

Dr. ERDAL OKTAY

PERSONAL DATA

NAME: Erdal Oktay
GENDER: Male
PLACE AND DATE OF BIRTH: Antalya, Turkiye | 24 March 1961
ADDRESS: EDA Tasarım Analiz Mühendislik Ltd.
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WORK EXPERIENCE

since 2003 | EDA Engineering Design and Analysis Ltd. Co.
• Leading Shareholder and General Manager
1993–2003 | Roketsan Missile Industries Inc. Department of Engineering Development
• Manager of Aerodynamics Department
• Chief Engineer of Aerodynamics Branch
• Design Engineer in Aerodynamics Branch
1991–1992 | NASA Langley Research Center
• Research associate
1991–1992 | Old Dominion University
• Research associate
1985–1991 | Middle East Technical University Department of Mechanical Engineering
• Instructor
• Research assistant

SCIENTIFIC EDUCATION

1986–1991 | PH.D. MECHANICAL ENG. - MIDDLE EAST TECHNICAL UNIVERSITY
• Thesis title: A Cell Vertex Method for 3D Inviscid Internal Flows
• Supervisor: Prof. Dr. Ahmet Üçer (METU Mechanical Engineering)
• Co-supervisor: Prof. Dr. Sinan Akmandor (METU Aeronautical Engineering)
1983–1986 | M.S. MECHANICAL ENG. - MIDDLE EAST TECHNICAL UNIVERSITY
• Thesis title: An Investigation on The Solution of Euler Equations for Compressible Flows
• Supervisor: Prof. Dr. Ahmet Üçer (METU Mechanical Engineering)
1982–1983 | ENGLISH PREPARATORY SCHOOL - MIDDLE EAST TECHNICAL UNIVERSITY
1978–1982 | B.S. AERONAUTICAL/MECHANICAL ENGINEERING, - ISTANBUL TECHNICAL UNIVERSITY
• Title of graduation project: Preliminary Design of a Passenger Aircraft
• Supervisor: Prof. Dr. Ahmet Nuri Yüksel (ITU Aeronautical Engineering)

LANGUAGES

- English (proficient)
- German (intermediate)
- Turkish (native)

COMPUTER EXPERIENCE

- **Operating systems:** Unix, Linux, DOS, Windows
- **Programming languages:** Fortran77, Fortran95, C, C++

- **Office programs:** Latex, Libre office, MS office
- **Parallel Computing:** Grid-Computing, Cloud-Computing, Parallel-Computers, Workstation-Clusters, assembling and administration of PC Clusters
- **Commercial and Professional Programs:** CFX, ICEM, ANSYS, I-DEAS, TECPLOT, FLUENT, PLOT3D, USM3D, VGRID3D, CFL3D

CONSULTING:

- Roketsan Missile Industries Inc., 1989-1991

AWARDS & SCHOLARSHIPS

- Research and Encouragement Award by “Middle East Technical University, Prof. Dr. Mustafa N. Parlar Education and Research Foundation”, 1992.
- Ph.D. Scholarship of the Elginkan Foundation.

INTERNATIONAL CERTIFICATIONS

- SDRC Education & Training Program entitled: Master Series Design and Simulation Course, Ankara, Turkey 1994.
- SGI Parallel Programming and Code Optimization Course, Cortaillod, Switzerland, 1998.
- Missile Design Training Program, abroad, 1998.
- Missile Design Training Program, abroad, 2000.

