

Dr. Sercan Acarer  
Associate Professor

İzmir Katip Çelebi University  
Faculty of Engineering and Architecture  
Mechanical Engineering Department  
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## EDUCATION

**Doctor's Degree**  
2011-2015

### İzmir Institute of Technology

*Mechanical Engineering Department*

- Dissertation Entitled 'Development of a Streamline Curvature Throughflow Design Method for Fan Module of Turbofan Engines' (Advisor: Asst. Prof. Dr. Ünver Özkol)

**Research Master**  
2010-2011  
Honor's degree

### von Karman Institute for Fluid Dynamics

*Turbomachinery&Propulsion Department*

- Axial and radial compressor specialization & measurement techniques
- Dissertation Entitled 'Two-Dimensional Hot-Wire Anemometry in High Speed Flow' (Advisor: Prof. Dr. Tony Arts, Supervisor: Beni Cukurel)

**Master's Degree**  
2008 - 2010

### Dokuz Eylül University

*Mechanical Engineering Department*

- Dissertation Entitled 'Numerical Analysis of Absorbers Used in LiBr/H<sub>2</sub>O Absorption Refrigeration' (Advisor: Prof. Dr. Nuri Kayansayan)

**Bachelor's Degree**  
2004-2008

### Dokuz Eylül University

*Mechanical Engineering Department*

- Graduation Project Entitled 'Thermal Design of a Single-Stage LiBr/H<sub>2</sub>O Absorption Refrigerator' (Originally written in Turkish) (Advisor: Prof. Dr. Nuri Kayansayan)

## PROFESSIONAL EXPERIENCE

**İzmir Katip Çelebi University**  
Mechanical Eng. Dept.  
Jan 2016 - current

### **Associate Professor**

*(Prior, Assistant Professor, Jan 2016 - Dec 2020)*

- Deputy Director of Institute of Natural and Applied Sciences (Nov 2020-present)
- Deputy Head of Mechanical Eng. Dept. (Aug 2016-present)

**Tusaş Engine Industries (TEI)**  
R&D Dept.  
Jan 2012 - Jan2016 (4 years)

### **Lead Aerodynamics Engineer**

*(Prior, Aerodynamics & Performance Engineer)*

- Transonic fan/compressor aerodynamic design
- Design of 2-stage power turbine for a medium-sized turboshaft engine
  - ❖ 1D mean-line
  - ❖ 2D meridional through-flow and blade sections design
  - ❖ 3D CFD & refinements
- Turbomachinery through-flow code development
- Other CFD simulations for various projects involving turbulent flows
- EuroProp International TP400 Engine exhaust assembly TEI performance responsible (in cooperation with ITP, Spain)
  - ❖ Manufacturing non-conformance aero-assessments (concessions)
  - ❖ CFD simulations
  - ❖ Industrializations and FRACAS reports (aero-sections)
  - ❖ Overall aerothermal issues

**İzmir Institute of Technology**  
Mechanical Eng. Dept.  
Fluid Mechanics Lab.  
Dec 2009 - Jan 2012 (2y 1m)

### **Research Assistant**

- Assistance of Fluid Mechanics Classes
- Assistance of Computational Fluid Dynamics Classes

## AWARDS, HONORS & CERTIFICATIONS

- Fellowship / Research Master in von Karman Institute for Fluid Dynamics, 2011
- Honor's degree / Research Master in von Karman Institute for Fluid Dynamics, 2011
- Six Sigma Greenbelt (2 Projects) / Tusaş Engine Industries, 2013
- Engineering performance recognised as "Star of the Month" / Tusaş Engine Industries, Oct. 2013

