

W. Kyle Anderson

Education

PhD, Aerospace Engineering, Mississippi State University, 1986
MS, Aerospace Engineering, Texas A&M University, 1982
BS, Aerospace Engineering, Texas A&M University, 1981

Employment

Professor, SimCenter: National Center for Computational Engineering, University of Tennessee at Chattanooga, August 2003 to Present
Chief Architect, Symantec Corporation, April 2000 to July 2003
Senior Research Scientist, NASA Langley Research Center, January 1983 to April 2000
Research Assistant, Texas A&M University, August 1980 to December 1982

University Service

ENCM 7310: Computational Design, Graduate-level course, Univ. of Tennessee at Chattanooga.
ENCM 7100: Computational Fluid Dynamics II, Graduate-level course, Univ. of Tennessee at Chattanooga.
AOE 6146, Computational Fluid Dynamics II, Graduate-level course, Virginia Polytechnic Institute and State University, Spring 1998 (adjunct).
Major thesis advisor for 5 (2 current) Masters students and 12 (7 current) Ph.D. students.

Academic Specialties

Computational Fluid Dynamics
Solution Algorithms for Structured and Unstructured Grids
High-Order Finite-Element Algorithms for Fluid Dynamics and Electromagnetics
Sensitivity Analysis and Computational Design

Honors and Awards

Univ. of Tennessee at Chattanooga Research Award (2007)
Gordon Bell Prize (Special Category), supercomputing '99, 1999
NASA Exceptional Achievement Medal, 1998
NASA Langley Richard T. Whitcomb Technology Transfer Award, 1998
AIAA Lawrence Sperry Award, 1994
Group Achievement Award for CFL3D Development Team, 1990
Outstanding Paper of the NASA Langley Aeronautics Directorate, 1989
Chairman of Computational Sciences Technical Committee, NASA Langley Research Center, 1999
National Aeronautics and Space Administration Certificates of Recognition (2007)

- CFL3D
- FUN3D-v8.0: Design Optimization Capability
- FUN3D-v7.0: Grid Deformation Capability
- FUN3D-v6.0: Sensitivity Analysis Capability
- FUN3D-v5.0: Adjoint Solver Capability

Professional Memberships and Service

Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA)
Member Institute for Electrical and Electronics Engineers (IEEE)
Member Applied Computational Electromagnetics Society (ACES)

Associate Editor AIAA Journal 2006-Present
Registered Professional Engineer (Texas)
Registered Patent Agent, United States Patent and Trademark Office
National Association of Patent Practitioners
AIAA Applied Aerodynamics Technical Committee (APA TC), 2008-2012
APA Liaison to AIAA Meshing, Visualization, and Computational Frameworks TC, 2008-2012
Department of Energy INCITE Proposal Review Board, 2009-2012
Report Judge for AIAA Design/Build/Fly Competition, 2009, 2011
Board of Directors, Chattanooga Technology Council, 2008-2011
External Reviewer for Professional Journals

