

# Mohamed S. Ebeida

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RESEARCH INTERESTS	Computational Geometry, Mesh Data Structures, Computational Fluid Dynamics, Reduced Order Modeling, Krylov Subspace Methods, Multigrid Methods.	
EDUCATION	<b>University of California</b> , Davis, California USA	
	Ph.D., Mechanical and Aeronautical Engineering	<b>Sept. 2008</b>
	<ul style="list-style-type: none"><li>• Thesis: Simulation of unsteady incompressible turbulent flows using Galerkin finite element and adaptive grids</li><li>• Advisor: Professor Roger L. Davis</li><li>• Area of Study: Computational Fluid Dynamics</li></ul>	
	M.S., Applied Mathematics	<b>June 2009</b>
	<ul style="list-style-type: none"><li>• Thesis: Reduced order modeling of incompressible flows using proper orthogonal decomposition and Galerkin projection</li><li>• Advisor: Professor Roland W. Freund</li><li>• Area of Study: Reduced Order modeling</li></ul>	
	<b>Alexandria University</b> , Egypt	
	M.S., Naval Architecture and Marine Engineering Department.	<b>June 2004</b>
	<ul style="list-style-type: none"><li>• Thesis: Application of CFD to some flow problems associated with inland water transportation</li><li>• Advisor: Professor Shaher Sabit</li><li>• Area of Study: Ship Hydrodynamics</li></ul>	
	B.S., Naval Architecture and Marine Engineering Department , with Honors.	<b>June 2000</b>
ACADEMIC EXPERIENCE	<b>Carnegie Mellon University</b> , Pittsburgh, PA USA	
	<i>Postdoctoral researcher</i>	<b>Sept. 2008 to present</b>
	My main duties at CMU include conducting research in geometric modeling and mesh generation. The main task is to design, develop and implement a flexible software system for geometry-representation and mesh generation with a focus on early-design evaluations as well as supporting complex analysis for a range of physics application that include the development of computational engineering tool sets for aircraft, ships and antenna in naval research.	
	<b>University of California</b> , Davis, California USA	
	<i>Research Assistant</i>	
	<ul style="list-style-type: none"><li>• Mechanical and Aero. Engineering dept.</li><li>• Dept. of Mathematics</li></ul>	<b>Sept. 2005 to Sept. 2006</b> <b>Jan. 2008 to June 2008</b>

*Teaching Assistant*

- Mechanical and Aero. Engineering dept. (EME 106, EME 165, ENG 103, EME 50, EAE 138, ENG 4). **October 2006 to June 2008**
- Dept. of Physics. (Physics 9C) **March 2007 to June 2007**

**Alexandria University**, Egypt

*Instructor*

- Naval Architecture and Marine Engineering dept. (Ship Machinery Drawing, Engineering Graphics and Computer Programming for Naval Architects). **Sept. 2004 to June 2005**

*Teaching Assistant*

- Naval Architecture and Marine Engineering dept. (MR 111, MR 112, MR 141, MR 224, MR 231, MR 232, MR 241, MR 261, MR 321, MR 331, MR 332, MR 351, HS 365, MR 421). **Sept. 2000 to June 2005**

AWARDS

Non-resident Tuition Fellowship from the Mechanical and Aeronautical Engineering Dept. - UCD for the following quarters: Fall 2005 - Winter 2006 - Spring 2006 - Fall 2006 - Winter 2007

REFEREED  
PUBLICATIONS

M. S. Ebeida, E. Mestreau, Y. Zhang and S. Dey, "Mesh Insertion of Hybrid Meshes", 18th International Meshing Roundtable, Salt Lake City, Utah October 25-28, 2009.

X. Liang, M. S. Ebeida and Y. Zhang, "Guaranteed-Quality All-Quadrilateral Mesh Generation with Feature Preservation", 18th International Meshing Roundtable, Salt Lake City, Utah October 25-28, 2009.

A. Patney, M. S. Ebeida and J. D. Owens, "Parallel View-Dependent Tessellation of Catmull-Clark Subdivision Surfaces", High Performance Graphics 2009, New Orleans, Louisiana, August 1-3, 2009.

M. S. Ebeida and R. L. Davis, "Incompressible Flow Simulation at High Reynolds Numbers using Galerkin Finite Element with Spatial/Temporal Adaptation", 19th AIAA Computational Fluid Dynamics, San Antonio, Texas, June 22-25, 2009.

M. S. Ebeida, R. L. Davis and R. W. Freund, "Unsteady Incompressible Flow Simulation using Galerkin Finite Element with Spatial/Temporal Adaptation", 47th AIAA Aerospace Sciences Meeting, Orlando, Florida, January 5-8, 2009.

M. S. Ebeida and R. L. Davis, "Fast Adaptive Hybrid Mesh Generation Based on Quad-tree Decomposition", AIAA 38th Fluid Dynamics Conference and Exhibit, Seattle 23 - 26 June 2008.

PRESENTATIONS  
AND INVITED  
TALKS

A New Technique for Quad-Dominant Adaptive Mesh Generation, 17th International Meshing Roundtable, Pittsburgh, Pennsylvania October 12-15, 2008.

Fast Adaptive Hybrid Mesh Generation Based on Quad-tree Decomposition - Bay Area Scientific Computing Day, March 29, 2008 - MSRI - UC Berkeley.

Simulation of Cavitating Flows using Hybrid Unstructured Meshes, Graduate Technical Lunch Series, February 15, 2007 - MAE - UC Davis.

Inland Water Transportation, Institute of Marine Engineers (Egypt Branch), June 8, 2000 - Arab Academy for Science and Technology campus (AAST).

## TECHNICAL SKILLS

Programming: C, C++, C#, Qt, Visual Basic, Fortran, MPI, Open MP, OpenGL.

MATLAB experience: linear algebra, Fourier transforms, nonlinear numerical methods, polynomials, statistics, visualization

Applications: AutoCad, 3dsmax, T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X, B<sub>I</sub>B<sub>T</sub>E<sub>X</sub>, Microsoft Office, and other common productivity packages for Windows, OS X, and Linux platforms

Operating Systems: Microsoft Windows XP/2000, Apple OS X, Linux

## SOFTWARE

Meera is an object oriented framework that I have developed to perform numerical simulation for various fluid flow problems.

It has three versions; a platform independent one written in C++; a serial version written in C# under Visual Studio.Net and a parallel one written in Fortran and MPI.

It serves as a development library, as well as a ready to use application.

Meera can be used in unsteady turbulent flows simulations based on Finite Volume and Galerkin Finite Element methods. The solver in Meera is coupled with an adaptive dynamic remesher.

Meera has the capability of generating and performing operations on sparse tensors efficiently.

## REFERENCES

Professor Roger L. Davis  
Mechanical and Aero. Eng. Dept.  
University of California, Davis  
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Davis, CA 95616  
davisrl@ucdavis.edu  
530-752-2264

Professor Roland W. Freund  
Department of Mathematics  
University of California, Davis  
One Shields Avenue  
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freund@math.ucdavis.edu  
530-752-1660

Professor John D. Owens  
Electrical and Computer Eng. Dept.  
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