Mustafa Kaya

CONTACT INFORMATION	Ankara Yildirim Beyazit Universitesi Cankiri Cad, Cicek Sok. Ulus, Ankara, TURKEY	*Voice:* +90 (312) 906 13 87 *Mobile:* *E-mail:* mukaya@ybu.edu.tr

RESEARCH INTERESTS

Computational Fluid Dynamics, Aerodynamics, Numerical Methods, Optimization, Parallel Processing

EDUCATION

Middle East Technical University, Ankara, Turkey
Aerospace Engineering Department

Ph.D., February, 2008

- *Thesis Title*: "Path Optimization of Flapping Airfoils
   Based on Unsteady Viscous Flow Solutions"
- *Supervisor*: Prof. Dr. İsmail Hakkı Tuncer

Middle East Technical University, Ankara, Turkey
Aerospace Engineering Department

M.Sc., July, 2003

- *Thesis Title*: "Computation of Viscous Flows over Flapping Airfoils
   and Parallel Optimization of Flapping Parameters"
- *Supervisor*: Assoc. Prof. Dr. İsmail Hakkı Tuncer

Middle East Technical University, Ankara, Turkey
Aeronautical Engineering Department

B.S., June, 2000

ACADEMIC AND PROFESSIONAL EXPERIENCE

Ankara Yildirim Beyazit University, Ankara, Turkey

Asst. Prof. Dr. in the Aerospace Engineering Department   **Sept. 2016 -**
Courses Taught
- AEE 501 Advanced Calculus for Application
- UTP 108 Flight Principles (Turkish Title: Uçuş Prensipleri)
- DT 512 Advanced Numerical Methods in Engineering
- 0030020014 Introduction to Aircraft Performance (in the Necmettin Erbakan University)
- 0030023012 Flight Mechanics (in the Necmettin Erbakan University)
- 0030024002 Aeronautical Engineering Design (in the Necmettin Erbakan University)
- 0030024020 Computed Fluid Dynamics (in the Necmettin Erbakan University)
- MAK 310 Numerical Methods (in the TOBB University of Economics and Technology)
- MAK 501 Engineering Mathematics (in the TOBB Uni. of Economics and Technology)
- MAK 502 Numerical Methods in Engineering (in the TOBB Uni. of Economics and Technology)

Kuzgun Tech (an R&D company for advanced engineering problems), Ankara, Turkey

Technical Coordinator and main shareholder   **May 2015 -**

University of Turkish Aeronautical Association, Ankara, Turkey

Asst. Prof. Dr. in the Flight Training Department	**June 2011 - Aug. 2016**
Vice Dean of Faculty of Air Transportation	**Jan. 2015 - Aug. 2016**
Dean Proxy of Faculty of Air Transportation	**May 2013 - Jan. 2015**
Chairman of the Flight Training Department	**May 2011 - May 2013**
Courses Taught	**Sept. 2011 - Aug. 2016**

- AEE 102 Introduction to Aircraft Performance
- AEE 502 Advanced Computational Fluid Dynamics
- AES 559 Aerodynamics for Pilots
- CENG 123 Computer Programming for Aviation
- FLT 124 Basic Aircraft Performance
- FLT 181 Fundamentals of Computers and Programming

- FLT 202 Introduction to Flight Theory
- FLT 301 Principles of Flight
- FLT 521 Principles of Flight for Pilots
- MAT 101 Calculus I
- MAT 102 Calculus II

Supervised Theses
- Ali Belhaj, Similarity Analysis of Unsteady Laminar Incompressible Stagnation Point Flow Boundary Layer in Presence of Oscillating Motion, PhD. Thesis, University of Turkish Aeronautical Association, 2018
- Tansu Sevine, Reconstruction of the Atmospheric Flows Based on Proper Orthogonal Decomposition Method, MSc. Thesis, Middle East Technical University, 2017 (Co-supervised)
- Osman Aycı, Development and Numerical Test of a Generic Flight Dynamics Model of a Helicopter, MSc. Thesis, University of Turkish Aeronautical Association, 2016

Project Leader   **Mar. 2013 - Mar. 2015**
TÜBİTAK (The Science and Technology Research Council of Turkey) 1001 project: "Numerical and Experimental Investigation of Oscillating Wings for Power Production from Wind Energy"

Research Associate   **Jan. 2012 - Dec. 2012**
AKA (Development Agency of Ankara) project: "Low-altitude UAV for Regional Supervision and Ground Station Development"

Defense Industries R&D Institute (TÜBİTAK-SAGE), Ankara, Turkey

Consultant   **June 2012 - June 2016**
Scientific programming tasks in the Terminal Ballistic and Fuse Technologies Division.

