PERSONAL INFORMATION

Name, Surname : Ertuğrul Tolga Duran
Associate Professor
Date of Birth : 29/03/1981
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Google Scholar : Ertuğrul Tolga Duran (Profile name)

CONTACT INFORMATION

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ABOUT

As a Managing Director and Chief Design Officer, I have been bringing over two decades of leadership in innovation, engineering design, and product development across high-impact industries including heavy-duty diesel engines, turbomachinery, cross-drive transmission systems, and aviation.

🔧 **R&D:**
Led and contributed to 75+ cutting-edge R&D projects across power train, defense, and energy sectors - bridging advanced engineering with practical applications.

🌍 **International Impact:**
Holder of multiple international patents, with inventions implemented in Siemens and Doosan gas turbine platforms.

🎓 **Academic Engagement:**
Delivered 11 unique courses at elite universities ranked in the QS Top 600, merging industrial depth with academic rigor.
Actively involved in peer-review processes and academic quality training.

📚 **Thought Leadership:**
Author of 35+ international publications in the fields of mechanical design, combustion, and applied thermodynamics.

🔬 **Reviewer & Trainer:**
Served as reviewer for respected journals and contributed to technical training for both industry professionals and academic researchers.

EDUCATION

PhD	**Sabancı University, Mechatronics Engineering, 2013** * GPA 3.87/4.00, First place graduation
MSc	**Sabancı University, Electronics Engineering and Computer Science, 2006** * GPA 4.00/4.00, First place graduation
BSc	**Istanbul Technical University, Mechanical Engineering, 2004** * GPA 3.90/4.00, First place graduation
Professional Trainings	Developing UAV Models using the Appropriate Level of Fidelity, 2022, Kuwait. Web of Science, Clarivate, 2021, Kuwait. 6-Sigma Black Belt, 2009, Istanbul, Turkey. LMS-Virtual Lab, 2008, Dunton, UK. Abaqus, 2008, Istanbul, Turkey. AVL-Excite, 2007, Graz, Austria. 6-Sigma Green Belt, 2007, Istanbul, Turkey. Siemens C3P TeamCenter, 2007, Kocaeli, Turkey. Using a Commercial Fatigue Analysis Code (Femfat), 2007, Bursa, Turkey. Simulation of Armed Truck Vehicles, Recurdyn, 2007, Bursa, Turkey. Altair Hyperworks, 2006, Bursa, Turkey.

EXPERIENCE

	PROFESSIONAL / R&D EXPERIENCE	ACADEMIC EXPERIENCE
2025-Present	**BAYKAR TECHNOLOGIES** *Consultant & Principal Researcher (03.2025-Present)* Technical and Project Management Support Procedure, Training, Workshop **ACADEMIC RDC** *Founder (03.2025 – Present)* Consultancy and Know-How Development Engineering and Project Management Services Test System Development	**KADİR HAS UNIVERSITY** *Associate Professor (08.2025 – Present)* Department of Mechatronics Engineering
2023-2025	**BMC POWER** *CDO / Chief Design Officer (11.2023 – 02.2025)*	
2019-2023	**BAYKAR TECHNOLOGIES** *Consultant & Principal Researcher (2022-2023)* Aero-Piston Engine & Transmission Development **BMC POWER** *Consultant & Principal Researcher (2023)* Engine, Transmission & Power Pack Development **TEMPA ENGINEERING** *Consultant & Principal Researcher (2020-2023)* BMCP Engine Development Projects	**AUM/AMERICAN UNIVERSITY of the ME** ***in affiliation with Purdue University*** *Associate Professor (02.2019 – 11.2023)* Department of Mechanical Engineering Coordinator, Automotive Prime Movers Coordinator, Global Eng. Prof. Seminar Structure and Properties of Materials Dynamics (Basic Mechanics II) Graphical Communication & Spatial Anlys.
2010-2019	**SDM R&D** (02.2010 – 02.2019) *Managing Director, R&D Executive (2018-2019)* *Research & Development Director (2012-2018)* *Turbine-R&D Partner (2017-2019)* *Consultant and Project Executive (2010-2012)*	**YEDİTEPE UNIVERSITY** *Adjunct Faculty (09.2016 – 01.2017)* Department of Mechanical Engineering Finite Element Methods **SABANCI UNIVERSITY** *Adjunct Faculty (01.2014 – 06.2014)* Department of Mechatronics Engineering Course: Mechanical Systems II **BAHÇEŞEHİR UNIVERSITY** *Adjunct Faculty (01.2012 – 06.2012)* Department of Mechatronics Engineering Advanced Finite Element Methods (MSc) **BAHÇEŞEHİR UNIVERSITY** *Full Time Faculty Member (09.2010 – 02.2012)* Department of Mechatronics Engineering Strength of Materials & Machine Elements Finite Element Methods Computer Aided Technical Drawing
2006-2010	**FORD OTOSAN** (07.2006-08.2010) *Power Train NVH Supervisor (2008-2010)* *Power Train NVH Subject Matter Expert Champion* *6-Sigma Black Belt* *P/T Durability & NVH R&D Engineer (2006-2008)*	
2004-2006		**SABANCI UNIVERSITY** *Teaching Assistant (07.2004 – 08.2006)* Department of Mechatronics Engineering

