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Biography

Dr Egemen Avcu is an Assistant Professor at the Department of Machine and Metal Technologies, Ford Otosan İhsaniye Automotive Vocational School, Kocaeli University, Turkey. He has currently ongoing international research collaborations with Universities in the UK, Germany, and Turkey. He has been teaching courses on materials science and mechanical engineering at course coordinator and lecturer levels at the School of Materials, The University of Manchester (since 2018), at Department of Mechanical Eng., and Department of Mechatronic Eng., Kocaeli University (since 2013).

Egemen Avcu's research background falls mainly into the field of understanding the microstructure-mechanical and tribological behaviour relationship of materials, and the development and processing of advanced materials and coatings, particularly composites. His research area covers; i) mechanical, tribological, and surface characterisation of aerospace materials, ii) processing of advanced composite materials and coatings, and iii) design and development of testing and processing systems.

Education Information

- I. Doctorate, Kocaeli University, Fen Bilimleri Enstitüsü, Makine Mühendisliği Anabilim Dalı, Turkey 2011 - 2013
- II. Postgraduate, Kocaeli University, Fen Bilimleri Enstitüsü, Makine Mühendisliği Anabilim Dalı, Turkey 2009 - 2011
- III. Undergraduate Double Major, Kocaeli University, Mühendislik Fakültesi, Makine Mühendisliği Bölümü, Turkey 2003 - 2010
- IV. Undergraduate, Kocaeli University, Mühendislik Fakültesi, Metalurji Ve Malzeme Mühendisliği Bölümü, Turkey 2003 - 2007

Dissertations

- I. Doctorate, TİTANYUM ALAŞIMLARININ PARTİKÜL EROZYONU İLE PÜRÜZLENDİRİLMESİ VE AŞINDIRILMASI İŞLEMLERİNİN OPTİMİZASYONU , Kocaeli Üniversitesi, Fen Bilimleri Enstitüsü, Makine Mühendisliği Anabilim Dalı, 2013
- II. Postgraduate, Farklı büyüklüklere sahip aşındırıcı partikül karışımlarının ti6al4v alaşımının erozif aşınma davranışına etkileri, Kocaeli Üniversitesi, Fen Bilimleri Enstitüsü, Makine Mühendisliği Anabilim Dalı, 2011

Research Areas

Academic Titles / Tasks

- I. Associate Professor, Kocaeli University, Ford Otosan İhsaniye Otomotiv Meslek Yüksekokulu, Makine ve Metal Teknolojileri, 2021 - Continues
- II. Assistant Professor, Kocaeli University, Ford Otosan İhsaniye Otomotiv Meslek Yüksekokulu, Makine Ve Metal Teknolojileri Bölümü, 2018 - 2021
- III. Assistant Professor, Kocaeli University, Ford Otosan İhsaniye Otomotiv Meslek Yüksekokulu, Makine Ve Metal Teknolojileri Bölümü, 2013 - 2018
- IV. Assistant Professor, Friedrich-Alexander-Universitaet Erlangen-Nürnberg, Technische Fakultat, Institute For Biomaterials, 2016 - 2016
- V. Research Assistant, Kocaeli University, Fen Bilimleri Enstitüsü, Makine Mühendisliği Anabilim Dalı, 2010 - 2013

Academic and Administrative Experience

- I. Kocaeli Üniversitesi, Ford Otosan İhsaniye Otomotiv Meslek Yüksekokulu, 2014 - Continues
- II. Kocaeli Üniversitesi, Ford Otosan İhsaniye Otomotiv Meslek Yüksekokulu, 2013 - 2016
- III. Kocaeli Üniversitesi, Ford Otosan İhsaniye Otomotiv Meslek Yüksekokulu, 2013 - 2016

Courses

- I. **Doctorate**
 - I. Malzemelerin Mekanik Yüzey İşlemleri, Doctorate, 2016 - 2017
- II. **Postgraduate**
 - I. Malzemelerin Mekanik Yüzey İşlemleri, Postgraduate, 2016 - 2017
- III. **Associate Degree**
 - I. YÜKSEK LİSANS TEZ, Associate Degree, 2016 - 2017
 - II. MALZEME BİLGİSİ, Associate Degree, 2016 - 2017
 - III. YÜZEY BİLGİSİ, Associate Degree, 2016 - 2017
 - IV. TEMEL İMALAT YÖNTEMLERİ, Associate Degree, 2016 - 2017