Senior Research Engineer   **Feb. 2009 - June 2011**
Includes engineering works in several projects executed in the Terminal Ballistic Division.

Middle East Technical University, Ankara, Turkey

Research Associate   **July 2007 - June 2008**
TÜBİTAK (The Science and Technology Research Council of Turkey) 1001 project: "Application and Development of Data Assimilation Models in Parallel Computing Environments for MM5 Program Used in Meteorological Forecasting"

Graduate Research Assistant   **Oct. 2000 - Sept. 2007**
Includes Ph.D. and M.Sc. researches and theses.

Teaching Assistant   **Feb. 2001 - July 2007**
Shared responsibility for lectures, assignments and grades. Courses assisted:
- AE 244 Fluid Dynamics
- AE 305 Numerical Methods
- ES 305 Computing Methods in Engineering
- AE 331 Heat Transfer

Lecturer   **June 2003**
Fortran 90 Programming Course to DMİ (State Directorate of Meteorology Affairs) in the name of IBM-Turkey.

HPC-EUROPA, Scotland, United Kingdom

Research Student   **Jan. 2005 - Feb. 2005**
Includes CFD research using high performance computing facilities in the University of Edinburgh and the University of Glasgow (Supervisor: Dr. George Barakos).

LESSONS THAT CAN BE TAUGHT
- Aircraft Performance
- Fluid Dynamics
- Aerodynamics
- Numerical Methods
- Computational Fluid Dynamics
- FORTRAN Programming