PROFESSIONAL SOCIETIES

- American Institute of Aeronautics and Astronautics (AIAA)
- Chamber of Mechanical Engineers (MMO)

RESEARCH INTERESTS

- Computational Fluid Dynamics (CFD)
- Missile Aerodynamics
- Aerodynamic Shape Optimization
- Structural Shape Optimization
- Topology Optimization
- Artillery Ballistics
- Fire Control Inputs (FCI)
- Tabular Firing Tables (TFT)
- Fire Control Software (FCS)
- Aeroheating
- Aeroelasticity
- Unstructured Navier-Stokes Solvers
- Unstructured Mesh Generation
- Computational Geometry
- Moving Boundary Problems
- Fluid Structure Interaction
- Store Separation

- Code Parallelization (Domain Decomposition, MPI)
- Aerodynamic & Airframe Design of Missiles
- Air-vehicle design and Performance
- Internal Flows (Duct, Compressor, Turbine)

PROFESSIONAL INTERNATIONAL PROJECTS INVOLVED

- “Computational Fluid Dynamics Study of Complex Configurations in Relative Motion-An Unstructured Approach”. ODU-USA and NASA Langley Research Center, Supported by U.S. Air Force Wright Research Laboratories, 1991-1993.
- “Validation of 3D Euler and Navier-Stokes Solvers Applied to Simple Missile Configurations in Supersonic Flight Regimes”. Roketsan, METU, ONERA-France, supported by AGARD, 1996-1998.
- “Parallelization of a Computational Fluid Dynamics Code”, IUPUI (Indiana University Purdue University Indianapolis)-USA, 1999-2000.
- “Aerodynamic Shape Optimization by Genetic Algorithms”, Rutgers University-USA, 1999-2000.
- “Code Improvement for the Solution of Moving Boundary and Fluid-Structure Interaction Problems”, IUPUI-USA, 2000-2002.
- Development of an Incompressible Overset Mesh Interface for Unstructured Mesh Generator MESHeda, supported by EDA Ltd., IUPUI-USA, 2009-2010.

PROFESSIONAL NATIONAL PROJECTS INVOLVED

- “A Software Development for Computer Aided Design and Physical Simulation of Guided Projectiles and Missiles”, EDA Ltd, partially supported by TEYDEB-TÜBITAK (Scientific and Technological Research Council of Türkiye), 2020-2023.
- “A Software Development for Motion Simulation of Liquid Cargo Tankers”, EDA Ltd, partially supported by TEYDEB-TÜBITAK (Scientific and Technological Research Council of Türkiye), 2017-2020.
- “A Software Development for Aerodynamics and Structural Shape Optimization and Design Automation”, EDA Ltd, partially supported by TEYDEB-TÜBITAK, 2015-2017.
- “Adding Structural and Thermal Design Capabilities to Indigenous CAEeda Software Package”, EDA Ltd, partially supported by TEYDEB-TÜBITAK (Scientific and Technological Research Council of Türkiye), 2011-2014.
- “A Software Development for Solid Model and Unstructured Mesh Generation for Complex Surface Geometries”, EDA Ltd, partially supported by TEYDEB-TÜBITAK (Scientific and Technological Research Council of Türkiye), 2009-2011.
- “Development of A Preprocessor for Computational Fluid Dynamics”, EDA Ltd, partially supported by TEYDEB-TÜBITAK (Scientific and Technological Research Council of Türkiye), 2007-2009.
- “A Parallel Software Development for Fluid Structure Interaction Problems”, EDA Ltd, partially supported by TEYDEB-TÜBITAK (Scientific and Technological Research Council of Türkiye), 2004-2007.
- “Developing a Commercial Software to Solve Fluid Structure Interaction for Aeroelasticity Problems to Solve Very Quickly in a Parallel Computer Network Environment Consisting of PCs”, EDA Ltd, TEKMER-KOSGEB (Small and Medium Enterprises Development Organization), 2004-2007.