Selected Journal Publications

1. Wang, L., and Anderson, W. K., "Shape Sensitivity Analysis for Compressible Navier-Stokes Equations via Discontinuous Galerkin Methods," *Computers and Fluids*, Vol. 69, October 2012, pp. 93-107.
2. Wang, L., and Anderson, W. K., "Adjoint-Based Shape Optimization for Electromagnetic Problems using Discontinuous Galerkin Methods," *AIAA Journal*, Vol. 49, No. 6, June 2011, pp. 1302-1305.
3. Kapadia, S., Anderson, W. K., and Burdyschaw, C., "Channel Shape Optimization of Solid-Oxide Fuel Cells Using Advanced Numerical Techniques," *Computers and Fluids*, Vol. 41, No. 1, February 2011, pp. 41-50.
4. Anderson, W. K., Wang, L., Kapadia, S., Tanis, C., and Hilbert, B., "Petrov-Galerkin and Discontinuous-Galerkin Methods for Time-Domain and Frequency-Domain Electromagnetic Applications," *J. Comput. Phys.*, Vol. 230, No. 23, September 2011, pp. 8360-8385.
5. Wang, L., Mavriplis, D. J., and Anderson, W. K., "Adjoint Sensitivity Formulation for Discontinuous Galerkin Discretizations in Unsteady Inviscid Flow Problems," *AIAA Journal*, Vol. 48, No. 12, December 2010, pp. 2867-2883.
6. Lange, K. J., and Anderson, W. K., "Using Sensitivity Derivatives for Design and Parameter Estimation in an Atmospheric Plasma Discharge Simulation," *J. Comput. Phys.*, Vol. 229, No. 17, August 2010, pp. 6071-6083.
7. Lange, K. J., and Anderson, W. K., "Sensitivity Derivatives for Plasma Discharge Simulations," *AIAA Journal*, Vol. 47, No. 6, June 2009, pp. 1549-1557.
8. Kapadia, S., Anderson, W. K., Elliott, L., and Burdyschaw, C., "Adjoint-Based Sensitivity Analysis and Error Correction Methods Applied to Solid-Oxide Fuel Cells," *J. Fuel Cell Sci. Tech.*, Vol. 6, No. 2, 2009.
9. Kapadia, S., and Anderson, W. K., "Sensitivity Analysis for Solid-Oxide Fuel Cells Using a Three-Dimensional Model," *J. of Power Sources*, Vol. 189, No. 2, April 2009, pp. 1074-1082.
10. Elliott, L., Anderson, W. K., and Kapadia, S., "Solid-Oxide Fuel Cell Design Optimization with Numerical Adjoint Model," *J. Fuel Cell Sci. Tech.*, Vol. 6, No. 4, November 2009.
11. Anderson, W. K., Burdyschaw, C., and Karman, S. L., "Geometry Parameterization Method for Multidisciplinary Applications," *AIAA Journal*, Vol. 47, No. 6, June 2009, pp. 1568-1578.
12. Kapadia, S., Anderson, W. K., Elliott, L., and Burdyschaw, C., "Adjoint Method for Solid-Oxide Fuel Cell Simulations," *J. of Power Sources*, Vol. 166, February 2007, pp. 376-385.
13. Karman, S. L., Anderson, W. K., and Sahasrabudhe, M., "Mesh Generation Using Unstructured Computational Meshes and Elliptic Partial Differential Equation Smoothing," *AIAA Journal*, Vol. 44, No. 6, 2006, pp. 1277-1286.
14. Burdyschaw, C. E., and Anderson, W. K., "A General and Extensible Unstructured Mesh Adjoint Method," *AIAA Journal of Aerospace Computing, Information, and Communication*, Vol. 2, No. 10, 2005, pp. 401-413.
15. Newman, J. C., Whitfield, D. L., and Whitfield, W. K., "A Step-Size Independent Approach for Multidisciplinary Sensitivity Analysis," *J. of Aircraft*, Vol. 40, No. 3, 2003, pp. 566-583.
16. Nielsen, E. J., and Anderson, W. K., "Recent Improvements in Aerodynamic Design Optimization on Unstructured Meshes," *AIAA Journal*, Vol. 40, No. 6, June 2002, pp. 1155-1163.
17. Rumsey, C. L., Gatski, T. B., and Anderson, W. K., "Isolating Curvature Effects in Computing Wall-Bounded Turbulent Flows," *Int. J. for Heat and Mass Transfer*, Vol. 22, No. 6, 2001, pp. 573-582.
18. Anderson, W. K., Newman, J. C., Whitfield, D. L., Nielsen, E. J., "Sensitivity Analysis for Navier-Stokes Equations on Unstructured Meshes Using Complex Variables," *AIAA Journal*, Vol. 39, No. 1, Jan. 2001, pp. 5663.
19. Nielsen, E. J., and Anderson, W. K., "Aerodynamic Design Optimization on Unstructured Meshes Using the Navier-Stokes Equations," *AIAA Journal*, Vol. 37, No 11, 1999, pp. 1411-1419.
20. Anderson, W. K., and Venkatakrishnan, V., "Aerodynamic Design Optimization on Unstructured Grids with a Continuous Adjoint Formulation," *Computers and Fluids*, Vol. 28, No. 4-5, 1999, pp. 443-480.
21. Anderson, W. K., and Bonhaus, D. L., "Airfoil Design on Unstructured Grids for Turbulent Flows," *AIAA Journal*, Vol. 37, No. 2, 1999, pp. 185-191.
22. Anders, J. B., Anderson, W. K., and Murthy, A. V., "Transonic Similarity Theory Applied to a Supercritical Airfoil in Heavy Gas," *AIAA Journal*, Vol. 36, No. 6, 1999, pp. 957-964.
23. Anderson, W. K., Rausch, R. D., and Bonhaus, D. L., "Implicit/Multigrid Algorithms for Incompressible Turbulent Flows on Unstructured Grids," *Journal of Computational Physics*, Vol. 128, No. 2, 1996, pp. 391-408.