Supervised Theses

- I. AVCU E., Metalik malzemelerin bilyalı dövme uygulaması sonrası tribolojik davranışının deneysel olarak incelenmesi, Postgraduate, H.ARDA(Student), 2015

Published journal articles indexed by SCI, SSCI, and AHCI

- I. **Cavitation erosion wear behavior of ship propeller material: Analysis of surface roughness (Ra) using the taguchi method Gemi pervane malzemesi kavitasyon erozyonu aşınma davranışı: Yüzey pürüzlülüğü (Ra) değişiminin Taguchi yöntemiyle analizi**
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Journal of the Faculty of Engineering and Architecture of Gazi University, vol.40, no.2 February, pp.1221-1232,

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- II. **Editorial: Tribological behavior of biomaterials**
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Frontiers in Materials, vol.12, 2025 (SCI-Expanded)
- III. **High temperature oxidation and its effect on the mechanical behavior of SiCf/BN/SiBCN composites**
Li Z., Zhang X., AVCU E., Zhong X., Withers P. J., Xiao P.
JOURNAL OF THE EUROPEAN CERAMIC SOCIETY, vol.45, no.1, 2025 (SCI-Expanded)
- IV. **Cavitation erosion behaviour of MAB-CU4 alloy: influences of cavitation number, attack angle, time, and stand-off distance**
Tini S. C., ZEREN A., YILDIRAN AVCU Y., Abakay E., Guney M., AVCU E.
Materials Research Express, vol.11, no.11, 2024 (SCI-Expanded)
- V. **Electrophoretically deposited Asphaltum punjabianum (Shilajit) coatings on polyvinylalcohol/carboxymethylcellulose hydrogels**
Hussain R., Minhas B., Batool S. A., Kazmi S. L., Javed U., Abbas Z., Khan A., Ahmed S., Imran A., Khaliq A., et al.
INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES, vol.278, 2024 (SCI-Expanded)
- VI. **Oxidation and mechanical properties of SiC fibers after high temperature exposure in air and steam**
Li Z., Zhang X., Zhang Q., AVCU E., Withers P. J., Xiao P.
JOURNAL OF THE EUROPEAN CERAMIC SOCIETY, vol.44, no.12, pp.6864-6874, 2024 (SCI-Expanded)
- VII. **The effects of diode and Er:YAG laser applications on the surface topography of titanium grade 4 and titanium zirconium discs with sand-blasted and acid-etched (SLA) surfaces**
Öztürk A., TOSUN E., MERAL S. E., Baştan F. E., Üstel F., Kan B., AVCU E.
Journal of Stomatology, Oral and Maxillofacial Surgery, vol.125, no.3, 2024 (SCI-Expanded)
- VIII. **Oxidized alginate-gelatin (ADA-GEL)/silk fibroin/Cu-Ag doped mesoporous bioactive glass nanoparticle-based hydrogels for potential wound care treatments**
Akhtar M., Nazneen A., Awais M., Hussain R., Khan A., Irfan M., AVCU E., Ur Rehman M. A., Boccaccini A. R.
Biomedical Materials (Bristol), vol.19, no.3, 2024 (SCI-Expanded)
- IX. **Experimental and numerical analysis of drilled- and molded-hole glass fiber reinforced polymer matrix (GFRP) composites**
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- X. **Flexural and low velocity impact behaviour of hybrid metal wire mesh/carbon-fibre reinforced epoxy laminates**
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Composites Communications, vol.46, 2024 (SCI-Expanded)
- XI. **Advances in improving tribological performance of titanium alloys and titanium matrix composites for biomedical applications: a critical review**
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FRONTIERS IN MATERIALS, vol.11, 2024 (SCI-Expanded)
- XII. **Corrosion Behavior of Shot-Peened Ti6Al4V Alloy Produced via Pressure-Assisted Sintering**
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- XIII. **Corrosion, surface, and tribological behavior of electrophoretically deposited polyether ether ketone coatings on 316L stainless steel for orthopedic applications**
Ahmad K., Batool S. A., Farooq M. T., Minhas B., Manzur J., Yasir M., Wadood A., AVCU E., Ur Rehman M. A.
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- XIV. **Enhancing the tribological performance of PLA-based biocomposites reinforced with graphene oxide**
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- XV. **Abrasion resistance of a Nb3Sn magnetron-sputtered coating on copper substrates for radio frequency superconducting cavities**
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- XVI. **Void Nucleation and Growth from Heterophases and the Exploitation of New Toughening Mechanisms in Metals**
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- XVII. **Electrophoretic Deposition, Microstructure, and Selected Properties of Poly(lactic-co-glycolic) Acid-Based Antibacterial Coatings on Mg Substrate**
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- XVIII. **Mapping plastic deformation mechanisms in AZ31 magnesium alloy at the nanoscale**
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- XIX. **Electrophoretic deposition, microstructure and selected properties of zein/cloves coatings on 316L stainless steel**
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- XX. **Surface and Tribological Properties of Powder Metallurgical Cp-Ti Titanium Alloy Modified by Shot Peening**