COMPUTER CODES DEVELOPED

- BALLISTICeda : Artillery Ballistic Solver (Aerodynamics, Internal ballistics modules and some other parts)
- CAEeda : Computer Aided Engineering Software (CFD module and some other parts)
- MESHeda : Mesh Generation Software (some parts)
- SINeda : Parallel Mesh Coupling Interface (some parts)
- FSleda : Fluid Structure Interaction Program (CFD part)
- FAPeda: Flow Analysis Program
- USER3DNS: Three Dimensional Unstructured Navier-Stokes Solver
- USER3D: Three Dimensional Unstructured Euler Solver
- USER3DP: Parallel Three Dimensional Unstructured Euler Solver
- USER3DP-SFI: Parallel Solid Fluid Interaction Solver
- ER3D: Three Dimensional Structured Euler Solver
- ADA: Three Dimensional Unstructured Adaptive Grid Enrichment Program
- FRICTION: Missile Drag Calculation Program
- AEROHEAT: Missile Aerodynamic Heating Calculation Program
- MISDES: Aerodynamic Missile Design Program

INTERNATIONAL TRAININGS PARTICIPATED

- USM3D-VGRID3D Training, by: Neal Frink, Shayar Pirzadeh, NASA-Langley Research Center, Hampton, Virginia, USA.
- IDEAS-Master Series Training, by: SDRC-Momentum, Ankara.
- Missile Design Training-1, abroad.
- Missile Design Training-2, abroad.
- SGI Parallel Programming and Code Optimization Course, Cortaillod, Switzerland.

JOURNAL REVIEWS

- International Journal for Numerical Methods in Fluids
- International Journal for Numerical Methods for Heat and Fluid Flow
- Computers and Fluids
- AIAA, Aerospace America, Annual Reviews on Fluid Dynamics
- The Aeronautical Journal

OTHER TECHNICAL ACTIVITIES

- Membership of NATO-RTO-AVT Task Group AVT-082-TG-023 on "Assessment of Turbulence Modeling for High Speed Air Vehicles"
- Membership of NATO-RTO-AVT Exploratory Team, AVT-ET-23 on "Improved Hypersonic Performance Through Boundary Layer Transition Prediction"
- Co-Supervision and Jury Membership of various MS and Ph.D. Thesis in Aeronautical Engineering of Middle East Technical University and Indiana University Purdue University Indianapolis.

THESIS CO-SUPERVISED

- Furkan Celen, “Investigation of Effect of Mass Distribution on Wing Flutter by Fluid-Structure Interaction Analysis”, MS Thesis, M.E.T.U., Ankara, 2022.
- Kemal Yüce Aydınoglu, “Development of A Computer Aided Engineering Tool for Pipe Lines”, MS Thesis, M.E.T.U., Ankara, 2016.
- Erhan Tarhan, “Two and Three Dimensional Overset Grid Solutions of Euler/Navier-Stokes Equations”, Ph.D. Thesis, M.E.T.U., Ankara, 2003.
- Koray Kavukcuoglu, “Wing Flutter Analysis with an Uncoupled Method”, MS Thesis, M.E.T.U., Ankara, 2003.
- Ugur Kakasci, “Three Dimensional Unstructured Grid Generation by Advancing Layer Method”, MS Thesis, M.E.T.U., Ankara, 2001.
- Zhenyin Li, “Parallel Computations Of 3D Unsteady Compressible Euler Equations With Structural Coupling”, MS Thesis, Purdue University, Indianapolis, 2002.
- Xiaoyin He, “Parallel Computations Of Solid-Fluid Interactions Using Arbitrary Lagrangian-Eulerian And relative Coordinate Formulations”, MS Thesis, Purdue University, Indianapolis, USA, 2004.
- Amid P., “Parallel Code Coupling Interface for Fluid Structure Interaction”, MS Thesis, Purdue University, Indianapolis, USA, 2005.
- Sing K., P., “Dynamic Unstructured Method For Prescribed And Aerodynamically Determined Relative Moving Boundary Problems”, Ph.D. Thesis, Old Dominion University, Norfolk, 1995.

