Dr. Ahmed Khamayseh
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Research Interests

Applied Mathematics, Differential Geometry, Numerical Analysis, Numerical Solution of Partial Differential Equations Arising in Physics, Computational Geometry, Computational Mesh Generation, Computational Fluid Dynamics

Education

Ph.D. Mathematical Sciences and Aerospace Engineering, Mississippi State University, 1994
M.S. Mathematics, Mississippi State University, USA, 1990
B.S. Mathematics, Alquds University, Jerusalem, Palestine, 1987

Professional Experience

2012 – Present **Dean**, College of Applied Sciences, Palestine Polytechnic University, Palestine
2011 – 2012 **Visiting Professor**, Applied Mathematics Department, Palestine Polytechnic University, Palestine
2010 – 2012 **Chairman**, Third Palestinian Conference on Modern Trends in Mathematics and Physics
2001 – 2011 **Senior Scientist**, Computer Science and Mathematics Division, Oak Ridge National Laboratory, USA
2000 – 2001 **Senior Engineer**, CFD Research Corporation, Huntsville, Alabama, USA
1996 – 2000 **Technical Staff Member**, Applied Physics Division, Los Alamos National Laboratory, USA
1994 – 1996 **Postdoctoral Research Associate**, Center for Nonlinear Studies, Los Alamos National Laboratory, USA
1991 – 1994 **Research Assistant**, NSF Engineering Research Center, Mississippi State University, USA

Honors and Awards

- NASA Postgraduate Scholarship, NASA Langley Research Center, 1991-1994
- Director's Postdoctoral Research Fellowship, Los Alamos National Laboratory, 1994-1996

Ahmed Khamayseh

Selected Publications

- Ahmed Khamayseh, "*Conservative Node, Face, and Cell Coupling Algorithms for Physics Quantities between Overlapped planar Meshes*", to be submitted 2012.

- Andrew Kuprat and Ahmed Khamayseh, "*Efficient Algorithms for Mapping Cell Quantities between Overlapped 3-D Unstructured Meshes*", to be submitted 2012.

- Ahmed Khamayseh and Andrew Kuprat, *"Deterministic Point Inclusion Methods for Computational Applications with Complex Geometry"*, Computational Science and Discovery, vol. 1 (2008) 015004.

- Ahmed Khamayseh, Valmor de Almeida, and Glen Hansen, "*Hybrid Surface Mesh Adaptation for Climate Modeling*", Numerical Mathematics: Theory, Methods and Applications, vol. 1, pp. 410-434 (2008).

- Ahmed Khamayseh and Valmor de Almeida, "*Adaptive Hybrid Mesh Refinement for Multiphysics Applications***",** Journal of Physics: Conference Series, vol. 78, (2007) 012039.

- Ahmed Khamayseh and Glen Hansen, *"Use of the Spatial kD-Tree in Computational Physics Applications"*, Communications in Computational Physics, vol. 2 (2007), pp. 545-576.

- Abdullah Al Zaman and Ahmed Khamayseh, *"A New Time-Varying-Autoregressive (TVAR) Modeling in Cascaded Form for Non-Stationary Signals"*, Proceedings of the IEEE International Conference on Acoustic, Speech, and Signal Processing (ICASSP), Toulouse, France, 2006.

- Abdullah Al Zaman and Ahmed Khamayseh, *"Muscle Fatigue Analysis for Healthy Adults Using TVAR Model with Instantaneous Frequency Estimation"*, IEEE Proceedings of the 38th Southeastern Symposium on System Theory, Tennessee Technological University, Cookeville, Tennessee, pp. 244- 247 (2006).

- John B. Drake, D.X. Guo, and Ahmed Khamayseh. "*Smooth Grid Transformations with Spectral Methods for Shallow Water Equations*", Oak Ridge National Laboratory Technical Report 2005.

- Ahmed Khamayseh and Andrew Kuprat, *Hybrid Curve Point Distribution Algorithm*, SIAM Journal on Scientific Computing, vol. 23, pp. 1464-1484 (2002).

