

HASAN U. AKAY

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SUMMARY

Dr. Akay has joined Atılım University on March 1, 2010 as Provost and Professor of Mechanical Engineering. As provost he is responsible with all academic affairs of the University, which include education and research programs. Prior to his present positions at Atılım, he has been with IUPUI (Indiana University-Purdue University Indianapolis) from 1980 to 2010 where he was Chancellor's Professor of Mechanical Engineering and the Founding Director Emeritus of the Multidisciplinary Undergraduate Research Institute (MURI) at IUPUI. He served as the Interim Associate Dean for Academic Affairs and Research of the School of Engineering and Technology in 2008-2009 and the Chair of the Department of Mechanical Engineering in 2000-2008.

He has received his Master's and Ph.D. degrees from The University of Texas at Austin, Texas in 1969 and 1974, respectively, with specializations in computational mechanics and the finite element method. He holds a B.S. degree from Middle East Technical University, Ankara, Turkey. He is a reviewer of a number of leading journals on numerical methods, fluid dynamics and solid mechanics. He serves on the editorial boards of the International Journal of Computational Fluid Dynamics and the International Journal for Computational Methods in Engineering Science and Mechanics.

Dr. Akay conducts research in developing parallel computational techniques for finite element and finite volume solution of large-scale problems in Computational Fluid Dynamics (CFD) and Computational Solid Dynamics (CSD), including solid-fluid interactions. Previously funded projects include parallel finite element solution of rotor-stator interaction problems for NASA; finite element modeling of solder joints of electronic packages for US Army, US Navy and Carrier Electronics; finite element benchmarking studies for Raytheon; parallel algorithms for solid-fluid interactions and aeroelasticity; and CFD modeling of pharmaceutical isolators of Eli Lilly and Company. He has published numerous journal and conference papers and book chapters (over 170) and presented lectures at various national and international conferences. He has been involved with large-scale computational and parallel grid computing research at the Computational Fluid Dynamics Laboratory of the Department of Mechanical Engineering at IUPUI for thirty years. He has conducted numerous research projects funded by various government and private agencies.

He has been a founding partner of Technalysis Inc. in USA (<http://www.technalysis.com>), where he served as a technical director from 1985 till 2010 leading algorithm development efforts in CFD and CSD areas. He currently serves as a consultant to EDA Engineering and Design Ltd. company (<http://www.eda-ltd.com.tr>) since 2004, where he provides technical support for development of CFD and CSD software for design and analysis of engineering products.

Dr. Akay is a Fellow Member of the American Society of Mechanical Engineers (ASME), Senior Member of the American Institute of Aeronautics and Astronautics (AIAA), and Member of the American Society of Engineering Education (ASEE).

CURRICULUM VITA

EDUCATION

- Ph.D., Civil Engineering (*Specialty: Computational Mechanics*), **The University of Texas at Austin**, Austin, Texas, 1974
 - M.S., Civil Engineering (*Specialty: Computational Mechanics*), **The University of Texas at Austin**, Austin, Texas, 1969
 - B.S., Civil Engineering, **Middle East Technical University**, Ankara, Turkey, 1967
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EXPERIENCE

Faculty Positions

- Professor of Mechanical Engineering, **Atılım University**, 2010-Present
- Chancellor's Professor of Mechanical Engineering, **IUPUI**, 2003-2010
- Professor of Mechanical Engineering, **IUPUI**, 1985-2003
- Associate Professor of Mechanical Engineering, **IUPUI**, 1981-1985
- Research Associate of Mechanical Engineering, **IUPUI**, 1980-1981
- Associate Professor of Civil Engineering, **Middle East Technical University**, Ankara, Turkey, 1979-1980
- Assistant Professor of Civil Engineering, **Middle East Technical University**, Ankara, Turkey, 1974-1980
- Instructor of Civil Engineering, **The University of Texas at Austin**, Austin, Texas, 1974

Administrative Positions

- Provost for Academic Affairs, **Atılım University**, 2010-Present
- Interim Associate Dean for Academic Programs and Research, Purdue School of Engineering and Technology, **IUPUI**, 2008-2009
- Chair, Department of Mechanical Engineering, **IUPUI**, 2000-2008
- Founding Director, Multidisciplinary Undergraduate Research Institute (MURI), Purdue School of Engineering and Technology (www.muri.iupui.edu), **IUPUI**, 2005-2010
- Member of Executive Committee, Richard G. Lugar Center for Renewable Energy, **IUPUI**, 2007-2010
- Co-Director, Computational Fluid Dynamics Laboratory, **IUPUI**, 1983-2010
- Assistant Chair, Department of Civil Engineering, **Middle East Technical University**, Ankara, Turkey, 1978-1980

Board Membership

- Member of the Board, **OSTIM Teknopark**, Ankara, Turkey, 2014-Present

Consulting

- Technical Consultant, **EDA Engineering and Design Ltd.**, 2004-Present
- Technical Consultant, **Technalysis, Inc.**, Indianapolis, IN, 1985-2010
- Technical Consultant, **Allison Transmission Company**, Indianapolis, IN, 1983-1985