PUBLICATIONS

Journal Papers:

- Akay, H.U., Oktay, E., Manguoglu, M., Sivas, A. A., “ Improved Parallel Preconditioners for Multi-physics Topology Optimization”, International Journal of Computational Fluid Dynamics, Vol. 30, 2016, pp.329-336.
- Oktay, E., Akay, H., U., Sehitoglu, O., T., ” Three - Dimensional Structural Topology Optimization of Aerial Vehicles Under Aerodynamic Loads, Computers & Fluids, Vol. 92, 2014, pp. 225-232.
- Oktay, E., Akay, H., Merttopcuoglu, O., “Parallelized Structural Topology Optimization and CFD Coupling for Design of Aircraft Wing Structures ”, Computers & Fluids, Vol. 49, No. 1, 2011, pp.141-145.
- Oktay, E., Akay, H. U., Uzun, A., “A Parallelized 3D Unstructured Euler Solver for Unsteady Aerodynamics,” AIAA Journal of Aircraft, Vol. 40, No.2, 2003, pp.348-354.
- Oktay, E., Alemdaroglu, N., Tarhan, E., Champigny, P., d’Espiney, P., “Unstructured Euler Solutions For Missiles,” Journal of Aerospace Sciences and Technologies, Vol. 4, No. 7, 2000, pp. 453-461.
- Oktay, E., Asma, C. O., “Drag Prediction with an Euler Solver at Supersonic Speeds,” AIAA Journal of Spacecraft and Rockets, Vol. 37, No. 5, 2000, pp. 692-697.
- Oktay, E., Alemdaroglu, N., Tarhan, E., Champigny, P., d’Espiney, P., “Euler and Navier-Stokes Solutions for Missiles at High Angles of Attack,” AIAA Journal of Spacecraft and Rockets, Vol. 36, No. 6, 1999, pp. 850-858.
- Oktay, E., Akmandor, S., I. and Üçer, A., S., “A Numerical Solution of 3D Inviscid Rotational Flow in Turbines and Ducts”, International Journal for Numerical Methods in Fluids”, Vol. 26, 1998, pp. 907-926.

- Oktay, E., Newman, J.C., Jr., and Baysal, O., “A Comparison of Unstructured Grids and Locally Structured Grids for Complex Geometries,” Virginia Journal of Science, vol. 43, No. 2, summer 1992.
- Oktay, E., Akay, H., U., “ CFD Predictions of Dynamic Derivatives for Missiles,” AIAA Journal of Spacecraft and Rockets. (Accepted for publication)

Book Chapters:

- Oktay, E. “Appendix 6 Case F: CFD Solutions for ONERA Non-Circular Body”, In “Turbulence Modeling for High Speed Vehicles”, RTO Technical Report, TR-AVT-082, April 2005.
- Hennig, P., Nöding, P., Champigny, P., Oktay, E., ”Chapter2 - Major problem areas for turbulence modeling on missiles”, In “Turbulence Modeling for High Speed Vehicles”, RTO Technical Report, TR-AVT-082, April 2005.

Conferans Proceedings:

- Oktay, E., Arpacı A., Sehitoglu, O., T., Akay, H.U., “A Parallel Aerostructural Shape Optimization Platform For Airplane Wings”, Parallel CFD’19, 14-17 Mayıs, 2019, Antalya Turkey.
- Akay, H.U., Oktay, E., Manguoglu, M., Sivas, A. A., “ Improved Parallel Preconditioners for Multi-physics Topology Optimization”, Parallel CFD’15, 17-22, 2015, Montreal, Canada
- Akay, H.U., Oktay, E., “Kavramdan Gerçek Tasarıma Giden Yol”, Yapı Mekanigi Semineri 2013, 15 Haziran, 2013, Eskisehir.
- Akay, H., Oktay, E., “Development of Integrated Engineering Analysis and Design Tools From Solid Modeling to Design Optimization ”, Parallel CFD’13, 20-24 Mayıs, 2013, Changsha, China.
- Oktay, E., Akargün, Ö., Isık, S., Oktay, F., “Hava Araçları Aerodinamik Sekil Optimizasyonu için Kavramsal Tasarım Aracı ”, SAVTEK 2012, 20-22 Haziran, 2012, Ankara.
- Oktay, E., Akay, H., “Yapısal Sistemlerin Yogunluk Degisimi Yönetimi ile Topoloji Optimizasyonu ”, SAVTEK 2012, 20-22 Haziran, 2012, Ankara.
- Akay, H., Oktay, E., “Yapısal Tasarım için Topoloji Optimizasyonu”, Yapı Mekanigi Semineri 2012, 15 Haziran, 2012, Eskisehir.
- Oktay, E., Akay, H., “Structural Topology Optimizations Under Aerodynamic Loads Using PETSc as Parallel Solver”, Parallel CFD’12, May 21-25, Atlanta, USA.
- Oktay, E., Akay, H., Merttopcuoglu, O., Sener C., “Parallelized Structural Topology Optimization and CFD Coupling for Design of Aircraft Structures”, Parallel CFD’10, May 17-21, 2010, Kaohsiung, Taiwan.
- Akay, H.U., Payli, R., Liu, J., Ecer, A., and Oktay, E., “ An Overset Unstructured Grid Method for Parallel Solvers”, Parallel CFD’09, May 18-22, 2009, Moffett Field, California, USA. Published by Springer Verlag.
- Oktay, E., Merttopcuoglu, O., Sener C., Ketenci A., Akay, H., “Grid Altyapısı Üzerinde bir Füzenin Sekil En iyileme Çalışması”, Basarım’09, Nisan 15-18, 2009, Ankara.
- Oktay, E., Merttopcuoglu, O., Sener C., Ketenci A., Akay, H., “Parallel Shape Optimization of a Missile on a Grid Infrastructure ”, Parallel CFD’08, May 19-22, 2008, Lyon, France. Published by Springer Verlag.
- Oktay, E., Merttopcuoglu, O., Akay, H., “An Unstructured Hybrid Method For Store Separation Simulations”, AIAC-2007-104, Ankara International Aerospace Conference, September 10-12, 2007, Ankara, Turkey.