AREAS OF EXPERTISE

* General Management, Engineering Management
* Research & Development
* Strategy & Business Development
* Project Management (6-Sigma Black Belt)
* Internal Combustion Engines and Power Train Development (Design, Analyses, Prototype Develop., Tests)
* Cross-Drive Transmission Development (Design, Analyses, Prototype Development, Tests)
* Steam and Gas Turbines
* Turbomachinery Sealing Technologies and Test System Development
* Computer Aided Engineering: Durability and NVH Analyses / Finite Element Methods
* Strength of Materials
* Machine Elements
* Tribology and Contact Mechanics

AWARDS & HONORS

* Outstanding performance evaluation for the CDO position in BMCP (2024).
* Export Champion SME (4th Golden Cube Awards, Teknopark Istanbul, 2018).
* Single Cylinder Research and Optical Research Engines – Project of the Year, 2nd Place (Koc Group), 2017.
* Nominated for R&D Company of the Year (3rd Golden Cube Awards, Teknopark Istanbul, 2017).
* Nominated for Export Champions of 2016 (3rd Golden Cube Awards, Teknopark Istanbul, 2017).
* Promoted to Managing Director and R&D Executive in 2016.
* Promoted to R&D Director in 2012.
* Become a member of Ford Global Subject Matter Expert teams of NVH and Multi Body Dynamics, Champion of Ford Motor Company – Turkey, 2009.
* Black Belt Certification, 2009.
* Letter of thanks from Mike Flewitt, general manager of Ford Motor Company - Turkey, and awarded with an extra salary because of high performance in 2009.
* Graded with *"excellent success"* in 2008&2009 because of high performance in P/T CAE and NVH CAE.
* Promoted to Power Train supervisor - Ford Otosan, Turkey in 2008.
* Green Belt Certification, 2007.
* Sabanci University, Faculty of Engineering and Natural Sciences, MSc – Mechatronics, Graduation Degree: 1st Rank *(GPA: 4.00/4.00)*, 2006.
* Letters of thanks from the president of Sabanci University, Prof. Dr. Tosun Terzioğlu, for the outstanding performance as a teaching assistant in Mechanical Systems I and II, 2004&2005.
* Istanbul Technical University, Faculty of Mechanical Engineering, BSc – Mechanical Engineering, Graduation Degree: 1st Rank *(GPA: 3.90/4.00)*, 2004.