Honors and Awards

- Director's Award for Distinguished Mentor, Center for Research and Learning, IUPUI, 2007
 - Fellow, American Society of Mechanical Engineers (ASME), 2004-Present
 - Chancellor's Professor of Mechanical Engineering, IUPUI, 2003-2010
 - Member, Alliance of Indiana University Distinguished and Titled Professors (<http://www.indiana.edu/~alldrp/members/akay.html>), 2003-Present
 - Dorris H. Merritt Outstanding Leadership Award, School of Engineering and Technology, IUPUI, 2002
 - Dean's Special Award for Distinguished Contributions to the School, 1999
 - TERA Teaching Excellence Recognition Award, IUPUI, 1997
 - Abe Max Distinguished Professor Award for Research, School of Engineering and Technology, 1993
 - NATO Scholarship of the Scientific and Technical Research Council of Turkey, (to study Ph.D. at The University of Texas at Austin), 1971-1973
 - Fulbright-Hays Scholarship of U.S. State Department (to study Master's at The University of Texas at Austin), 1967-1968
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TEACHING

Topics

- Finite Element Method
- Computational Methods
- Basic Mechanics
- Fluid Mechanics
- Solid Mechanics
- Continuum Mechanics

Courses Taught

- Basic Mechanics
- Mechanics of Materials
- Mechanical Design
- Basic Fluid Mechanics

- Intermediate Fluid Mechanics
 - Computer Methods
 - Computer-Aided Engineering Analysis
 - Advanced Stress Analysis
 - Finite Element Analysis
 - Advanced Applications of Finite Element Method
 - Computational Fluid Dynamics
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RESEARCH

Research Areas

- Computational Fluid Dynamics
- Computational Solid Dynamics
- Finite Element and Finite Volume Methods
- Parallel Computing
- Solid-fluid Interactions
- Fatigue and Creep Modeling
- Electronic Package Reliability
- Multi-scale Computations

Externally Funded Projects

- "Development of an Incompressible Overset Mesh Interface for Unstructured Mesh Generator MESHeda," EDA Ltd, \$41,922, 10/08 - 09/09. Principal Investigator.
- "Development of Computational Fluid Dynamics Models for Improving Performance of Pharmaceutical Isolators, Phases 1 and 2," Eli Lilly and Company, \$283,542, 04/04 - 05/08. Principal Investigator.
- "MultiScale Methodology for the Design of Active Materials," Indiana 21st Century Research and Technology Fund, \$573,000, 9/03 - 8/05. Co-Principal Investigator.
- "Parallelization and Development of Solid-Fluid Interaction Models for Aeroelasticity," Aeronautical Engineering Department, Middle East Technical University, \$57,507, 8/99 - 12/02. Principal Investigator.
- "Dynamic Load Balancing on Heterogeneous Systems," NASA Glenn Research Center, \$200,000, 9/99 - 9/00. Co-Investigator.
- "Establishment of a Parallel Network of IBM RS/6000 Computers at the CFD Laboratory," IBM Corporation, \$152,730, 12/98 - 12/99, Co-Principal Investigator.
- "Methods for Improving the Efficiency of Heterogeneous Parallel Computation of Internal Flows," NASA Lewis Research Center, \$240,000, 11/97 -- 10/00. Co-Principal Investigator.
- "Benchmarking of FEA Capabilities for Structural Analysis," \$59,000, 3/98 - 3/99, Raytheon Technical Services. Principal Investigator.

- "Prediction of Fatigue Life of Solder Joints Under Thermal Loads," \$41,006, 5/96 -- 4/97, United Technology/Carrier Electronics, Principal Investigator.
- "Establishment of Distributed Computing," Dassault Aviation, France, \$20,730, 09/96 -- 02/97. Co-principal Investigator.
- "Prediction of Fatigue Life of Solder Joints Under Thermal Loads," Carrier Electronics, Huntington, IN, \$41,006, 05/96 - 04/97. Principal Investigator.
- "Parallel CFD on Heterogeneous Workstations," Dassault Aviation, France, \$18,000, 1996. Co-Principal Investigator.
- "Parallel Computation of Unsteady Flows on a Network of Workstations," NASA Lewis Research Center, Cleveland, Ohio, \$223,490, 03/94 -12/96. Co-principal Investigator.
- "Industry/University Cooperative Research Center for Advanced Electronics Interconnects," Cummins Electronics, \$10,000, 11/1/94 - 10/31/96. Co-Principal Investigator
- "Industry/University Cooperative Research Center for Advanced Electronics Interconnects," Delco Electronics, Kokomo, IN, \$30,000, 11/1/94 - 10/31/96. Co-Principal Investigator.
- "Industry/University Cooperative Research Center for Advanced Electronics Interconnects," Rockwell International, \$20,000, 11/1/94 -- 10/31/96. Co-Principal Investigator.
- "Conductive Epoxy Materials Research," US Naval Air Warfare Center, Indianapolis, IN, \$55,076, 9/1/94 -9/13/95. Co-Principal Investigator.
- "Lead Solder Alternatives," US Naval Air Warfare Center, Indianapolis, IN, \$8,000, 01/15/94 - 1/14/95. Co-Principal Investigator.
- "Dynamic Load Balancing for Parallel Computations," NASA Lewis Research Center, Cleveland, Ohio, \$15,300, 1994. Co-Principal Investigator.
- "A Computational Grid-Oriented Data Base for Parallel Computation of Turbomachinery Problems," NASA Lewis Research Center, \$223,880, 01/91 - 01/93. CoPrincipal Investigator.
- "Coupling of Unsteady Flows with Structural Deformations," Dassault Aviation, France, \$25,000, 91 - 93. Co-Principal investigator.
- "Automated Finite Element Modeling of Circuit Card Assemblies," US Army Research Office, \$100,000, 07/1/91 - 06/30/93. Co-Principal Investigator.
- "Parallel Computations on IBM 3090 Supercomputer," IBM Research Center, Kingston, New York, \$100,000, 01/87 - 01/93. CoPrincipal Investigator.
- "Numerical Simulation of Unsteady Compressible Euler Flows," Ministere de la Defense, France, \$25,000, 90 -- 91. Co-Principal Investigator.
- "A Block--Structured Finite Element Analysis of Wing-Nacelle Configurations," General Electric, Cincinnati, Ohio, \$65,000, 01/87 01/90. Co-Principal Investigator.
- "Parallel Processing of Multi-Stage Turbomachinery," NASA Lewis Research Center, Cleveland, Ohio, \$134,000, 01/88 - 01/91. Co-Principal Investigator.
- "Solution of Unsteady Euler Equations," Dassault Aviation, France, \$17,040, 01/89 - 05/90. Co--Principal Investigator.
- "Analysis of Three-Dimensional Flows through Blade Passages of Hydraulic Retarders and Torque Converters," Detroit Diesel Allison Division of GM, Indianapolis, IN, \$49,500, 84 -- 85. Co-Principal Investigator.
- "Finite Element Analysis of Flows through Turbine Volutas," Schwitzer Corporation, Indianapolis, IN, \$8,000, 01/84 -- 12/84. Co-Principal Investigator.