PUBLICATIONS	M. Kaya, *A CFD Based Application of Support Vector Regression to Determine the Optimum Smooth Twist for Wind Turbine Blades*, Sustainability, Vol. 11, No:16, Aug. 2019, 4502.
	M. Kaya and M. Elfarra, *Effect of Taper Modification on the Performance of NREL VI Wind Turbine Blade for Low and Mid Wind Speeds*, Wind Engineering, Vol. 43, Issue 4, Aug. 2019, pp. 392-403
	M. Kaya and M. Elfarra, *Optimization of the Taper/Twist Stacking Axis Location of NREL VI Wind Turbine Rotor Blade Using Neural Networks Based on Computational Fluid Dynamics Analyses*, Journal of Solar Energy Engineering - Including Wind Energy and Building Energy Conservation -, Vol. 141, Issue 1, Feb. 2019
	M. Kaya and M. Elfarra, *Investigation of the Effect of Taper Stacking Location on Aerodynamic Loads for ONERA M6 Wing at a Fixed Angle of Attack*, Journal of Aeronautics and Space Technology, Vol. 12, No:1, Jan. 2019.
	M. Elfarra and M. Kaya, *Comparison of Optimum Spline Based Probability Density Functions to Parametric Distributions for the Wind Speed Data in terms of Annual Energy Production*, Energies, Vol. 11, No:11, Nov. 2018, 3190.
	M. Elfarra and M. Kaya, *CFD Analysis of the Effect of Parabolic Taper Distribution of an Untwisted Helicopter Rotor Blade*, Journal of Aeronautics and Space Technology, Vol. 11, No. 2, Jul. 2018, pp. 59-70
	M. Kaya and M. Elfarra, *CFD Based Optimization of Oscillatory Wing Motion for Maximum Energy Harvesting from Wind*, International Journal of Renewable Energy Research, Vol. 8, No. 1, 2018
	H.E. Konokman, A. Kayran and M. Kaya, *Aircraft Vulnerability Assessment Against Fragmentation Warhead*, Aerospace Science and Technology, Vol. 67, Aug. 2017, pp. 215-227
	M. Kaya, I.H. Tuncer, K.D. Jones and M.F. Platzer, *Optimization of Flapping Motion Parameters for Two Airfoils in a Biplane Configuration*, Journal of Aircraft, Vol. 46, No. 2, March-April 2009, pp. 583-592
	M. Kaya and I.H. Tuncer, *Non-Sinusoidal Path Optimization of a Flapping Airfoil*, AIAA Journal, Vol. 45, No. 8, Aug. 2007, pp. 2075-2082
	I.H. Tuncer and M. Kaya, *Optimization of Flapping Airfoils for Maximum Thrust and Propulsive Efficiency*, AIAA Journal, Vol. 43, No. 11, Nov. 2005, pp. 2329-2336
	I.H. Tuncer and M. Kaya, *Thrust Generation Caused by Flapping Airfoils in a Biplane Configuration*, Journal of Aircraft, Vol. 40, No. 3, May-June 2003, pp. 509-515
INTERNATIONAL CONFERENCE PRESENTATIONS	O. Ayısıt and M. Kaya, *Determination of Shaped Charge Jet Characteristics Using a Neural Networks Model Based on Hydrocode Simulations*, 10th Ankara International Aerospace Conference, Ankara, Turkey, Sept. 18-20, 2019
	M. Kaya and M. Elfarra, *Effect of Taper Distribution on the Torque and Thrust Generated by a Wind Turbine Rotor Blade*, 2019 10th International Renewable Energy Congress, Sousse, Tunisia, March 26-28, 2019
	M. Kaya, M. Elfarra and F. Kadioglu, *Investigation of the Effect of Taper Stacking Location on Drag Force for ONERA M6 Wing*, AIAA-2019-2123, AIAA Scitech 2019 Forum, San Diego, California, Jan. 7-11, 2019
	M. Kaya, M. Elfarra and F. Kadioglu, *A Parametric CFD Study for the Effect of Taper/Twist Stacking Point Location on the Torque of NREL VI Wind Turbine Rotor Blade*, AIAA-2018-1496, 2018 Wind Energy Symposium, Kissimmee, Florida, Jan. 8-12, 2018
	M. Elfarra, M. Kaya and F. Kadioglu, *A Parametric CFD Study for the Effect of Spanwise*

Parabolic Chord Distribution on the Thrust of an Untwisted Helicopter Rotor Blade, AIAA-2018-1795, 2018 AIAA Aerospace Sciences Meeting, Kissimmee, Florida, Jan. 8-12, 2018

M. Kaya and M. Elfarra, *Numerical Optimization of Oscillatory Motion of a Flapping Airfoil for Maximum Power Production from Wind Energy*, 8th Ankara International Aerospace Conference, Ankara, Turkey, Sept. 10-12, 2015

H.E. Konokman, A. Kayran and M. Kaya, *Analysis of Aircraft Survivability Against Fragmenting Warhead Threat*, AIAA-2014-0355, 55th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, National Harbor, Maryland, Jan. 13-17, 2014

M.Ö. Efe, M. Kaya, M. Elfarra, R. Özdemir, *Autonomous Trajectory Tracking and Imaging via a Quadrotor Type UAV: A System Integration Approach*, 20th Int. Conf. on Mechatronics and Machine Vision in Practice (M2VIP'13), Ankara, Turkey, Sept. 20 2013, pp. 1-6

H.E. Konokman, A. Kayran and M. Kaya, *Survivability Analysis of Aircraft Under Fragmentation Warhead Threat*, 7th Ankara International Aerospace Conference, Ankara, Turkey, Sept. 11-13, 2013

M. Kaya, M.A. Ak and I.H. Tuncer, *An Implementation of Parallel GMRES Solution Method on a 3-D Unstructured Flow Solver*, 5th Ankara International Aerospace Conference, Ankara, Turkey, Aug. 17-19, 2009

M. Kaya, G. Ahmet, S. Kumru and I.H. Tuncer, *Development and Application of a POD Based Data Assimilation Method for Meteorological Flowfields*, 5th Ankara International Aerospace Conference, Ankara, Turkey, Aug. 17-19, 2009

M. Kaya and I.H. Tuncer, *Path Optimization of Thrust Producing Flapping Airfoils Using Response Surface Methodology*, ECCOMAS 2008, Venice, Italy, 30 June - 4 July, 2008.