PROFESSIONAL ASSOCIATIONS & ORGANIZATIONS

* Invited member of ASME Aerospace Division Executive Committee – 2022
* Member of ASME – American Society of Mechanical Engineers
* Member of SAE – Society of Automotive Engineers

TUBITAK PROJECT DUTIES

* **Project Coordinator**, 117G004, TLM16V185 Type Heavy Duty Diesel Engine Modernisation, KAMAG – Community Research Support Group, 1007 – Kamu/Sanayi, ARDEB, Project Start - End: 15.12.2018 – 15.06.2024.
* **Project Coordinator**, 113G096, E Class 130MW Gas Turbine 3rd Stage Rotor and Stator Blade Development and Manufacturing with Precision Casting, KAMAG – Community Research Support Group, 1007 – Kamu/Sanayi, ARDEB, Project Start - End: 01.05.2014 – 01.11.2022.
* **Project Personnel,** 3090170, Euro-5 Ecotorq Engine Development Project (9500 and 7500 Series), 1501-TÜBİTAK SANAYİ ARGE YARD. UYG. PROJELER, TEYDEB, Project Start - End: 01.12.2008 – 30.06.2010.

PATENTS

* Seal for Combustion Apparatus, 2021/11/3, WO 2021/043527 A1. (employed in Siemens Gas Turbines)
* Rotor Including Replaceable Self-Locking Sealing Assembly, Turbine, and Gas Turbine Including the Same, 2021/4/15, US 2021/0108566 A1. (employed in Doosan Gas Turbines)
* Woven Cloth Layer Supported Leaf Seal, 2020/8/6, US20200248812A1, WO 2019/083475 A2.

COURSES DELIVERED

* Automotive Prime Movers (FCV, EV, ICE)	American University of the Middle East, Mechanical Eng.
* Structure and Properties of Materials	American University of the Middle East, Mechanical Eng.
* Dynamics (Basic Mechanics II)	American University of the Middle East, Mechanical Eng.
* Graphical Communication & Spatial Analysis	American University of the Middle East, Mechanical Eng.
* Global Engineering Professional Seminar	American University of the Middle East, Mechanical Eng.
* Finite Element Methods and Applications	Yeditepe University, Mechanical Engineering
* Mechanical Systems-II *(Machine Elements)*	Sabancı University, Mechatronics
* Advanced Finite Element Methods	Bahcesehir University, Mechatronics Eng., MSc Program
* Introduction to Finite Element Methods	Bahcesehir University, Mechatronics Eng.
* Mechanical Components and Systems	Bahcesehir University, Mechatronics Eng.
* Computer Aided Technical Drawing	Bahcesehir University, Mechatronics Eng.

TRAINING, WORKSHOPS & SPEECHES GIVEN BY E. TOLGA DURAN

* "Sustainable & Intelligent Vehicles", American University of the Middle East, Kuwait, 2022
* "Development of Power Train Using CAE, Part 1: Durability and Life Assessment", AUM, Kuwait, 2022
* "Development of Power Train Using CAE, Part 2: Noise-Vibration-Harshness", AUM, Kuwait, 2022
* "Computer Aided Engineering for Engine Development: Professional Methods & Case Studies", AUM, 2022
* "Practices for eLearning", American University of the Middle East, Kuwait, 2021
* "How Did We Succeed It?", 3rd R&D and Innovation Summit, Istanbul, Turkey, 2018
* "Internal Combustion Engine Technologies", National Engine Summit, Turkey, 2017
* "Finite Element Based Fatigue", Yeditepe University, Turkey, 2016
* "Methodologies for Brush Seal Structural Analyses", Turkey, 2016
* "Bucket Tip Sealing Technologies", Doosan Heavy Industries, South Korea, 2016
* "Brush Seal Development for Steam Turbines", Doosan Heavy Industries, South Korea, 2016
* "Sealing Technologies in Modern Turbomachinery", Turkey, 2015
* "Brush Seal Structural Analyses for Steam Turbines", Doosan Heavy Ind., South Korea, 2014