- “A Zonal Approach to the Design of Finite Element Grids for 3-D Transonic Flows with Complex Geometries,” US Air Force, Office of Scientific Research, \$122,962, 09/83 - 09/86. Co-Investigator.
- “Analysis of Three-Dimensional Transonic Potential Flows Using Optimum Grids,” US Air Force, Office of Scientific Research, \$143,978, 09/81 - 09/83. Co-Investigator.
- “Finite Element Analysis of Transonic Flow through a Cascade of Airfoils Using a Self Adaptive Mesh,” NASA Research Center, \$203,947, 01/80 - 12/83. Co-Principal Investigator.

Internally Funded Projects (IUPUI)

- “Expansion of the Multidisciplinary Undergraduate Research Institute to All IUPUI Schools,” \$90,000 annual base budget received from IUPUI together with the IUPUI Center for Research and Learning, 2007-2010. Founding Director.
- “Establishment of a Multidisciplinary Undergraduate Research Institute in the School of Engineering and Technology,” IUPUI, \$135,000 annual base budget received from IUPUI, 2005 till 2010. Founding Director.
- “Development of Parallel CFD Algorithms for Multidisciplinary Applications on the TeraGrid, Including Parallel Rendering of Solutions on the TeraGrid.” Internally funded. 2005 - 2008. Principal Investigator.
- “Parallel Solution of Fluid-Structure Interaction Problems via Coupling of Fluid Dynamics (CFD) and Solid Dynamics (CSD) Codes for Aeroelastic Flutter Predictions.” Internally Funded. 2003-2007. Principal Investigator
- “Practicing Computational Engineering on the Internet,” Funded by the Indiana University High Performance Network Program, \$20,000, 8/99 -- 8/00. Principal Investigator.
- “Development of Network Computing Capabilities for ME 551 on the Internet,” Faculty Development Grant, School of Engineering and Technology, \$5,000, 6/99 -- 5/00. Principal Investigator.
- “Establishment of a Parallel Network of Workstations and PCs at the CFD Laboratory,” IUPUI Research Investment Fund, 9/97 -- 9/98, \$70,000. Co-Principal Investigator.
- “Support of Computational Fluid Dynamics Laboratory,” IUPUI Research Investment Fund, \$84,000, 1/90 - 12/94. Co-Principal Investigator.
- “Industry/University Cooperative Research Center for Advanced Electronic Interconnect,” IUPUI Research Venture Award, \$67,400, 1993. Co-Principal Investigator.
- “Biomechanics and Biomaterials Research Center,” IUPUI Research Investment Fund, \$222,630, 1990. Co-Principal Investigator.
- “Establishment of the Computational Fluid Dynamics Laboratory in the Department of Mechanical Engineering,” IUPUI Research Initiative Fund, \$40,000, 1986. Co-Principal Investigator.

SIGNIFICANT PROFESSIONAL SERVICE

Membership in Scientific and Professional Societies

- Fellow Member, American Society of Mechanical Engineers (ASME)
- Senior Member, American Institute of Aeronautics and Astronautics (AIAA)

- Member, American Society of Engineering Education (ASEE)

Editorial Boards

- Member of Editorial Board, International Journal of Computational Fluid Dynamics, 1990-Present
- Member of Editorial Board, International Journal for Computational Methods in Engineering Science and Mechanics, 2003-Present

Journal Reviews

- ASME Journal of Electronic Packaging
- Computer Methods in Applied Mechanics and Engineering
- International Journal of Computational Fluid Dynamics
- International Journal International Journal for Computational Methods in Engineering Science and Mechanics
- International Journal of Computers and Fluids
- International Journal for Numerical Methods in Engineering
- International Journal for Numerical Methods in Fluids