## PROJECTS

- **NATO, SCIENCE FOR PEACE AND SECURITY (SPS) PROGRAM**, Grant No.: G5939, "Additively Printed Engine (APE)", Co-Director, 18.10.2021-18.10.2024 (Tusaş Engine Industries (TEI) and FİGES Company are the end-users).
- **NATO, SCIENCE FOR PEACE AND SECURITY (SPS) PROGRAM**, Grant No.: G5202, "Versatile UAV Engine Development via CVT-Coupled Micro Turbofan", Co-Director, 19.12.2016-19.12.2019 (Completed) (Tusaş Engine Industries, TEI, is an end-user).
- **TÜBİTAK ARDEB 1001**, "Yüzer Rüzgâr Türbini Salınım Dinamiği ve Performansının Deniz Dalgaları ve Aşırı Rüzgâr Hızları Altında İncelenmesi," Researcher, 2018-Ongoing.
- **İKÇÜ BAP/ÖDL**, Grant no: 2018-ÖDL-MÜMF-0013, "Döner Muhafazalı Sıvı Halka Kompresöründe Soğutmalı Sıkıştırma İşleminin Verimliliğinin Bilgisayar Simülasyonlarıyla İncelenmesi," Director, 12/04/2018-11/08/2020 (Completed).
- **İKÇÜ BAP/ÖNP**, Grant no: 2016-ÖNP-MÜMF-0030, "Radyal Türbin Mimarisinin Rüzgâr Enerjisi Alanında Gerçeklenmesi," Director, 12/12/2016-27/05/2020 (Completed).
- **DEÜ BAP**, Grant no: 2017.kb.fen.031, "Eşli Halde Çalışan Darrieus Tipi Rüzgâr Türbinlerinin Enerji Etkileşimleri," Researcher, 2017-Ongoing.
- **İKÇÜ BAP/ÖNP**, Grant no: 2016-ÖNP-MÜM-0002, "Akıllı Rüzgâr Türbini Kompozit Kanadı Tasarımı ve Karakterizasyonu," Researcher, 2017-Ongoing.
- **VON KARMAN INSTITUTE FOR FLUID DYNAMICS**, A Commercial Turbofan Engine Fan High-Frequency Aerodynamic Measurements, Research Master Fellow, 10.2010-09.2011.

## INDUSTRIAL CONSULTANCIES

Industrial and academic consultancies have been provided to entities (10 as of 2022) entities in scope of turbomachinery design and simulations, multiphase flows, cooling for aluminum die casting, aeroacoustics.