24. Anderson, W. K., Bonhaus, D. L., McGhee, R. J., and Walker, B. S., "Navier-Stokes Computations and Experimental Comparisons for Multielement Airfoil Configurations," *Journal of Aircraft*, Vol. 32, No. 6, 1995, pp. 1246-1253.
25. Anderson, W. K., and Bonhaus, D. L., "An Implicit Upwind Algorithm for Computing Turbulent Flows on Unstructured Grids," *Computers & Fluids*, Vol. 23, No. 1, 1994, pp. 1-21.
26. Anderson, W. K., "Numerical Study on Using Sulfur-Hexafluoride as a Wind-Tunnel Test Gas," *AIAA Journal*, Vol. 29, No. 12, 1991, pp. 2179-2180.
27. Anderson, W. K., Thomas, J. L., and Rumsey, C. L., "Extension and Application of Flux-Vector Splitting to Calculations on Dynamic Meshes," *AIAA Journal*, Vol. 27, No. 6, 1989, pp. 673-674.
28. Anderson, W. K., Thomas, J. L., and Whitfield, D. L., "Multigrid Acceleration of the Flux-Split Euler Equations," *AIAA Journal*, Vol. 26, No. 6, 1988, pp. 649-654, doi: 10.2514/3.9949.
29. Anderson, W. K., Thomas, J. L., and van Leer, B., "Comparison of Finite Volume Flux Vector Splittings for the Euler Equations," *AIAA Journal*, Vol. 24, No. 9, 1986, pp. 1453-1460, doi: 10.2514/3.9465.

Book Chapters and Special Publications

1. Salas, M. D., and Anderson, W. K., eds. *Computational Aerosciences in the 21st Century, ICASE LaRC Interdisciplinary Series in Science and Engineering*: Springer, 2000.
2. Thomas, J. L., and Anderson, W. K. "Finite Volume Methods," *Handbook of Fluid Dynamics and Fluid Machinery*. John Wiley and Sons, 1996.
3. Anderson, W. K., and Thomas, J. L. "Convergence Acceleration," *Handbook of Fluid Dynamics and Fluid Machinery*. John Wiley and Sons, 1996.

Recent Theses and Dissertations Directed and/or Major Professor

1. Glasby, R., "Computational Design for Electromagnetic Simulations," Ph.D. Dissertation, University of Tennessee, Chattanooga, 2011.
2. Lange, K. J., "Sensitivity Analysis for a Radio-Frequency Atmospheric Pressure Plasma Discharge Simulation," Ph.D. Dissertation, University of Tennessee, Chattanooga, 2009.
3. Kapadia, S., "Computational Design and Analysis of Solid-Oxide Fuel Cells," Ph.D. Dissertation, University of Tennessee, Chattanooga, 2008.
4. Elliott, L., "Solid-Oxide Fuel Cell Simulation and Design Optimization with Numerical Adjoint Techniques," Ph.D. Dissertation, University of Tennessee, Chattanooga, 2008.
5. Lange, J. K., "A Fully Implicit Characteristic-Based Algorithm for a One-Dimensional Radio Frequency Glow Discharge Fluid Simulation," M.S. Thesis, University of Tennessee, Chattanooga, August 2007.
6. Burdyslaw, C. E., "Achieving Automatic Concurrency Between Computational Field Solvers and Adjoint Sensitivity Codes," Ph.D. Dissertation, University of Tennessee, Chattanooga, May 2006.
7. Nielsen, E. J., "Aerodynamic Design Sensitivities on an Unstructured Mesh Using the Navier-Stokes Equations and a Discrete Adjoint Formulation," Ph.D. Dissertation, Virginia Polytechnic Institute and State University, 1998
8. Bonhaus, D. L., "A Higher Order Accurate Finite Element Method for Viscous Compressible Flows," Ph.D. Dissertation, Virginia Polytechnic Institute and State University, 1998
9. Bonhaus, D. L., "An Upwind Multigrid Method for Solving Viscous Flows on Unstructured Meshes," M.S. Thesis, George Washington University, 1993.
10. Viken, S., "Comparison of a Navier-Stokes and a Coupled Euler/Integrated Boundary Layer Flow Solver with Transonic Airfoil Experimental Results," M.S. Thesis, George Washington University, 1998.