Conference Organizations

- Member, Advisory Board, International Engineering Education Conference, Atılım University, November 4-6, 2010, Antalya, Turkey
- Member, Scientific Organizing Committee, International Parallel Computational Fluid Dynamics Conference since 2009 (an annual conference held since 1989)
- Session Chair and Paper Presenter, *Parallel Computational Fluid Dynamics Conference*, Moscow, Russia, May 12, 2003
- Session Chair and Invited Paper Presenter, *Electronic Packaging Symposium, ASME Annual Meeting*, New York, NY, November 13, 2001
- *Session chair and presenter, European Congress on Computational Methods in Applied Sciences and Engineering*, Barcelona, Spain, September 12, 2000.
- *Session chair and presenter, Parallel CFD Workshop '99, Istanbul Technical University, Istanbul, Turkey, June 17, 1999*
- *Session chair and presenter, Parallel Computational Fluid Dynamics Conference '99, Williamsburg, VA, May 25, 1999*
- *Session chair and presenter, ASME Advances in Electronic Packaging Conference, InterPACK'97, Kohala Coast, Hawaii, June 15-19, 1997*

Other Professional Service Activities

- Member, E-Science Infrastructure Advisory Board of Turkey, TUBITAK, ULAKBIM, 2010-2013
- Visiting Professor, Department of Engineering Design and Manufacture, University of Malaya, Kuala Lumpur, Malaysia, August 2012 (two weeks)
- Member, Review Committee, 2nd National High Performance and Grid Computing Conference (Basarim '10), July 10-13, 2010, Istanbul Technical University, Istanbul, Turkey

- Co--chair, Computing Breakout Session, Indiana University, Energy Workshop, Indiana University, IN, August 6-7, 2009
- Member, Computing Breakout Session, Great Lakes Alliance for Sustainable Energy Research (Glaser) Workshop, University of Chicago and ANL, Chicago, IL, May 26-27, 2009
- Member, Review Committee, Parallel Computational Fluid Dynamics Conference, Moffett Field (NASA Ames), CA, 2009
- Member, Organizing Committee, Parallel Computational Fluid Dynamics Conference, NASA Ames and U.S. Army Research, Moffett Field, CA, May 18-22, 2009
- Member, Scientific Committee, Ankara International Aerospace Conference, Middle East Technical University, Ankara, Turkey, 2009
- Member, Review Committee, 1st National High Performance and Grid Computing Conference (Basarim '09), April 15-18, 2009, Middle East Technical University, Ankara, Turkey
- External Examiner for the Department of Mechanical Engineering Programs at Universiti Tenaga Nasional (UNITEN), Malaysia, 2008 and 2010
- Member, Scientific Review Committee, Parallel Computational Fluid Dynamics Conference, Antalya, Turkey, May 21-24, 2007
- Member, Scientific Committee, Ankara International Aerospace Conference, Middle East Technical University, Ankara, Turkey, 2007
- Participant, ASME Mechanical Engineering Education Conference, Clearwater Beach, FL April 11-15, 2004
- Participant, ASME Mechanical Engineering Education Conference, Clearwater Beach, FL April 7-10, 2002
- Participant, ABET Preparedness Workshops, November 11, 2001 and March 5, 2004
- Organizer/Instructor, Short Course on "Advanced Applications of the Multiphysics Finite Element Program ANSYS," (For Engineers of Crane Naval Surface Warfare Center, Crane, IN) IUPUI, Indianapolis, March 13-15, 2001
- Participant, ABET Regional Engineering Faculty Workshop, September 23-24, 2000, Newton, IO.
- Co-Organizer/Co-Instructor, A One-week Short Course on "The Finite Element Method in Computational Fluid Dynamics and Heat Transfer," 1984-1994, annually (with A. Ecer, W. Habashi, J.N. Reddy, and D. Gartling)
- Co-Instructor, A One-week Short Course on "The Finite Element Method and Its Applications in Turbomachinery," The Von Karman Institute for Fluid Dynamics, May 1987 (with W. Habashi, A. Ecer, and J.N. Reddy)

Invited Lectures

- 'Integrated Engineering Tools from Solid Modeling to Design Optimization', Department of Computer Engineering, Middle East Technical University, Ankara, Turkey, May 28, 2014.
- 'Development of Integrated Engineering Analysis and Design Tools from Solid Modeling to Design Optimization', Parallel Computational Fluid Dynamics Conference, National Supercomputing Center, Changsha, Hunan, China, May 20-24, 2013 .
- 'Bilgisayar Destekli Tasarımın Teknolojik Gelişime Etkisi,' Altıncı Mühendislik ve Teknoloji Sempozyumu, Çankaya Üniversitesi, 25-26 Nisan, 2013.