## PUBLICATIONS

### INTERNATIONAL ARCHIVAL JOURNAL ARTICLES (SCI and SCI-EXP.):

15. Palman, M., Linsky, D., Miezner R., Leizeronok B., Cukurel, B., Gurbuz, M.T., **Acarer S.**, Andreoli, V., Vyas, U., Braun, J., Paniagua, G. "Mechanical Design Considerations in Micro-Turbojet to Variable Bypass Micro-Turbofan Conversion," **Under Preparation**.
14. Çelik, A. Jacobi, I. Cukurel, B., **Acarer, S.**, "Numerical Investigation of Inverse Magnus Effect on a Circular Cylinder by Controlling Azimuthal Circulation Distribution," **Submitted**.
13. Lange, Y., Kırmızıgöl, S.F., **Acarer, S.**, Cukurel, B., "Skin Cooling of Turbine Airfoils by Single Wall Effusion: Part I - Reduced Order Modeling," **Submitted**.
12. Lange, Y., Kırmızıgöl, S.F., **Acarer, S.**, Cukurel, B., "Skin Cooling Of Turbine Airfoils by Single-Wall Effusion: Part II - CFD Validation and Preliminary Design Optimization," **Submitted**.
11. **Acarer, S.**, Gürbüz, T., Çukurel, B., "Numerical Analysis of Liquid Ring Compressors with Stationary and Rotating Casing," **Submitted**.
10. Çelik, A., Linsky, D., Miezner, R., Kleiman, A., Leizeronok, B., Palman, M., **Acarer, S.**, Cukurel, B. (2022), "Design Methodology and Concept Demonstration of Preambled Additively Manufactured Turbomachinery Systems: Case study of Turbocharger based Medical Ventilators," **ASME Journal of Engineering for Gas Turbines and Power**, **in press, also see Int. Conf. Section**.
9. **Acarer, S.** (2020), "Critical study of the effects and numerical simulations of boundary layer transition in lift-based wind turbines at moderate Reynolds numbers," **J. Renewable Sustainable Energy**, Vol.12(6), paper 063309.
8. **Acarer, S.**, Uyulan, C., Karadeniz, Z.H. (2020), "Optimization of Radial Inflow Wind Turbines for Urban Wind Energy Harvesting," **Energy**, Vol. 202, paper 117772.
7. **Acarer, S.** (2020), "Peak Lift-to-Drag Ratio Enhancement of the DU12W262 Airfoil by Passive Flow Control and Its Impact on Horizontal and Vertical Axis Wind Turbines," **Energy**, Vol.201, paper 117659.
6. İlhan, M., Gürbüz, M.T., **Acarer, S.** (2019), "Unified Low Pressure Compressor Concept For Engines of Future High-Speed Micro-Unmanned Aerial Vehicles," **Proc IMechE Part G: Journal of Aerospace Engineering**, Vol.233(14), pp. 5264-5281.
5. Gürbüz, M.T., İlhan, M., **Acarer, S.**, Karadeniz, Z.H. (2019), "Investigation of Radial Turbines for Wind Energy Harvesting," **Proc IMechE Part A: Journal of Power and Energy**, Vol.233(5), pp. 659-672.
4. **Acarer, S.** & Özkol, Ü. (2019), "Off-Design Analysis of Transonic Bypass Fan Systems Using Streamline Curvature Through-Flow Method," **International Journal of Turbo and Jet-Engines**, Vol.36(2), pp. 137-147.
3. Kor, O., **Acarer, S.**, Özkol, Ü. (2018), "Aerodynamic Optimization of Through-flow Design Model of A High By-Pass Transonic Aero-Engine Fan Using Genetic Algorithm," **Proc IMechE Part A: Journal of Power and Energy**, Vol. 232(3), pp. 211-224.
2. **Acarer, S.** & Özkol, Ü. (2017), "An Extension of the Streamline Curvature Through-Flow Design Method for By-Pass Fans of Turbofan Engines," **Proc IMechE Part G: Journal of Aerospace Engineering**, Vol. 231(2), pp. 240-253.
1. Cukurel, B., **Acarer, S.**, Arts, T. (2012), "A Novel Perspective to High Speed Cross-Hot-Wire Calibration Methodology," **Experiments in Fluids**, Vol. 53(4), pp. 1073-1085.

### INTERNATIONAL BOOK CHAPTERS:

1. Kor, O., Acarer, S. (2020), "Aerodynamic Optimization of a Compressor Rotor Using Genetic Algorithm" in "Designing Engineering Structures using Stochastic Optimization Methods (Ed.Aydın, L., Artem, S. and Oterkus, S.)," CRC Press, U.K., ISBN 9780367255190.

### NATIONAL ARCHIVAL JOURNAL ARTICLES (TR-DİZİN):

3. Gürbüz, M.T. & Acarer, S. (2022), "Aerodynamic Analyses of an Integrated Low-Pressure Compression System for Adaptive-Cycle Micro Turbofan Type Jet Engine," **Dokuz Eylül University - Faculty of Engineering Journal of Science and Engineering**, Vol. 24(72), pp. 939-951.
2. Kırmızıgöl, S.F., Özaydın, O., Acarer, S., Armakan, E. (2020), "Fluid Flow and Heat Transfer Simulations of the Cooling System in Low Pressure Die Casting," **Celal Bayar University of Science, Special Issue for University & Industry Cooperation**, Vol. 16(2), pp. 161-168.
1. Acarer, S. (2017), "Kanatlarına Basamak Açmanın Darrieus Düşey Eksenli Rüzgar Türbini Güç Üretimine Etkisi (The Effect of Airfoil Backward-Facing Step on Power Production of a Darrieus Vertical-Axis Wind Turbine)," **Dokuz Eylül University - Faculty of Engineering Journal of Science and Engineering**, Vol. 19(56), pp. 399-409.