- Oktay, E., Merttopcuoglu, O., “Combined Trajectory And Airframe Shape Optimization Of A Missile Using Parallel Genetic Algorithms”, AIAC-2007-085, Ankara International Aerospace Conference, August September 10-12, 2007, Ankara, Turkey.
- Oktay, E., Merttopcuoglu, O., Akay, H., “ An Approach for Parallel CFD Solutions of Moving Boundary Problems,” Parallel CFD’07, May 21-24, 2007, Antalya, Turkey. Published by Springer Verlag.
- Akay, H.U., Baddi A., Oktay, E., “Large-Scale Parallel Computations Of Solid-Fluid Interaction Problems For Aeroelastic Flutter Predictions”, AIAC-2005-002, Ankara International Aerospace Conference, August 22-25, 2005, Ankara, Turkey.
- Akgun, M. A., Kavukcuoglu, K., Oktay, E., “An Uncoupled Procedure For Wing Flutter Analysis”, AIAC-2005-089, Ankara International Aerospace Conference, August 22-25, 2005, Ankara, Turkey.
- R. Payli, R., Akay, H.U, Baddi, A., Yilmaz, E., Ecer, A., and Oktay, E., “CFD Applications of TeraGrid,” Proceedings of Parallel CFD’05, May 24-27,2005, University of Maryland, College Park, MD, USA. Edited by A. Deane, et al., Elsevier Science, 2005.
- Akay, H. U., Oktay, E., ”Parallel Adaptivity for Solution of Euler Equations Using Unstructured Meshes,” Parallel Computational Fluid Dynamics - New Frontiers and Multi-Disciplinary Applications, K. Matsuno, et al. (Editors), Elsevier Science B.V., Amsterdam, The Netherlands, 2003, pp. 371-378.
- Akay, H. U., Oktay E., Li Z., He X., “Parallel Computing For Aeroelasticity Problems,” AIAA Paper 2003-3511, 33rd AIAA Fluid Dynamics Conference, June 23-27, 2003, Orlando, Florida, United States.
- Akay, H. U., Oktay E., He X., Payli R., U. “A Code Coupling Application for Solid-Fluid Interactions and Parallel Computing”, May 13-15, 2003, Parallel CFD 2003, Moscow, Russia. Published by Elsevier Science.
- Akay, H., U., Oktay, E., “Parallel Adaptivity For Solution Of Euler Equations Using Unstructured Solvers,” May 20-22, 2002, Parallel CFD 2002, Kansai Science City, Japan.
- Oktay, E., Akay, H., U., “ CFD Predictions of Dynamic Derivatives for Missiles,” AIAA Paper 2002-0276, Jan. 2002.
- Oktay, E., Akay, H. U., Uzun, A., “A Parallelized 3D Unstructured Euler Solver for Unsteady Aerodynamics,” AIAA Paper 2002-0107, Jan. 2002.
- Tarhan, E., Oktay, E., Kavsoglu, M., “Solution of Airfoil-Flap Configurations by Using Chimera Grid System”, ICAS-2002, Toronto, Canada, 2002.
- Oktay, E., Asma, C. O., “Drag Prediction with an Euler Solver at Supersonic Speeds,” AIAA paper 2000-0392, Jan. 2000.
- Oktay, E., Alemdaroglu, N., Tarhan, E., Champigny, P., d’Espiney, P., “3D Euler and Thin Layer Navier-Stokes Solutions for Missiles at Supersonic Speeds and High Angles of Attack,” RTO MP-5, 1998, pp. 27.1-27.12.
- Oktay, E., Alemdaroglu, N., Tarhan, E., Champigny, P., d’Espiney, P., “Unstructured 3D-Euler Computations for Missiles at Supersonic Speeds and High Angles of Attack,” AIAA Paper 98-0392, Jan. 1998.
- Oktay, E., Newman, J.C., Jr., and Baysal, O., “A Comparison of Unstructured Grids and Locally Structured Grids for Complex Geometries,” 70th Annual Meeting of Virginia Academy of Science, Richmond, VA, May 18-21, 1992.
- Oktay, E., Akmandor, S., I. and Üçer, A., S., “Three Dimensional Solution of Internal Flows Using a Cell Vertex Finite Volume Method”, AGARD-CP-510, 1991, Paper No: 27.

- Oktay E., “Roket Tasarımında Sayısal Akiskanlar Dinamigi Uygulamaları”, Savunma Sanayi-indeki Teknolojik Gelismeler Sempozyumu”, Kara Harp Okulu, 5-6 Haziran 1997, Sa. 481-488.
- Oktay E., “Roket Tasarımında Sayısal Akiskanlar Dinamiginin (SAD) Rolu ve Roketsan SAD Çalışmaları”, 1inci Havacılık Sempozyumu, Hava Harp Okulu, 9-10 Haziran 1994, Sa. 83-88.
- Oktay E., “Akiskan-Yapı Etkilesimi Problemleri İçin Paralel Bilgisayar Uygulamaları”, Havacılıkta Ileri Teknolojiler ve Uygulamaları Sempozyumu, 9-10 Aralık 2004.
- Oktay E., “Aerodinamik Sönümleme Katsayısı Tayini İçin Paralel Bilgisayar Hesaplamaları”, Havacılıkta Ileri Teknolojiler ve Uygulamaları Sempozyumu, 9-10 Aralık 2004.

Thesis:

- Oktay, E., “A Cell Vertex Method for 3D Inviscid Internal Flows”, Ph.D. Thesis, M.E.T.U., Ankara, 1991.
- Oktay, E., “An Investigation on The Solution of Euler Equations for Compressible Flows”, M.S. Thesis, M.E.T.U., Ankara, 1986.