- “The Need for Simulation--Based Engineering and Science Emphasis in Engineering Education,” International Engineering Education Conference – Turkey’s Vision 2023 Conference Series, Atılım University, Antalya, Turkey, November 4-6, 2010
- “The Need for Simulation-Based Engineering and Science Emphasis in Engineering Education,” International Engineering Education Conference – Turkey’s Vision 2023 Conference Series, Atılım University, Antalya, Turkey, November 4-6, 2010
- “Program Assessment Process in the Department of Mechanical Engineering,” *Presented to the Ph.D. Class of Dr. Trudy Banta in the School of Education (a renowned educationist in program assessment)*, IUPUI, June 5, 2007, <http://planning.iupui.edu/institute>
- “Computational Science and Engineering (CSE) Programs,” *EDUCEE Workshop*, Bahcesehir University, Istanbul, Turkey, October 4, 2006
- “Parallel Grid Computing of Large-Scale Simulation Problems,” Istanbul Technical University, Istanbul, Turkey, October 3, 2006
- “Parallel Grid Computing of LargeScale Simulation Problems,” Middle East Technical University, Ankara, Turkey, September 29, 2006
- “Parallel Grid Computing of Large Scale Computing of Large-Scale Simulation Problems,” TOBB Economy and Technology University, Ankara, Turkey, September 27, 2006
- “Large-Scale Parallel Computations of Solid-Fluid Interaction Problems for Aeroelastic Flutter Predictions,” *Ankara International Aerospace Conference*, Middle East Technical University, Ankara, Turkey, August 22-25, 2005
- “Challenges in Parallel and Distributed Computing of CFD Problems,” *ASME Congress, Applied Mechanics Session*, Anaheim, CA, November 15, 2004
- “Continuous Program Assessment in the Department of Mechanical Engineering, IUPUI,” *Presented to the Ph.D. Classes of Dr. Trudy Banta in the School of Education (a renowned educationist in program assessment)*, IUPUI, May 27, 2003 (<http://planning.iupui.edu/institute>)
- “Metacomputing of Solid-Fluid Structure Interaction Problems via I-Light,” *I-Light Applications Workshop*, IUPUI, December 4, 2002
- “Parallel Computational Fluid Dynamics and Dynamic Load Balancing on Heterogeneous Computer Clusters,” *Mechanical Engineering Seminar Series, Rice University*, February 27, 2002, Houston, TX
- “Documenting Progress on Assessment,” *2001 Assessment Institute*,” IUPUI, Indianapolis, IN, November 6, 2001
- “Simplification of Finite Element Models for Thermal Fatigue Life Prediction of PBGA Packages,” *Electronic Packaging Symposium, ASME Annual Meeting*, New York, November 11-16, 2001
- “Parallel Computational Fluid Dynamics Research at IUPUI,” *Wright Patterson Air Force Base, Multidisciplinary Research Group*, March 21, 2001, Dayton, Ohio
- “Dynamic Load Balancing Applications on Heterogeneous Unix and NT Clusters,” *European Congress on Computational Methods in Applied Sciences and Engineering*, Barcelona, Spain, September, 12, 2000
- “Parallel Computing for Large Scale Computational Fluid Dynamics,” *Department of Physics Seminar Series*, IUPUI, February 3, 2000
- “Parallel Computational Fluid Dynamics with Network of PCs,” *IUPUI Alumni Breakfast at Rolls--Royce Corporation*, Indianapolis, IN, November 30, 1999

- “A Parallel 3D Euler Solver for Unsteady Aerodynamics,” *Parallel CFD Workshop '99, Istanbul Technical University, Istanbul, Turkey, June 17, 1999*
- A Study of Fatigue Life Predictions for PBGA Joints and Comparisons with Test Data,” *ASME Advances in Electronic Packaging Conference, Hawaii, July 14, 1999*
- “Efficiency Studies of a Parallel Substructuring Algorithm on Different Platforms,” *Parallel CFD Workshop '99, Istanbul Technical University, Istanbul, Turkey, June 18, 1999*
- “Solution of Unsteady Euler Equations Using Dynamically Deforming Unstructured Grids,” *Department of Aeronautical Engineering, Middle East Technical University, Ankara, Turkey, January 6, 1999*
- “Fatigue Life Prediction of Solder Joints of Electronic Packages,” *Delco-Remy, Kokomo, IN, October 14, 1998*
- “A Semi-Explicit Parallel Solver for Viscous Incompressible Flows,” *Symposium on Advances in Computational Mechanics on 60th Birthday of Professor J. Tinsley Oden, The University of Texas at Austin, January 13-15, 1997*
- “Load Balancing in Parallel Computing,” *Sixth International Symposium on Computational Fluid Dynamics, Lake Tahoe, NV, September 4-8, 1995*
- “Efficiency Considerations for Explicit CFD Solvers on Parallel Computers,” *Workshop on Solution Techniques for Large-Scale CFD Problems, Concordia University, Montreal, Canada, July 12, 1995*
- “Viscoelastic Finite Element Analysis of Adhesive Joints Under Thermal Loads,” *ASME INTERpack '95, Hawaii, March 26-30, 1995*
- Experimental Evaluation of Finite Element and Fatigue Life Prediction Methods for Thermally Loaded Solder Joints,” *Workshop on Solder Joint Life Prediction Modeling held at Jet Propulsion Laboratory, Pasadena CA, December 15, 1994*
- “Parallel Computation of Unsteady Flows on Network of Workstations,” *2nd Japan--US Symposium on Finite Element Methods in Large-Scale Computational Fluid Dynamics, Tokyo, Japan, March 15, 1994*

SIGNIFICANT INSTITUTIONAL SERVICE

Campus Level Service, Atılım

- Provost, Responsible for Academic Affairs (Education and Research), 2010-Present
- Chair, Self-Evaluation Steering Committee for European Union Institutional Evaluation Program, 2011-Present
- Chair, Research Steering Committee, 2010-Present
- Member, University Research Committee, 2010-Present
- General Coordinator, Instructional Technologies and Pedagogy Office (ETPO), 2011-Present