### INTERNATIONAL FULL-TEXT CONFERENCE PAPERS:

10. Çelik, A., Linsky, D., Mieznar, R., Kleiman, A., Leizeronok, B., Palman, M., Acarer, S., Cukurel, B. (2022), "Design Methodology and Concept Demonstration of Preassembled Additively Manufactured Turbomachinery Systems: Case study of Turbocharger based Medical Ventilators," GT2022-81739, **Proceedings of ASME Turbo Expo Turbomachinery Technical Conference and Exposition 2022**, Rotterdam, Netherlands. *Also published as a journal article, item 10 in the journal article list.*
9. Çelik, A., Acarer, S., Jacobi, I., Cukurel, B. (2021), "Investigation of Inverse Magnus Effect by Partial Circulation Control Elements: Experimental Design," **8th International Conference on Fluid Flow, Heat and Mass Transfer (FFHMT'21)**, Virtual Congress (Remote Presentation).
8. (Abstract) Kırmızıgöl, S.F. & Acarer, S. (2021), "Internal Flow Simulations of Effusion Cooling in Micro Gas Turbine Blades," **5th International Students Science Congress**, İzmir, Turkey (Remote Presentation).
7. Hakyemez, D. & Acarer, S. (2020), "Accurately Capturing Heat Transfer in a Turbulent U-Bend Flow," **4th International Students Science Congress**, İzmir, Turkey (Remote Presentation).
6. (Abstract) Acarer, S. (2020), "The Effects of Boundary Layer Transition on the Overall Efficiencies of Wind Turbines," **8th European Conference on Renewable Energy Systems**, Istanbul, Turkey (Remote Presentation).
5. (Abstract) Çelik, H. and Acarer, S. (2020), "Numerical Investigation of High Turning Blades with Boundary Layer Blowing," **8th European Conference on Renewable Energy Systems**, Istanbul, Turkey (Remote Presentation).
4. Acarer, S. & Özkol, Ü. (2015), "Development of a New Universal Inverse Through-Flow Program and Method for Fully Coupled Split-Flow Turbomachinery Systems," **Proceedings of ASME Turbo Expo Turbine Technical Conference and Exposition 2015**, Montreal, Quebec, Canada.
3. Acarer, S., Tatar, V., Türk, S. (2015), "A Numerical and Experimental Study on Heat Transfer at the Gas Turbine Exhaust Cone," **7th Baltic Heat Transfer Conference**, Tallinn, Estonia.
2. Tatar, V. & Acarer, S. (2015), "Thermal Analysis of a Gas Turbine Exhaust Cone and Comparison with Experimental Data," **8th Ankara International Aerospace Conference**, Ankara, Turkey.
1. Topal, E., Acarer, S., Kırgız, T. (2013), "The Design and Performance Evaluation of a Novel Air/oil Separator for Use in a Miniature Jet Engine," **49th AIAA Joint Propulsion Conference**, San Jose, California, U.S.A.

### NATIONAL FULL-TEXT CONFERENCE PAPERS:

14. (Abstract) Acarer, S., Pekgüzelsu, Z.E.Y., Fıtil, M.F. (2021), "Design of a Two Way Axial Fan for Single Room Ventilation Units," **5th International Conference on Engineering Technologies (ICENTE 2021)**, Virtual Congress (Remote Presentation).
13. Acarer, S., Arslan, E., Uyulan Ç. (2021), "Aerodynamic Investigation of an E-Scooter & Rider System Through Computational Fluid Dynamics Approach," **10th International Automotive Technologies Congress (OTEKON)**, Virtual Congress (Remote Presentation).
12. Gürbüz, M.T., Acarer, S. (2020), "Değişken Hızlı Mikro Turbofan için Motor Performans Analizleri," **VIII. Ulusal Havacılık ve Uçay Konferansı (UHUK)**, Ankara, Turkey (Remote Presentation).
11. Almaz, R., Acarer, S., Karadeniz, Z.H., Kökey, İ., Turgut, A. (2019), "Geliştirilen DMST Yazılımı ile Yunuslama Açısı Kontrolünün Darrieus Türbini Performansına Etkisinin İncelenmesi," **5. İzmir Rüzgar Sempozyumu ve Sergisi**, İzmir, Turkey.
10. Hakyemez, D., Yıldırım, C., Acarer, S. (2019), "Mikro Turbojet Motorları İçin Basit Egzoz Isı Kazanım Kanallarının Tasarım Optimizasyonu ve Motora Olan Etkileri (Preliminary Design Optimization of a Recuperator for a Micro Turbojet Engine And Its Impact On The Engine Performance)," **14. Ulusal Tesiat Mühendisliği Kongresi ve Sergisi (TESKON)**, İzmir, Turkey.

