmed H. Mahmoud, Hesam Salehipour, and Massimiliano Meneghin
Filed on January 29, 2005 by Autodesk, Inc.

TALKS

Dynamic Mesh Processing on the GPU
SIGGRAPH (August 2025 - Vancouver, Canada)
Highlights of Parallel Computing (July 2025 - Portland, Oregon
Brown Visual Computing Seminar (October 2024 - Brown University)
Adobe (November 2023 - Virtual))

RXMesh: A High-performance Mesh Data Structure and Programming Model on the GPU
NVIDIA GTC (March 2022 - Virtual)

Neon: A Multi-GPU Programming Model for Grid-based Computations
NVIDIA GTC (March 2022 - Virtual)

RXMesh: A GPU Mesh Data Structure
SIGGRAPH (August 2021 - Virtual)

A Constrained Resampling Strategy for Mesh Improvement
ACM/Eurographics Symposium on Geometry Processing (July 2017 - London, UK)

TEACHING

Accelerated Computing (6.S894)   *Fall 2024*
MIT
Guest Lecturer

Control Systems I (EEC 157A)   *Fall 2017*
University of California, Davis
Teaching Assistant

Computer Programming (CS224)   *Fall 2015*
Alexandria University, Egypt
Assistant Lecturer

Ships and Machines Drawing (**MR111**) *Fall 2015*
Alexandria University, Egypt
Assistant Lecturer

Fluid Mechanics (**MR231**) *Fall 2015*
Alexandria University, Egypt
Assistant Lecturer

Fluid Mechanics and Hydraulic Machines (**MR232**) *Spring 2014*
Alexandria University, Egypt
Assistant Lecturer

Marine Hydro-dynamics (**OCE323**) *Spring 2014*
Alexandria University, Egypt
Assistant Lecturer

Theory of Machines (**ME145**) *Spring 2014*
Alexandria University, Egypt
Assistant Lecturer

Material Technology (**MR242**) *Fall 2013*
Alexandria University, Egypt
Assistant Lecturer

Marine Power Plants (**MR352**) *Fall 2013*
Alexandria University, Egypt
Assistant Lecturer

ACADEMIC SERVICE

SIGGRAPH Posters *2025*
Juror

Summer Geometry Initiative *2025*
Admission Committee and mentor

New England Symposium on Graphics *2025*
Organizing Committee

ACM/Eurographics Symposium on Geometry Processing *2024, 2025*
Technical Papers Committee

Summer Geometry Initiative *2024*
Mentor

High Performance Graphics *2024*
International Paper Committee

International Conference on Geometric Modeling and Processing *2023, 2024*
Technical Program Committee

ECE Peer Mentoring Program at UC Davis *2021, 2023*
Mentor

UC Davis SACNAS's Mentor Match Program *2023*
Mentor

REFEREE SERVICE

SIGGRAPH *2024, 2025*

SIGGRAPH Asia	*2024*
Computers & Graphics	*2024*
Transactions on Visualization and Computer Graphics	*2023*
Eurographics	*2023*
Computer Aided Geometric Design	*2022*
The SIAM International Meshing Roundtable Workshop	*2022, 2023, 2024*
International Meshing Roundtable	*2019, 2021*
Computer-Aided Design	*2019*

MENTEES

Anh Truong (Ph.D. Student, MIT) → First SIGGRAPH Asia paper
Sachin Kishan (SGI Fellow) → Ph.D. Student at New York University
Changcheng (Eric) Yuan (M.Sc. Student, UC Davis) → Ph.D. Student, Texas A&M University
Brooke Dolny (Autodesk Research intern) → M.Sc. Student, University of Waterloo

MEDIA COVERAGE

Sandia LabNews *April 2020*
Automating complex 3D modeling (webpage, pdf)

REFERENCES

John D. Owens
Child Family Professor of Engineering and Entrepreneurship – University of California, Davis
jowens@ece.ucdavis.edu

Justing Solomon
Associate Professor – Massachusetts Institute of Technology
jsolomon@mit.edu

Jonathan Ragan-Kelley
Associate Professor – Massachusetts Institute of Technology
jrk@mit.edu

Mohamed S. Ebeida
Principal Member Of Technical Staff – Sandia National Laboratories
msebeid@sandia.gov