Mahmoud Zeidan

Institute for Visualization and Data Analysis (IVD)
Karlsruhe Institute of Technology (KIT)
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PERSONAL DATA

EMail	:	zeidan.mahmoud@protonmail.com ◇ mahmoud.zeidan@kit.edu
Personal homepage	:	https://mahmoudsvirtualcorner.github.io/
Institute homepage	:	https://cg.ivd.kit.edu/staff/research/zeidan/mitarbeiter_zeidan.php

EXECUTIVE SUMMARY

Resourceful **Computer Graphics Researcher and Developer** with extensive experience in scientific visualization, GPU programming, and real-time rendering. Skilled in **C++**, **Python**, and parallel computing frameworks such as **CUDA**, **OpenGL**, and **Vulkan**. Demonstrates strong problem-solving and system design skills in developing scalable visualization systems, geometric flow representations, and performance-critical rendering pipelines. Combines research-driven thinking with practical software engineering expertise to deliver efficient, interactive, and data-intensive computational solutions that drive innovation in science and technology.

RESEARCH INTERESTS

Computer graphics, scientific visualization, scientific computing, parallel processing, and real-time interactive rendering.

EXPERIENCE

Karlsruhe Institute of Technology (KIT) August 2016 – Present
Research and Teaching Assistant

Developed software solutions and visualization frameworks for scientific data analysis and real-time rendering within research projects at the Institute for Visualization and Data Analysis (IVD).

February 2016 – February 2020: Assisted in practical sessions and coursework for General-Purpose Computation on GPUs, GPU Computing, Graphics Programming, and Game Development.

Faculty of Computer and Information Sciences, Ain Shams University December 2005 - February 2016
Research and Teaching Assistant Cairo, Egypt

Developed scientific work in the field of rendering using path tracing and photon mapping techniques for realistic image synthesis, focusing on light transport simulation.

Implemented and optimized rendering algorithms, improving computational efficiency and visual accuracy in 3D scenes on GPU.

Assisted in teaching the following courses: Math I & II (Calculus), Math III (Linear Algebra), Math IV (Differential Equations), Physics, Probability and Statistics, and Structured Programming.

Microsoft Research, Advanced Technology Labs (ATLC) October 2012 - March 2013
Research Assistant Intern Cairo, Egypt

Developed computer vision tools for object detection and image-based search, focusing on enhancing machine perception in real-world applications.

Mentor: Dr. Motaz El-Saban.

Ractors Inc. May 2007 - December 2007
Web Developer Cairo, Egypt

Worked as a back-end web developer for social media applications using HTML, JavaScript, and PHP.

quTIP Software Company November 2006 - April 2007
Software Developer Cairo, Egypt

Worked as a software developer using Microsoft .NET tools for various desktop applications.
Company website: http://www.qutip.com

EDUCATION

Karlsruhe Institute of Technology (KIT) February 2016 – Present
PhD Candidate in Computer Science Expected Graduation: December 2025
Computer Graphics Group, Institute for Visualization and Data Analysis (IVD)
Thesis: Glyph-based Display and Level-of-Detail Particle Rendering for Interactive Scientific Visualization
Supervisor: Prof. Dr.-Ing. Carsten Dachsbacher

Faculty of Computer and Information Sciences, Ain Shams University, Egypt June 2009 – July 2011
MSc in Computer Science
Thesis: Applying Parallel Processing Approach for Interactive Global Illumination, link
Supervisors: Prof. Dr. Taymour Nazmy, Prof. Dr. Mohamed Hashem, and Dr. Haytham El-Messiry

Faculty of Computer and Information Sciences, Ain Shams University, Egypt September 2000 – June 2004
BSc in Computer Science
Overall grade: Excellent with Honors ($\geq$ 85%)
Senior Thesis: Ahmed Zakaria, Mahmoud Zeidan, and Ahmed Hamdy, "Photonix, a 3D Modeling Tool for Realistic Image Synthesis Using Photon Mapping", link

General Secondary Education, Egypt June 2000
Math Section
Overall grade: 98%

PUBLICATIONS

Mahmoud Zeidan. "Large Particle Datasets Visualization on GPUs." IVD - KIT, under submission.

Mahmoud Zeidan, Christoph Peters, Tobias Rapp, and Carsten Dachsbacher. "Versatile Geometric Flow Visualization by Controllable Shape and Volumetric Appearance." In Proceedings of Smart Tools and Applications in Graphics (STAG), 2022. paper link.

Mahmoud Zeidan, Tobias Rapp, Christoph Peters, and Carsten Dachsbacher. "Moment-based Opacity Optimization." In Proceedings of Eurographics Symposium on Parallel Graphics and Visualization (EGPGV), 2020. paper link.

Mahmoud Zeidan, Taymour Nazmy, and Mostafa Aref. "GPU-based Out-of-Core HLBVH Construction." In Proceedings of Eurographics Symposium on Rendering (EGSR) – Experimental Ideas & Implementation (EI&I), 2015. paper link.

TECHNICAL STRENGTHS

Programming Languages:	C/C++, Python, and Matlab — experienced in writing clean, efficient, and maintainable code with strong understanding of object-oriented design, design patterns, and SOLID principles for scalable software architectures.
Research and Development Tools:	OpenGL, GLSL, Vulkan, and CUDA — advanced experience in GPU programming, shader development, and performance optimization for scientific visualization and real-time rendering.
Software Engineering Tools:	Git (version control), CMake (build automation), and Bash scripting — proficient in workflow automation, continuous integration, and multi-platform deployment.
Visualization and Design Tools:	Blender, GIMP, Inkscape, and Clip Studio Paint — used for research visualization and editing purposes.
Operating Systems:	Linux (primary) and Windows — experienced in system configuration, shell scripting, and cross-platform development environments.

HOBBIES AND PERSONAL INTERESTS

Painting and modeling on physical and digital media, woodworking, nature walks, and writing and blogging in Arabic.

LANGUAGES

Arabic (Egypt)	:	Native
English	:	Professional working proficiency
German	:	Daily life interactions

Last updated: November 3, 2025