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- XXI. **An Air Quality Modeling and Disability-Adjusted Life Years (DALY) Risk Assessment Case Study: Comparing Statistical and Machine Learning Approaches for PM2.5 Forecasting**
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SUSTAINABILITY, vol.14, no.24, 2022 (SCI-Expanded)
- XXII. **The effect of reduced graphene oxide content on the microstructural and mechanical properties of copper metal matrix composites**
AVCU E., Cao H., Zhang X., Guo Y., Withers P. J., Li X., Wang N., Yan S., Xiao P.
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- XXIII. **Biodegradable Polymer Matrix Composites Containing Graphene- Related Materials for Antibacterial Applications: A Critical Review**
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ACTA BIOMATERIALIA, vol.151, pp.1-44, 2022 (SCI-Expanded)
- XXIV. **Analytical Methods for Physicochemical Characterization and Toxicity Assessment of Atmospheric Particulate Matter: A Review**
Agibayeva A., Guney M., Karaca F., Kumisbek A., Kim J. R., AVCU E.
SUSTAINABILITY, vol.14, no.20, 2022 (SCI-Expanded)
- XXV. **Wear resistance of an additively manufactured high-carbon martensitic stainless steel**
Iakovakis E., AVCU E., Roy M. J., Gee M., Matthews A.
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- XXVI. **Effects of the residential built environment on remote work productivity and satisfaction during COVID-19 lockdowns: An analysis of workers' perceptions**
Tleuken A., Turkyilmaz A., Sovetbek M., Durdyev S., Guney M., Tokazhanov G., Wiechetek L., Pastuszak Z., Draghici A., Boatca M. E., et al.
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- XXVII. **Dry sliding wear behaviour of additive manufactured CrC-rich WC-Co cemented carbides**
Iakovakis E., AVCU E., Roy M. J., Gee M., Matthews A.
WEAR, vol.486, 2021 (SCI-Expanded)
- XXVIII. **Modification of surface and subsurface properties of aa1050 alloy by shot peening**
Avcu Y., Gönül B., Yetik O., Sönmez F., CENGİZ A., Guney M., AVCU E.
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- XXIX. **TAILORING SURFACE MORPHOLOGY AND TOPOGRAPHY OF SHOT-PEENED Ti6Al4V VIA GRIT BLASTING**
Yıldıran Avcu Y., Yetik O., Guney M., Sınmazçelik T., Avcu E.
MATERIALI IN TEHNOLOGIJE, vol.55, no.5, pp.625-628, 2021 (SCI-Expanded)
- XXX. **Surface, Subsurface and Tribological Properties of Ti6Al4V Alloy Shot Peened under Different Parameters**
Yıldıran A., Yetik O., Guney M., Iakovakis E., Sınmazçelik T., Avcu E.
MATERIALS, vol.13, no.19, 2020 (SCI-Expanded)
- XXXI. **Electrophoretic deposition of chitosan-based composite coatings for biomedical applications: A review**
Avcu E., Bastan F. E., Abdullah H. Z., Rehman M. A. U., Avcu Y., Boccaccini A. R.
PROGRESS IN MATERIALS SCIENCE, vol.103, pp.69-108, 2019 (SCI-Expanded)
- XXXII. **3D Imaging of Indentation Damage in Bone**
Lowe T., Avcu E., Boussier E., Sellers W., Withers P. J.
MATERIALS, vol.11, no.12, 2018 (SCI-Expanded)
- XXXIII. **Tailoring the surface characteristics of electrophoretically deposited chitosan-based bioactive glass composite coatings on titanium implants via grit blasting**
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- XXXIV. **Electrophoretic co-deposition of PEEK-hydroxyapatite composite coatings for biomedical applications**
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- XXXV. **Dry Sliding Wear Behaviour of Shot Peened Ti6Al4V Alloys at Different Peening Times**
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- XXXVI. **Fracture strengths of endocrown restorations fabricated with different preparation depths and CAD/CAM materials**
Kanat-Erturk B., Sarıdağ S., Kösel E., Helvacioğlu-Yigit D., Avcu E., Yıldıran-Avcu Y.
DENTAL MATERIALS JOURNAL, vol.37, pp.256-265, 2018 (SCI-Expanded)
- XXXVII. **The influences of ECAP on the dry sliding wear behaviour of AA7075 aluminium alloy**
Avcu E.
TRIBOLOGY INTERNATIONAL, vol.110, pp.173-184, 2017 (SCI-Expanded)
- XXXVIII. **Evaluation of dentin defect formation during retreatment with hand and rotary instruments: A micro-CT study**
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- XXXIX. **Micro-computerized tomography analysis of cement voids and pull-out strength of glass fiber posts luted with self-adhesive and glass-ionomer cements in the root canal**
Sarıdağ S., Helvacioğlu-Yigit D., Oezcan M., Avcu E., Kiziltas G.
Journal of Adhesion Science and Technology, vol.30, no.14, pp.1585-1595, 2016 (SCI-Expanded)
- XL. **Optimization of Surface Properties of Shot Peened Ti6Al4V Alloy**
Yıldıran Y., Avcu E., Sınmazçelik T.
ACTA PHYSICA POLONICA A, vol.127, no.4, pp.984-986, 2015 (SCI-Expanded)
- XLI. **Investigation of the Effects of Erosion Test Parameters on the Particle Impingement Velocity by Using CFD Analysis**
ÖNEN B., Yıldıran Y., AVCU E., ÇINAR A.
ACTA PHYSICA POLONICA A, vol.127, no.4, pp.1225-1229, 2015 (SCI-Expanded)
- XLII. **Possible Use of Volcanic Ash as a Filler in Polyphenylene Sulfide Composites: Thermal, Mechanical, and Erosive Wear Properties**
AVCU E., ÇOBAN O., BORA M. Ö., FİDAN S., SINMAZÇELİK T., ERSOY O.