- Andrew Kuprat and Ahmed Khamayseh, *Volume Conserving Smoothing for Piecewise Linear Curves, Surfaces, and Triple Lines*, Journal of Computational Physics, vol. 172, pp. 99-118 (2001).

- Ahmed Khamayseh and Glen Hansen, *Quasi-Orthogonal Grids with Impedance Matching*, SIAM Journal on Scientific Computing, vol. 22, pp. 1220-1237 (2000).
- Ahmed Khamayseh, and Andrew Kuprat, *Surface Grid Generation Systems*, in Handbook of Grid Generation, eds. Joe Thompson et al., pp. 9.1-9.29, CRC Press, (1999).
- Ahmed Khamayseh, Andrew Kuprat, and Wayne Mastin, *Boundary Orthogonality in Elliptic Grid Generation*, in Handbook of Grid Generation, eds. Joe Thompson et al., pp. 6.1-6.26, CRC Press, (1999).
- Gamal Elnagar and Ahmed Khamayseh, *Numerical Solution of Nonstationary Aero-Autoelasticity Integro-Differential Operator Equations*, Journal of Mathematical Methods in the Applied Sciences, vol. 22, pp. 501-513 (1999).
- William Hachfeld, Glen Hansen, and Ahmed Khamayseh, "RIGEL: An Interactive Structured Grid Generation System," in Proceedings of the 1998 AIAA/ASME Joint Thermophysics and Heat Transfer Conference, Albuquerque, NM, June 1998.
- Gamal Elnagar and Ahmed Khamayseh, ``On the Optimal Spectral-Chebyshev Solution of a Controlled Nonlinear Dynamical System", IMA Journal of Applied Mathematics, vol. 58, pp. 147-157 (1997).
- Ahmed Khamayseh and Andrew Kuprat, *Anisotropic Smoothing and Solution Adaption for Unstructured Grids*, International Journal for Numerical Methods in Engineering, vol. 39, pp. 3163-3174 (1996).
- Ahmed Khamayseh and Wayne Mastin, *Computational Conformal Mapping for Surface Grid Generation*, Journal of Computational Physics, vol. 123, pp. 394-401 (1996).
- Ahmed Khamayseh, *A Generalized Elliptic Grid Generation System for Anisotropic Domains*, Center for Nonlinear Studies Newsletter, Los Alamos National Laboratory, No. 127, pp. 1-14 (1996).
- Ahmed Khamayseh, Frank Ortega, and Harold Trease, *Ray Tracing for Point Distribution in Unstructured Grid Generation*, Proceedings of the Fifth International Conference on Numerical Grid Generation in Computational Fluid Dynamics and Related Fields, pp. 257-267 (1996).
- Ahmed Khamayseh and Bernd Hamann, *Elliptic Grid Generation Using NURBS Surfaces*, Computer Aided Geometric Design, vol. 13, pp. 369-386 (1996).
- Ahmed Khamayseh and Wayne Mastin, *Surface Grid Generation based on Elliptic PDE Models*, Applied Mathematics and Computation, vol. 65, pp. 253-264 (1994).
- Wayne Mastin and Ahmed Khamayseh, ``Elliptic Grid Generation on Surfaces", Advances in Hydro-Science and Engineering, vol. 1, pp. 2016-2022 (1993).

- Ahmed Khamayseh and R. Shivaji, ``Evolution of Bifurcation Curves for Semi-Positone Problems When Non-Linearities Develop Multiple Zeroes", Applied Mathematics and Computation, vol. 52, pp. 173-188 (1992).