PUBLICATIONS

1. Demiral, M., Duran, E. T., *"Torsional Fatigue Performance of a Spot-Welded Structure: An XFEM Analysis"*, Appl. Sci. 2024, 14(20), 9593; https://doi.org/10.3390/app14209593.
2. Duran, E. T., Demiral, M., *"Comparing and Validating the Numerical Modeling of Spot-welded Fatigue Failure using FEM and XFEM Methods for HCF"*, Engineering Failure Analysis, Volume 158, 108049, ISSN 1350-6307, 2024, https://doi.org/10.1016/j.engfailanal.2024.108049.
3. Demiral, M., Duran, E. T., *"Failure Analysis of Resistance Spot-Welded Structure Using XFEM: Lifetime Assessment"*, Appl. Sci. 2023, 13(19), 10923; https://doi.org/10.3390/app131910923.
4. Dinc, A., Mamedov, A., Duran, E. T., Abbassi, F., Elbadawy, I., Nag, K., Moayyedian, M., Fayed, M., Otkur, M., Gharbia, Y., *"Effect of Refrigerated Inlet Cooling on Greenhouse Gas Emissions for a 250 MW Class Gas Turbine Engine"*, Aerospace 2023, 10(10), 833; https://doi.org/10.3390/aerospace10100833.
5. Duran, E. T., *"Methodology for Counter Torque, Power Loss and Frictional Heat for Brush Seals under Eccentric Transients"*, Tribology Transactions, 1, 21, 1040-2004, Taylor & Francis, 2023, https://doi.org/10.1080/10402004.2023.2167677.
6. Duran, E. T., *"Comparative Multi-Axial High-Cycle Fatigue Analysis of Spot Weld Models Using Findley's Damage Criteria"*, SAE Int. J. Mater. Manf. 16(1):59-70, 2023, https://doi.org/10.4271/05-16-01-0006.
7. Duran, E. T., *"Effect of 3D and 2D Element Types on Stress and Life Analysis of Spot-Welded Components"*, PAJES Journal of Engineering Sciences, 2023, 29(2), 120-130, PAJES-35853, doi:10.5505/pajes.2022.35853.
8. Duran, E. T., *"Effect of Bristle Diameter on Operational Modal Assessment and Seating Load of Brush Seals"*, ASME Turbo Expo 2022, GT2022-78289, https://doi.org/10.1115/GT2022-78289.
9. Duran, E. T., *"Operational Modal Analyses of Brush Seals and Seating Load Simulations"*, ASME. J. Eng. Gas Turbines Power, 2022, https://doi.org/10.1115/1.4053964.
10. Duran, E. T., *"Effect of Load Distribution Modeling on the Accuracy of Spot Weld Analyses"*, WCX World Congress, SAE Technical Paper 2022-01-0776, 2022, https://doi.org/10.4271/2022-01-0776.
11. Duran, E. T., *"Sensitivity of Solid Element Spot Weld Modeling Methodology to Nugget Diameter"*, SAE Int. J. Adv. & Curr. Prac. in Mobility 4 (2022-01-0777), 1923-1930, https://doi.org/10.4271/2022-01-0777.
12. Duran, E. T., *"Finite Element Based Multi-Axial Low Cycle Fatigue Analyses of Spot-Welded Components and Correlation with Tests"*, Engineering Failure Analysis, Vol.132, February 2022, 105899, https://doi.org/10.1016/j.engfailanal.2021.105899.
13. Duran, E. T., *"Brush Seal Contact Force Theory and Correlation with Tests"*, Alexandria Engineering Journal, Volume 61, Issue 4, April 2022, Pages 2925-2938, https://doi.org/10.1016/j.aej.2021.08.027.