Contributions to New Programs Initiated at Atılım University

- Scientific Research Projects Program, BAP (an expanded version of an earlier program)
- Research Laboratories Projects Program, ALP
- Undergraduate Research Projects Program, LAP

- Atılım University's Top 50 Students Program
- Sharing the Success Program for Scholarship Students
- Atılım University's The One Book-One Topic Program
- The Educational Technologies and Pedagogy Office, ETPO
- The Mobile Education Program of Atılım
- The mPAD TabletPC Program of Atılım
- An Orientation Program for New Academic Staff on Educational Technologies
- A Performance Evaluation Program for Academic Staff
- An Institutional Improvement and Planning Office

Campus Level Service, IUPUI

- Member, Purdue University Graduate Council, 2008-2009
- Member, IUPUI Graduate Affairs Committee, 2008-2009
- Member, IUPUI Council of Associate Deans for Academic Programs, 2008-2009
- Member, IUPUI Council of Associate Deans for Research, 2008-2009
- Member, IUPUI Program Review and Assessment Committee, 2008-2009
- Member, Indiana University Intellectual Property Policy Council, 2008-2009
- Member, Executive Committee, IUPUI United Way Campaign, 2007-Present
- Chair, IUPUI Action Committee on Transfer of Technology and Translational Research, 2007
- Founding Director, Multidisciplinary Undergraduate Research Institute, IUPUI, 2005- Present
- Chair, IUPUI Faculty Council Technology Committee, 2004-2009
- Chair, IUPUI International Development Fund Advisory Committee, 2004-Present
- Program Review Committee for Computer Science Department, 2006, Member
- Member, Executive Committee, IUPUI Center for Undergraduate Research and Learning, 2004-Present
- Member At Large (elected), IUPUI Faculty Council, 2002-2004 and 2006-Present
- Member, IUPUI Faculty Grievance Advisory Panel, 2004-2008
- Member, IUPUI Future Group, 2001-2003
- Chair, IUPUI Faculty Council Budgetary Affairs Committee, 2000-2002
- Member, IUPUI Faculty Council Budgetary Affairs Committee, 2003
- Chair, CSCI and ECE Joint Curriculum Committee, (an ad hoc committee formed by IUPUI administration for two departments), 2003-2008

School Level Service, IUPUI

- Chair, Research Advisory Committee, 2008-2009
- Chair, Computing Resources Committee, 2005-2008
- Chair, Faculty Affairs Committee, 2004 (member, 2002-2004)
- Member, Joint IUPUI/Purdue Committee for Establishing Engineering Ph.D. Programs at IUPUI, 2003
- Chair, Budgetary Affairs Committee, 2002-2004

- Member, Dean of Engineering and Technology Review Committee, 2002
- Member, Unit Promotion and Tenure Board, 1986-2007 (elected or appointed)
- Chair, Constitution and Bylaws Committee. 1994-1998 (member, 2000-2003)
- Chair, Tenure and Promotion Workshops, 1997, 1999, 2003, and 2005

Department Level Service, IUPUI

- Chair or Member, ME Graduate Committee, 1990-2000
- ME Department Representative, Purdue School of Mechanical Engineering Graduate Committee, West Lafayette, 1998-2000
- Chair, Primary Promotion and Tenure Board, 1990-2000
- Chair or Member, Search and Screen Committees including the search committee for department chair, computer-aided design, thermal science, and biomedical faculty positions, 1990-2000

PRINCIPAL PUBLICATIONS

Research Related Journal Papers

1. H.U. Akay, E. Oktay, M. Manguoglu, A.A. Sivas (2016), "Improved Parallel Preconditioners for Multidisciplinary Topology Optimisations," *International Journal of Computational Fluid Dynamics*, Vol. 30, pp. 333-336 (<http://dx.doi.org/10.1080/10618562.2016.1205737>).
2. E. Oktay, H.U. Akay, O.T. Sehitoglu, "Three-Dimensional Structural Topology Optimization of Aerial Vehicles Under Aerodynamic Loads," *Computers and Fluids*, Vol. 92, pp. 225-232, 2014 (<http://dx.doi.org/10.1016/j.compfluid.2013.11.018>).
3. E. Oktay, H.U. Akay, and O. Merttopcuoglu, "Parallelized Structural Topology Optimization and CFD Coupling for Design of Aircraft Wing Structures," *Computers and Fluids*, Vol. 49, pp. 141-145, 2011 (<http://dx.doi.org/10.1016/j.compfluid.2011.05.005>).
4. J. Liu, H.U. Akay, A. Ecer, and R.U. Payli, "Flow Around Moving Bodies Using a Dynamic Unstructured Overset-grid Method," *Int. J. Computational Fluid Dynamics*, Vol. 24, N. 6, pp. 187-200, 2010 (<http://dx.doi.org/10.1080/10618562.2010.521130>).
5. N. Nayan, H.U. Akay, M.R. Walsh, W.V. Bell, G.L. Troyer, R.E. Dukes, and P. Mohan, "CFD Modeling of Pharmaceutical Isolators with Experimental Verification of Airflow," *PDA J. Pharmaceutical Science and Technology*, pp. 237-254, 2007.
6. J. Koh, A.T. Hsu, H.U. Akay, and M.F. Liou, "Analysis of Overall Heat Balance in Self-Heated Proton-Exchange-Membrane Fuel Cells for Temperature Predictions," *Journal of Power Sources*, No. 144, pp. 122-128, 2005.
7. M. Pikal, S. Chen, and H.U. Akay, "Glass Transition Models in Freeze Drying," *Pharmaceutical Development and Technology*, Vol. 10, No. 1, pp. 17-32, 2005.
8. R.M. Pidaparti, P.W. Longest, A.T. Hsu, and H.U. Akay, "Nanoscale Computational Analysis for an Idealized Bio-molecular Motor," *Bulletin of the Polish Academy of Sciences, Technical Sciences*, Vol. 53, No. 4, 2005.
9. E. Oktay, H.U. Akay, and A. Uzun, "A Parallelized 3D Unstructured Euler Solver for Unsteady Aerodynamics," *AIAA Journal of Aircraft*, Vol. 40, No. 2, pp. 348-354, 2003.