M. Kaya and I.H. Tuncer, *Path Optimization of Dual Airfoils Flapping in a Biplane Configuration Using Response Surface Methodology in a Parallel Computing Environment*, Proceedings of Parallel CFD 2008 Conference, Lyon, France, May 19-22, 2008

M. Kaya and I.H. Tuncer, *Response Surface Method for the Maximization of Thrust in Flapping Airfoils*, 4th Ankara International Aerospace Conference, Ankara, Turkey, Sept. 10-12, 2007

M. Kaya, I.H. Tuncer, K.D. Jones and M.F. Platzer, *Optimization of Aeroelastic Flapping Motion of Thin Airfoils in a Biplane Configuration for Maximum Thrust*, 37th AIAA Computational Fluid Dynamics Conference, Miami, Florida, June 25-28 2007

M. Kaya and I.H. Tuncer, *Non-Sinusoidal Path Optimization of Dual Airfoils Flapping in a Biplane Configuration*, Proceedings of Parallel CFD 2007 Conference, Antalya, Turkey, May 21-24, 2007

M. Kaya, I.H. Tuncer, K.D. Jones and M.F. Platzer, *Optimization of Flapping Motion of Airfoils in a Biplane Configuration for Maximum Thrust and/or Efficiency*, AIAA Paper 2007-0484, 45th AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nevada, Jan. 8-11 2007

I.H. Tuncer and M. Kaya, *Path Optimization of Flapping Airfoils Based on NURBS*, Proceedings of Parallel CFD 2006 Conference, Busan, Korea, May 15-18, 2006

M. Kaya, I.H. Tuncer, A. Spentzos, G.N. Barakos and K. Badcock, *Numerical Investigation of 3-D Effects on Thrust Generation of Flapping Airfoils*, 3rd Ankara International Aerospace Conference, Ankara, Turkey, Aug. 22-25, 2005

M. Kaya and I.H. Tuncer, *Path Optimization of Flapping Airfoils for Maximum Thrust*

Based on Unsteady Viscous Flow Solutions, 3rd Ankara International Aerospace Conference, Ankara, Turkey, Aug. 22-25, 2005

J. Young, J.C.S. Lai, M.Kaya and I.H. Tuncer, *Thrust and Efficiency of Propulsion by Oscillating Foils*, Third International Conference on Computational Fluid Dynamics, ICCFD3, Toronto, Canada, July 12 - 16, 2004

I.H. Tuncer and M. Kaya, *Parallel Optimization of Flapping Airfoils in a Biplane Configuration for Maximum Thrust*, Proceedings of Parallel CFD 2004 Conference, Gran Canaria, Canary Islands, Spain, May 24-27, 2004

I.H. Tuncer and M. Kaya, *Optimization of Flapping Airfoils For Maximum Thrust and Propulsive Efficiency*, 3rd International Conference on Advanced Engineering Design, Prague, Czech Republic, June 1-4 2003

I.H. Tuncer and M. Kaya, *Optimization of Flapping Airfoils For Maximum Thrust*, AIAA Paper 2003-0420, 41st AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nevada, Jan. 6-9 2003

I.H. Tuncer and M. Kaya, *Parallel Computation of Flows Around Flapping Airfoils in Biplane Configuration*, Proceedings of Parallel CFD 2002 Conference, Kansai Science City, Japan, May 20-22, 2002

National Conference Presentations

A. Samancı, A. Can ve M. Kaya, *Çok Hafif Hava Aracı Olarak Konsept Bir Planör Tasarımı*, III. Uluslararası Endüstriyel Tasarım ve Mühendislik Sempozyumu, Antalya, 22-25 Kasım 2018

M. Kaya ve M. Elfarra, *Rüzgar Enerjisinden Maksimum Güç Üretimi ve Verimi için Salınır Kanat Kesitlerinin Salınma Hareketi Eniyilemesi*, V. Ulusal Havacılık ve Uzay Konferansı, Kayseri, 8-10 Eylül 2014