9. Kırmızıgöl, S.F., Özyayın, O., **Acarer, S.**, Armakan, E. (2018), "Parametric Analysis of the Cooling Channels In LPDC," II. International University Industry Cooperation, R&D and Innovation Congress, Manisa, Turkey.
8. Tatlı, Ö.F., Dursun, M.N., Gürbüz, M.T., **Acarer, S.** (2018), "Düşey Kalkış Kabiliyetli Hibrit Rotorlu Model İHA'nın Ön İncelemesi," **VII. Ulusal Havacılık ve Uzay Konferansı (UHUK)**, Samsun, Turkey.
7. Kırmızıgöl, S.F., Gürbüz, M.T., İlhan, M., **Acarer, S.** (2018), "Magnus Etkisi ile Çalışan Model İHA Tasarımı, Simülasyonları ve İmalatı," **VII. Ulusal Havacılık ve Uzay Konferansı (UHUK)**, Samsun, Turkey.
6. Kökey, İ., Karadeniz, Z.H., Turgut, A., **Acarer, S.** (2017), "Eşli Olarak Çalışan Düşey Eksenli Rüzgar Türbinleri ve Fırsat Penceresi," **4. İzmir Rüzgar Sempozyumu ve Sergisi**, İzmir, Turkey.
5. İlhan, M., Gürbüz, M.T., **Acarer, S.**, Karadeniz, Z.H. (2017), "Radyal Türbin Mimarisinin Rüzgar Enerjisi Alanında Kullanımının Doğrulanmış Sayısal Akış Benzetimleri ile İncelenmesi," **21. Ulusal Isı Bilimi ve Tekniği Kongresi**, Çorum, Turkey.
4. Baytekin, E., **Acarer, S.**, Karadeniz, Z.H., Turgut, A. (2016), "Darrieus Tipi Bir Rüzgar Türbininde Kanat Ucu Hızı Oranının Art İzine Etkisi," **10. Uluslararası Temiz Enerji Sempozyumu (UTES)**, İstanbul, Turkey.
3. Kor, O., **Acarer, S.**, Özkol, Ü. (2016), "Transonik Fan Pali Aerodinamik Optimizasyonu," **VI. Ulusal Havacılık ve Uzay Konferansı (UHUK)**, Kocaeli, Turkey.
2. **Acarer, S.**, Yasa, T., Enser, Ç. (2012), "Prob Kalibrasyonları için Atmosferik Jet Tasarımı," **IV. Ulusal Havacılık ve Uzay Konferansı (UHUK)**, İstanbul, Turkey.
1. Çanakçı, C. & **Acarer, S.** (2009), "Jeotermal Enerji ile Sera Isıtma Sistemleri Tasarım Esasları," **IV. Ulusal Tesisat Mühendisliği Kongresi ve Sergisi (TESKON)**, İzmir, Turkey.

#### OTHER PUBLICATIONS:

4. Arslan, E., Uyulan, Ç., **Acarer, S.** (2020), "Veri Tabanlı Mühendislikte İndirgenmiş Modeller (İM) ve Uygulamaları," **FİGES ARGE Dergisi**, Vol.2(26), pp.4-10.
3. Palman, M., Leizeronok, B., Mieznar, R., Cukurel, B., Andreoli, V., Vyas, U., Paniagua, G., Gurbuz, M.T., İlhan, M., **Acarer, S.**, (2019), "Adaptive Cycle Micro-Turbofan Engine," **ASME Turbo Expo Turbine Technical Conference and Exposition 2019**, Poster Presentation, Phoenix, Arizona USA.
2. Kırmızıgöl, S.F., Gürbüz, M.T., İlhan, M., **Acarer, S.** (2018), "Magnus Etkisi ile Çalışan Model Uçak Ön Tasarımı," **FİGES ARGE Dergisi**, Vol.1(17), pp.48-52.
1. Kökey, İ., Karadeniz, Z.H., **Acarer, S.**, Turgut, A. (2018), "Energy Interaction of Vertical Axis Wind Turbines Working In Pairs: A Case Study And An Application of IEC61400-12-1:2017," **WindEurope 2018 Conference at the Global Wind Summit**, Poster Presentation, Hamburg, Germany.