- POLYMER COMPOSITES, vol.35, no.9, pp.1826-1833, 2014 (SCI-Expanded)
- XLIII. **Mechanical and Thermal Properties of Pumice Powder Filled PPS Composites**
ŞAHİN A. E., YILDIRAN Y., AVCU E., FİDAN S., SINMAZÇELİK T.
ACTA PHYSICA POLONICA A, vol.125, no.2, pp.518-520, 2014 (SCI-Expanded)
- XLIV. **Influences of Particle Impingement Angle and Velocity on Surface Roughness, Erosion Rate, and 3D Surface Morphology of Solid Particle Eroded Ti6Al4V Alloy**
AVCU E., YILDIRAN Y., ŞAHİN A. E., FİDAN S., SINMAZÇELİK T.
ACTA PHYSICA POLONICA A, vol.125, no.2, pp.541-543, 2014 (SCI-Expanded)
- XLV. **Effect of particle impact angle, Erodent particle size and acceleration pressure on the solid particle erosion behavior of 3003 Aluminum alloy**
Yildiran Y., AVCU E., ŞAHİN A. E., FİDAN S., YETİŞTİREN H., SINMAZÇELİK T.
Acta Physica Polonica A, vol.125, no.2, pp.523-525, 2014 (SCI-Expanded)
- XLVI. **Solid particle erosion behaviour of Ti6Al4V alloy**
AVCU E., FİDAN S., YILDIRAN Y., SINMAZÇELİK T.
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- XLVII. **The Effect of TiO2 Filler Content on the Mechanical, Thermal, and Tribological Properties of TiO2/PPS Composites**
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POLYMER COMPOSITES, vol.34, no.10, pp.1591-1599, 2013 (SCI-Expanded)
- XLVIII. **Effect of heat treatment on erosive wear behaviour of Ti6Al4V alloy**
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- XLIX. **Solid Particle Erosive Wear Behavior of Glass Mat Reinforced PPS Composites: Influence of Erodent Particle Size, Pressure, Particle Impingement Angle, and Velocity**
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- L. **A Study on the Derivation of Parametric Cutting Force Equations in Drilling of GFRP Composites**
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- LII. **Internal damage investigation of the impacted glass/glass plus aramid fiber reinforced composites by micro-computerized tomography**
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- LIII. **The Influence of Annealing on the Crystallization and Tribological Behavior of MWNT/PEEK Nanocomposites**
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- LIV. **A review: Fibre metal laminates, background, bonding types and applied test methods**
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MATERIALS & DESIGN, vol.32, no.7, pp.3671-3685, 2011 (SCI-Expanded)