10. H.U. Akay, Y. Liu, and M. Rassaian, "Simplification of Finite Element Models for Thermal Fatigue Life Prediction of PBGA Packages," *ASME Journal of Electronic Packaging*, Vol. 125, pp. 347-353, 2003.
11. E. Yilmaz, M.S. Kavsoglu, H.U. Akay, and I.S. Akmandor, "Cell-vertex Based Parallel and Adaptive Explicit 3D Flow Solution on Unstructured Grids," *International Journal of Computational Fluid Dynamics*, Vol. 14, pp. 271-286, 2001.
12. Y.P. Chien, A. Ecer, H.U. Akay, S. Secer, and J.D. Chen, "Cost Estimation for Parallel CFD Using Variable Time-Stepping Algorithms," *International Journal of Computational Fluid Dynamics*, Vol. 15, pp. 183-195, 2001.
13. S. Kocak and H.U. Akay, "Parallel Schur Complement Method for Large-Scale Systems on Distributed Memory Computers," *Journal of Applied Mathematical Modeling*, Vol. 25, pp. 873--886, 2001.
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105. A. Ecer and H.U. Akay, "On the Finite Element Formulation of Mixed Elliptic--Hyperbolic Problems in Fluid Dynamics," *International Congress on Numerical Methods for Engineering*, Paris, France, November 27-30, 1978.
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113. H.U. Akay and P. Gulkan, "Earthquake Analysis of Keban Dam," *Proceedings of the Fifth European Conference on Earthquake Engineering*, Istanbul, Turkey, September 22-25, 1975.

Theses

- H.U. Akay, "Static and Dynamic Large Deflection and Shear Deformation Solution of Plate Bending Problems Using Mixed Finite Element Models," *Post-doctoral Thesis* (for promotion to Associate Professorship position), Middle East Technical University, Ankara, Turkey, September 1978.
- H.U. Akay, "Linear Buckling and Geometrically Nonlinear Analysis of Planar Plate-Stiffener Type Structures by the Finite Element Method," *Ph.D. Thesis*, The University of Texas at Austin, Austin, Texas, January 1974.
- H.U. Akay, "A Discrete-Element Solution of Skew Plates," *Master's Thesis*, The University of Texas at Austin, Austin, Texas, May 1969.

SUPERVISION OF STUDENTS AND POST-DOCS

Graduate Students at Atilim University

- Sogair Edeeb, Ph.D. "Simulation of Aerodynamic Heating with Conjugate Heat Transfer Method," In-progress.

Graduate Students at IUPUI

- Jingxin Liu, Ph.D. "*Simulating Unsteady Flow of Moving Flow and Control Valves by an Unstructured Overset Grid Method*," December 2008.
- Cai Shen, MSME, Thesis: "*CFD Models for Flow and Mass Transfer of Hydrogenperoxide in Pharmaceutical Isolators*," December 2008.
- Cem Ersungur, MSME, Thesis: "*Kinetic Monte Carlo Molecular Simulations for Fuel Cell Applications and Surface Reactions*," August 2007.
- Amit Baddi, MSME, Thesis: "*Parallel Computations of Solid-Fluid Interactions Problems*," December 2005.
- Xiaoyin He, MSME, Thesis: "*Parallel Computations of Solid-Fluid Interactions Using Arbitrary Lagrangian-Eulerian and Relative Coordinate Formulations*," IUPUI, May 2004.
- Zhenyin Li, MSME, Thesis: "*Parallel Computations of 3D Unsteady Compressible Euler Equations with Structural Coupling*," IUPUI, August 2002.
- Yan Liu, MSME, Thesis: "*Simplified 2D/3D Models for Fatigue Life Prediction of BGA Solder Joints of Electronic Packages*," IUPUI, August 2001.
- Christoffer Bronnenberg, MSME, Thesis: "*An Unstructured Grid Partitioning Program For Parallel Computational Fluid Dynamics*," IUPUI, August 1999.
- Ali Uzun, MSME, Thesis: "*Parallel Computations of Unsteady Euler Equations on Dynamically Deforming Unstructured Grids*," IUPUI, August 1999.
- Jamie Workman, MSME, Thesis: "*3D Unstructured Grids for Unsteady Compressible Flows*," IUPUI, August 1999.
- Gunasekaran Kaliappan, MSME, Thesis: "*A Comparative Evaluation of Fatigue Life Prediction Methods for Solder Joint Assemblies*," IUPUI, May 1999.
- Hongyan Zhang, MSME, Thesis: "*Combined Heat Transfer and Thermal Stress Analysis of Power Resistor Assemblies for Fatigue Life Predictions*," IUPUI, May 1998.
- Karoly Fekete, MSE, Thesis: "*A Domain Decomposition Based Parallel Solver for Incompressible Navier-Stokes Equations Using the Finite Element Method*," IUPUI, August 1997.