#### COURSES TAUGHT

- Thermodynamics I and II
- Fluid Mechanics
- Advanced Fluid Mechanics (Graduate)
- Introduction to Computational Fluid Dynamics
- Computational Fluid Dynamics (Graduate)
- Fundamentals of Fluid and Thermal Sciences (Graduate)
- Gas Turbines and Jet Propulsion
- Outlines of Mechanical Engineering
- Graduation Projects and Internships
- Interdisciplinary Engineering Design Project

#### GRADUATE STUDENTS

##### GRADUATED:

- Deniz Hakyemez Çetiner, "Exhaust Thermal Energy Recuperation in Small Gas Turbine and Turbojet Engines," İzmir Katip Çelebi University, Graduate School of Natural and Applied Sciences, M.S. Thesis, January 2022.
- S.Fatih Kırmızıgöl, "Mikro Gaz Türbin Kanatlarında Efüzyon Soğutma için Analizler Yapılması ve İndirgenmiş Model Geliştirilmesi (Development of Reduced Order Model and Simulations for Effusion Cooling of Micro Gas Turbine Blades)," İzmir Katip Çelebi University, Graduate School of Natural and Applied Sciences, M.S. Thesis, August 2021.
- Acar Çelik, "Numerical Investigation of Inverse Magnus Effect on a Circular Cylinder by Controlling Azimuthal Circulation Distribution," İzmir Katip Çelebi University, Graduate School of Natural and Applied Sciences, M.S. Thesis, May 2021.
- M. Tayyip Gürbüz, "Simulations of a Novel Low Pressure Compression System for Variable-Speed Micro Turbofan," İzmir Katip Çelebi University, Graduate School of Natural and Applied Sciences, M.S. Thesis, June 2019.
- Menal İlhan, "Aerodynamic Design of a Novel Low Pressure Compression System for Variable-Speed Micro Turbofan," İzmir Katip Çelebi University, Graduate School of Natural and Applied Sciences, M.S. Thesis, December 2019.

##### ONGOING:

- Seçkin Aker, Ahmet Yıldırım, Anıl Tahsin Eke, Çağlar Utku Bağcıoğlu, N.Mert Koçanalı, Mustafa Ülger.

## **SOFTWARE SKILLS**

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Regular (advanced) user of:

- ANSYS Fluent, CFX, Meshier, TurboGrid, Design Modeler and Blade Editor
- NUMECA FINE/Turbo CFD Suite
- AxStream
- Matlab
- Solidworks
- QBlade
- Basic Language
- Microsoft Office

## **REVIEWERSHIPS**

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- Proc IMechE Part G: Journal of Aerospace Engineering
- Applied Energy
- Energy
- Aerospace Science and Technology
- International Journal of Turbo&Jet Engines
- Physics of Fluids
- Journal of Cleaner Production
- Propulsion and Power Research
- Applied Ocean Research
- Advances in Mechanical Engineering
- Journal of Applied Fluid Mechanics
- Journal of Advanced Research in Fluid Mechanics and Thermal Sciences
- ASME, International Gas Turbine Institute (IGTI), Turbo Expo Conference
- Journal of Thermal Science and Technology
- Experimental Techniques
- Isı Bilimi ve Tekniđi Dergisi
- Anadolu Üniversitesi Bilim ve Teknoloji Dergisi A - Uygulamalı Bilimler ve Mühendislik
- Dokuz Eylül Üniversitesi Fen ve Mühendislik Dergisi
- Düzce Üniversitesi Bilim ve Teknoloji Dergisi
- TÜBİTAK – TEYDEB ve ARDEB
- Afyon Kocatepe Üniversitesi Fen ve Mühendislik Bilimleri Dergisi
- TÜBİTAK - Uluslararası İşbirliği Projeleri
- 22. Isı Bilimi ve Tekniđi Kongresi
- Ulusal Havacılık ve Uzay Konferansı (UHUK)
- 5. İzmir Rüzgar Sempozyumu ve Sergisi
- TÜBİTAK En İyi Öğrenci Projeleri Deđerlendirme Jürisi