Selected Talks

- "Solution-based Mesh Adaptation for Climate Modeling and Simulation", Third Palestinian Conference on Modern Trends in Mathematics and Physics, Palestine Polytechnic University, Hebron, July 2012.
- "Geometry, Meshing, and Adaptivity in Computational Sciences", Alquds University, Jerusalem, Palestine, April 2012.
- "Conservative Field Coupling between Overlapped Unstructured Meshes", Oak Ridge National Laboratory, Oak Ridge, TN, February 2011.
- "Advanced Meshing Methods for Complex Multiphysics Applications", Second Palestinian Conference on Modern Trends in Mathematics and Physics, An-Najah National University, Nabulus, June 2010.
- "Least-Squares Approximation of Rough Climate Data with Spherical Harmonics Basis Functions", SIAM Conference on Computational Science and Engineering, Miami, Florida, March 2009.
- "Time-Dependent Mesh Adaptivity for Climate Modeling", SIAM Conference on Computational Science and Engineering, Miami, Florida, March 2009.
- "Advanced Geometric Modeling and Simulation of Nuclear Reactors", Super Computing Conference, Austin, Texas, November 2008.
- "Geometry Interface Embedding in Quadrilateral Mesh Generation for Fuel Cycle Calculations", Oak Ridge National Laboratory, Oak Ridge, TN, October 2008.
- "Next Generation of Interoperable Geometry, Meshing, and Adaptivity Tools for Advanced Reactor Simulations", Idaho National Laboratory, Idaho, March 2007.
- "Mesh Generation for Nuclear Reactor Simulation", Computational Engineering and Science Conference (SESC), Washington, D.C., April 2007.
- "Adaptive Hybrid Mesh Optimization and Refinement for Multiphysics Applications", Applied Mathematics Research (AMR) Program Annual Meeting, Lawrence Livermore National Laboratory, California, May 2007
- "Computational Geometry in Engineering Sciences", US Department of Energy Day of Science, Knoxville, Tennessee, October 2007.
- "Anisotropic Mesh Adaptation for Multiphysics Simulation'', SIAM conference on Geometric Design and Computing, November 2007, San Antonio, Texas.
- "A Framework for Field Transfer in Coupled Multiphysics Applications", ITAPS-CCA Parallel Coupling Forum, Chicago, Illinois, March 2007
- "New Frontiers in Modern Scientific Research", University of Tennessee, Knoxville, Tennessee, September 2006.
- "Computational Geometry in Engineering Science and Technology". Palestine Polytechnic University, Hebron, Palestine, July 2006.

- “Overview: Mathematical Foundations of Mesh Generation, Optimization, and Adaptation”, Oak Ridge National Laboratory, Oak Ridge, Tennessee, March 2004
- “Adaptive Hybrid Conformal Surface Meshing”, Conformal Geometry of Surfaces Conference: Theory, Computation, Application. Smoky Mountain National Park-Townsend Tennessee, May 2003.
- “Mesh Generation/Optimization/adaptation for Climate Modeling”, Sandia National Laboratory. Albuquerque, New Mexico, August 2003.
- “Adaptive Hybrid Mesh Optimization for Moving Boundary Problems”. Oak Ridge National Laboratory, Oak Ridge, Tennessee, January 2002.
- ``Parallel Hybrid Mesh Generation on Complex Geometries". Oak Ridge National Laboratory, Oak Ridge, Tennessee, August 2001.
- ``Conformal Grid Generation for Computational Simulation". Oak Ridge National Laboratory, Oak Ridge, Tennessee, February 2001.
- ``Jacobian-Weighted Surface Grid Smoothing". SIAM Annual Meeting, Puerto Rico, July 2000.
- ``Grid Generation on Boundary Representation Models". CFD Research Corporation, Huntsville, Alabama, December, 1999.
- ``Orthogonal Grid Generation with Impedance Matching". Argonne National Laboratory, Argonne, Illinois, June 1999.
- ``Adaptive Finite Element Method for Conservation Laws ". University of South Carolina, Spartanburg, South Carolina, April 1999.
- ``Non-Parametric Volume Conserving Smoothing". Sixth International Conference on Numerical Grid Generation in Computational Field Simulations, London, England, July 1998.
- ``Surface Grid Generation Systems". Los Alamos National Laboratory, Los Alamos, New Mexico, May 1998.
- ``Adaptive Surface Grid Generation". SIAM Annual Meeting, Kansas City, Kansas, July 1996.
- ``Ray Tracing for Point Distribution in Unstructured Grid Generation". Fifth International Conference on Numerical Grid Generation in Computational Fluid Dynamics and Related Fields. Mississippi State University, Mississippi, April 1996.
- ``A Grid Generation Paradigm Based on NURBS and CSG Modeling". Los Alamos National Laboratory, Los Alamos, New Mexico, March 1996.
- ``Quasielliptic Smoothing for Unstructured Grids". Workshop on Surface Modeling and Related Issues in CFD Solutions, NASA Lewis Research Center, Cleveland, Ohio, May 1995.
- ``Time-Dependent Dynamic Grid Generation". Differential Equations and Computational Simulations Conference, Mississippi State University, Mississippi, April 1995.
- ``An Algorithm for Hybrid Grid Generation". Differential Equations and Computational Simulations Conference, Mississippi State University, Mississippi, April 1995.
- ``Survey on Nonuniform Rational B-Splines (NURBS)". Los Alamos National Laboratory, Los Alamos, New Mexico, December 1994.