R. Özdemir, M. Cihan, M. Kaya, M. Elfarra ve M. Ö. Efe, *Döner Kanatlı İnsansız Hava Aracı Kullanarak Bölgesel Gözetim Amaçlı Kişi ve Nesne Takibi*, IV. Ulusal Havacılık ve Uzay Konferansı, İstanbul, 12-14 Eylül 2012

G. Ahmet, S. Kumru, M. Kaya ve I.H. Tuncer, *Meteorolojik Hava Tahminleri İçin Uyumlu Dik Ayrışım (POD) Yöntemiyle Veri Asimilasyonu*, III. Ulusal Havacılık ve Uzay Konferansı, Eskişehir, 16-18 Eylül 2010

M. Kaya ve I.H. Tuncer, *İki Çırpan Kanadın Ürettiği İtkinin Hareket Eden ve Bozulan Çözüm Ağlarında Eniyileştirilmesi*, I. Ulusal Havacılık ve Uzay Konferansı, Ankara, 21-23 Eylül 2006

M. Kaya ve I.H. Tuncer, *Maximum İtki İçin Çırpan Kanat Kesitlerinde Yörünge Eniyileştirilmesi*, XIV. Ulusal Mekanik Kongresi, Mustafa Kemal Üniversitesi, Antakya, 12-16 Eylül 2005

M. Kaya ve I.H. Tuncer, *Çırpan Kanat Kesitlerinde İtkinin Yapay Zeka İle Eniyileştirilmesi*, HITEK 2004 Havacılıkta İleri Teknolojiler Konferansı, 9-10 Aralık 2004

M. Kaya ve I.H. Tuncer, *Üst Üste Çırpan İki Kanat Kesitinin Maksimum İtki İçin Paralel Eniyileştirilmesi*, V. Kayseri Havacılık Sempozyumu, 13-14 Mayıs 2004

M. Kaya ve I.H. Tuncer, *Çırpan Kanat Kesitlerinde İtki Üretiminin Hesaplanması ve Deneysel Sonuçlarla Karşılaştırılması*, V. Kayseri Havacılık Sempozyumu, 13-14 Mayıs 2004

M. Kaya ve I.H. Tuncer, *Çırpan Kanat Kesitlerinde İtkinin Paralel Olarak Hesaplanması ve Eniyileştirilmesi*, IV. Kayseri Havacılık Sempozyumu 13-15 Mayıs 2002

AWARD	**Best Study**
	XIVth National Mechanics Convention **Sept. 12-16, 2005**
	by TUMTMK (Turkish National Committee for Theoretical and Applied Mechanics)

CONFERENCE ADMINISTRATION	**4th Ankara International Aerospace Conference**, Ankara, Turkey
	Local Committee Member **Sept. 10-12, 2007**
	Facility arrangement, equipment maintenance and proceeding preparation

Parallel CFD 2007, Antalya, Turkey

Local Committee Member   **May 21-24, 2007**

Session management and equipment maintenance

I. Ulusal Havacılık ve Uzay Konferansı (1st National Aerospace Conference), Ankara, Turkey

Local Committee Member   **Sept. 21-23, 2006**

Facility arrangement, equipment maintenance and proceeding preparation

3rd Ankara International Aerospace Conference, Ankara, Turkey

Local Committee Member   **Aug. 22-25, 2005**

Facility arrangement, equipment maintenance and proceeding preparation

COMPUTER SKILLS	• Expert programming with Fortran and C, parallel processing, Perl and Python scripting
	• Extensive coding in most numerical algorithms including machine learning
	• Advanced use of Unix/Linux, Windows
	• LaTeX, Tecplot, MATLAB and commonly used MS Windows softwares

MISCELLANEOUS	• *Citizenship*: Republic of Turkey
	• *Languages*: Turkish (native)
	English (advanced)
	French (intermediate)
	Arabic (beginning)
	• *Year of Birth*: 1977
	• *Marital Status*: Married, with two children
	• *Military Service*: Done (Aug. 2008 - Jan. 2009)