- Ahmet B. Acikmese, MSME, Thesis: "Parallel Computations of Unsteady Compressible Viscous Flows Using the Finite Element Method," May 1996. Currently a Senior Scientist at Sandia National Laboratories.
- Geoffrey L. Glogas, MSME, Thesis: "Experimental Study of Viscoelastic Properties of a Conductive Adhesive for Electronic Packaging," May 1996.
- Altug Bilgic, MSME, Thesis: "Fatigue Life Prediction Methods for Thermally Loaded Solder Joints Using the Finite Element Method," May 1996.
- Xu Song, MSME, Thesis: "Numerical Modeling of Creep Phenomena in Adhesive Epoxy and Solder Joint Assemblies of Electronic Packages," August 1995.
- Yuehua Chen, MSME, Thesis: "Parallel Solution of Unsteady Compressible Euler Equations Using the Finite Element Method," August 1995.
- Ozan Selcuk, MSME, Thesis: "Parallel Solution of Coupled Unsteady Compressible Flow and Aeroelasticity Equations," August 1994. Currently, Vice President of Leaf Solutions, a software development company in Indianapolis, IN.
- William B. Kemle, MSME, Thesis: "Parallel Implementation of a Three-Dimensional Unsteady Potential Finite Element Flow Solver," May 1993.
- Jeffrey Haskett, MSME, Thesis: "Stress Fracture Investigation of a Rabbit Tibia Using Finite Element Analysis," August 1993.
- Ali Beskok, MSME, Thesis: "A Parallel Algorithm for the Time-Averaged Solution of the Rotor--Stator Interaction Problem," May 1991. Currently, Batten Professor of Computational Engineering, Department of Aerospace Engineering, Old Dominion University, Norfolk, VA.
- Evangelos Spyropoulos, MSME, Thesis: "Finite Element Solution of the Unsteady Euler Equations Employing Clebsch Variables," May 1990.
- David Turner, MSME, Thesis: "Finite Element Analysis of the Three--Dimensional Euler Equations in a Rotating Turbomachinery Blade Passage," May 1988.
- Paul Willhite, MSME, Thesis: "Finite Element Solution of Transonic Euler Equations Around Lifting Airfoils," May 1985.
- Ismail H. Tuncer, MSME, Thesis: "Design of Three-Dimensional Finite Element Grids for Transonic Flows Around Wing--Body Combinations," May 1983. Currently, Professor and Chair, Department of Aerospace Engineering, Middle East Technical University, Ankara, Turkey.
- John Spyropoulos, MSME, Thesis: "An Investigation of a Finite Element Algorithm for Two--Dimensional Inviscid Rotational Flows," May 1983.
- Beyazit Sener, MSME, Thesis: "Finite Element Analysis of ThreeDimensional Euler Equations," May 1983.
- Bilal Bhutta, MSME, Thesis: "Finite Element Solution of Three-Dimensional Potential Flows," May 1982.

Graduate Students at METU

- Oguzhan Gurdogan, MSCE, Thesis: "Isoparametric Finite Elements for Stress Intensity Computations in Fracture Mechanics," December 1978.
- Mehmet Utku, MSCE, Thesis: "Finite Element Solution of Transonic Flow Problems," May 1978. Currently, Professor, Middle East Technical University, Department of Civil Engineering, Ankara, Turkey.

- Tacettin Sarioglu, MSCE, Thesis: “*Development of Mixed Plate Bending Isoparametric Elements*,” May 1978.
- Turgut Tokdemir, Ph.D., Dissertation: “*A Finite Element Galerkin Formulation for the Dynamic Analysis of Linear Viscoelastic Two-Dimensional Solids*,” May 1977. *Currently, Chair and Professor, Department of Engineering Sciences, Middle East Technical University, Ankara, Turkey.*

Post-Doctorate Fellows at IUPUI

- Dr. Erdal Yilmaz, Computational Fluid Dynamics Laboratory, 1999-2008. Ph.D. from Middle East Technical University, Ankara, Turkey, 1999.
 - Dr. Fethi Kadioğlu, Computational Mechanics Laboratory, 2002-2004. Ph.D. from Istanbul Technical University, Istanbul, Turkey.
 - Dr. Süleyman Koçak, Computational Mechanics Laboratory, 1997-1999. Ph.D. from Cukurova University, Adana, Turkey.
 - Dr. Uğurhan Akyüz, Computational Mechanics Laboratory, 1996-1997. Ph.D. from Middle East Technical University, Ankara, Turkey.
 - Dr. Kaan Karamete, Computational Fluid Dynamics Laboratory, 1996-1997. Ph.D. from Middle East Technical University, Ankara, Turkey.
 - Dr. Helen Y. Wang, Computational Fluid Dynamics Laboratory, 1991-1993. Ph.D. from Syracuse University, NY.
 - Dr. Yihong Tong, Computational Mechanics Laboratory, 1991-1993. Ph.D. from University of Michigan, MI.
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