Articles Published in Other Journals

1. **Modification of surface and subsurface properties of cold-rolled Ti6Al4V sheets through water jet**

shot peening

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- II. **Understanding Public Perception of Air Quality in the Urban Environment of Central Asia: An Empirical Assessment Using Structural Equation Modelling**
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- III. **Effect of laser energy density on porosity and microstructural features of Inconel 625 alloy produced by selective laser melting**
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- IV. **Annual and Periodic Variations of Particulates and Selected Gaseous Pollutants in Astana, Kazakhstan: Source Identification via Conditional Bivariate Probability Function**
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- V. **3D Printing Assisted Fabrication of Copper-Silver Mesoporous Bioactive Glass Nanoparticles Reinforced Sodium Alginate/Poly(vinyl alcohol) Based Composite Scaffolds: Designed for Skin Tissue Engineering**
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- VI. **High-velocity air fuel coatings for steel for erosion-resistant applications**
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- VII. **The Effects of Grit Size and Blasting Pressure on the Surface Properties of Grit Blasted Ti6Al4V Alloy**
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- IX. **Bilyalı Dövme Parametrelerinin AA7075 Alüminyum Alaşımının Yüzey Altı Özelliklerine Etkileri**
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- X. **Surface Properties of AA7075 Aluminium Alloy Shot Peened under Different Peening Parameters**
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- XI. **Microstructure and Mechanical Properties of High Velocity Oxygen Fuel HVOF Sprayed Nickel Powder Coating on Welding Regions of Aluminum Alloy AA5754 and DP600 Welded Steel Plates with the Friction Stir Spot Welding Process**
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Supported Projects

- I. AVCU E., Project Supported by Higher Education Institutions, BİLYALI DÖVME TEST SİSTEMİ İÇİN OTOMATİK KONTROLLÜ SİSTEMİN GELİŞTİRİLMESİ VE İMALATI, 2019 - 2020
- II. AVCU E., Project Supported by Higher Education Institutions, KURU SÜRTÜNME AŞINMA TEST SİSTEMİ TASARIMI VE İMALATI, 2017 - 2018
- III. AVCU E., Project Supported by Higher Education Institutions, BİLYALI DÖVME İLE YÜZEYLERİ İŞLENMİŞ AA7075 ALÜMİNYUM ALAŞIMININ ADHESİF AŞINMA DAVRANIŞLARININ İNCELENMESİ, 2016 - 2017
- IV. AVCU E., Project Supported by Higher Education Institutions, MONOLİTİK VE KONVANSİYONEL ZİRKONYA ALT YAPILARIN KUMLAMA SONRASI YÜZEY MORFOLOJİLERİNİN İNCELENMESİ, 2015 - 2016
- V. AVCU E., Project Supported by Higher Education Institutions, TİTANYUM ALAŞIMLARININ YÜKSEK SICAKLIK EROZİF AŞINMA DAVRANIŞLARININ İNCELENMESİ, 2014 - 2015
- VI. TUBITAK Project, Farklı büyüklüklere sahip aşındırıcı partikül karışımlarının sünek yarı sünek ve gevrek malzemelerin katı partikül erozyonu davranışlarına etkileri, 2010 - 2012

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Coaching Duties

Refereeing Duties

Non Academic Experience

- I. 110M064 nolu BİLİMSEL VE TEKNOLOJİK ARAŞTIRMA PROJELERİNİ DESTEKLEME PROGRAMI (1001) PROJESİ, Proje Bursiyeri
- II. TÜBİTAK-MAM Malzeme Enstitüsü, Proje iç bursiyer
- III. D.S.C. Otomotiv Koltuk Sistemleri A.Ş., Üretim ve Üretim Planlama Takım Şefi
- IV. D.S.C. Otomotiv Koltuk Sistemleri A.Ş., Üretim Mühendisi