- ``Quasiconformal Mappings and Grid Generation". Department of Mathematical Sciences, San Diego State University, San Diego, California, November 1994.
- ``Interactive Automated Surface and Volume Grid Generation". Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, New Mexico, November 1994.
- ``Generation of Structured Grids on NURBS Surfaces". Los Alamos National Laboratory, Los Alamos, New Mexico, March 1994.
- ``Surface Generating System based on Elliptic PDE Models". Differential Equations and Computational Simulations Conference, Mississippi State University, Mississippi, March 1993.
- ``Bifurcation Curves for a Class of Semi-Positone Problems". 67-th Annual Joint Meeting MAA, Lake Charles, Louisiana, February 1990.
- ``An Existence and Uniqueness Result for A Two Point Semi-Positone Boundary Value Problem". 66-th Annual Joint Meeting MAA, Biloxi, Mississippi, February 1989.

Technical Reports

- Valmor de Almeida and Ahmed Khamayseh, “An h-p Adaptive Least-Squares Cartesian Method with Spherical Harmonics Basis Functions for the Shallow Atmosphere Equations”, Oak Ridge National Laboratory Report (2007).
- Valmor de Almeida and Ahmed Khamayseh, “Unstructured Least-Squares Approximation of Rough Data with Surface Spherical Harmonics Basis Functions”, Oak Ridge National Laboratory Report (2006).
- Ahmed Khamayseh and John Drake. "Adaptive Hybrid Mesh Generation for Climate Modeling", Oak Ridge National Laboratory Report (2004).
- Ahmed Khamayseh and Sami Bayyuk. "Gradient-Weighted Adaptive Hybrid Mesh Optimization", Oak Ridge National Laboratory Report (2003).
- J.B. Drake, D.X. Guo, and Ahmed Khamayseh. "Smooth Grid Transformations with Spectral Methods for Shallow Water Equations", Oak Ridge National Laboratory Report (2002).
- Ahmed Khamayseh and Andrew Kuprat, ``A Hybrid Analytic and Discrete Computation of Transit Times", Los Alamos Technical Report (1997).
- William Hachfeld, Ahmed Khamayseh, and Glen Hansen, ``Rigel: An Interactive Structured Grid Generation System", Los Alamos Technical Report (1997).
- Jacob Anderson, Ahmed Khamayseh, and Brian Jean, ``Adaptive Resolution Refinement for High-Fidelity Continuum Parameterizations", Los Alamos Technical Report (1996).
- Ahmed Khamayseh and Wayne Mastin, ``Quasiconformal Grid Generation", Los Alamos Technical Report (1995).
- Ahmed Khamayseh, Frank Ortega, and Andrew Kuprat, ``A Robust Point Location Algorithm for General Polyhedra", Los Alamos Technical Report (1995).

Books

- Co-Author, Handbook of Grid Generation, eds. Joe Thompson et al., CRC Press, (1999).
- Ahmed Khamayseh, Andrew Kuprat and Glen Hansen, Conformal Mappings with Applications to Computational Geometry, 2009, in preparation.

Journal Reviews

- Journal of Computational Physics
- Communications in Computational Physics
- SIAM Journal on Scientific Computing
- Journal of Computers and Mathematics with Applications
- Journal of Heat Transfer
- Journal of Engineering with Computers
- International Journal for Numerical Methods in Engineering
- Journal of Differential Equations
- Journal of Applied Mathematics Letters
- Palestine Journal of Mathematics