14. Duran, E. T., *"Oil Brush Seal in Turbomachinery: Flow Analyses and Closed Form Solutions"*, ASME Journal, GTP-20-1134, 2020, https://doi.org/10.1115/1.4048327.
15. Duran, E. T., Aksit, M., Ozmusul M., *"Brush Seal Structural Analyses and Correlation with Tests for Turbine Conditions"*, ASME. J. Eng. Gas Turbines Power, GTP-15-1292, 2016, pISSN: 0742-4795, eISSN: 1528-8919, https://doi.org/10.1115/1.4031565.
16. Doğu, Y., Kocagül, M., Sertçakan, M., Duran, E. T., Özmusul, M. S., *"Gaz Türbinli Motorlar için Sızdırmazlık Elemanları Test Sistemi Tasarımı ve Validasyonu"*, 28-30.Sep.2016, UHUK-2016-064.
17. Duran, E. T., Aksit, M., Ozmusul M., *"Brush Seal Structural Analyses and Correlation with Tests for Turbine Conditions"*, Proceedings of the ASME Turbo Expo 2015: Turbine Technical Conference and Exposition. Volume 5C: Heat Transfer. Montreal, Quebec, Canada. June 15–19, 2015. V05CT15A037. ASME. https://doi.org/10.1115/GT2015-44067.
18. Duran, E. T., Aksit, M., Ozmusul M., *"Brush Seal Free State Stiffness Analyses, Tests and Inspection on Dynamic Effects"*, Proceedings of the ASME Turbo Expo 2015: Turbine Technical Conference and Exposition. Volume 5C: Heat Transfer. Montreal, Quebec, Canada. June 15–19, 2015. V05CT15A039. ASME. https://doi.org/10.1115/GT2015-44069.
19. Duran, E. T., Aksit, M., Ozmusul M., *"CAE Based Brush Seal Characterization for Stiffness and Stress Levels"*, Proceedings of the ASME Turbo Expo 2015: Turbine Technical Conference and Exposition. Volume 5C: Heat Transfer. Montreal, Quebec, Canada. June 15–19, 2015. V05CT15A038. ASME. https://doi.org/10.1115/GT2015-44068.
20. Duran T, Tabak MS, Braumueller D, Erpolat S, Tekeli A, Senoguz T, *"Powertrain Analysis with Excite-Minimization of the High Speed Boom Noise"*, AVL AST International User Conference 201,Graz, 2011.
21. Duran, E. T., Aksit, M., *"Shear Heat Included Hydrodynamic Lift Clearance Derivation for Brush Seals"*, STLE 2010.
22. Duran, E.T., Braumueller, D., *"Power Train NVH Analysis with Excite in a Four Cylinder Inline Engine by Including Crankshaft Dynamics and Flywheel Swirl"*, ESDA2010-24608, https://doi.org/10.1115/ESDA2010-24608.
23. Cevik, G., Tuncalı, Z., Duran, E. T., *"A Study on the Diesel Engine Crankshaft Fatigue Performance Optimization"*, SAE – 2009-01 -0261, https://doi.org/10.4271/2009-01-0261.
24. Aksoy, S., Aksit, M., Duran, E.T., *"Brush Seal Performance Measurement System"*, IJTC2009-15275.
25. Duran, E. T., Sever, C., *"Dynamic Simulation and Endurance Limit Safety Factor Calculation for Crankshaft under the Effect of Dynamic and Inertial Loads"*, SAE – 2008-01 -2622, https://doi.org/10.4271/2008-01-2622.
26. Duran, E. T., Sever, C., *"PUMA I5 Diesel Engine Oil Pan Assembly NVH Optimization with Optistruct and AVL-Excite"*, SAE – 2008-01 -2721, https://doi.org/10.4271/2008-01-2721.
27. Duran, E. T., Aksit, M., *"A Study of Brush Seal Oil Pressure Profile Including Temperature-Viscosity Effects"*, American Institute of Aeronautics and Astronautics, AIAA-2008-4622, https://doi.org/10.2514/6.2008-4622.
28. Duran, E. T., Aksit, M., Dogu, Y., *"Oil Temperature Analysis of Brush Seals"*, ASME/STLE International Joint Tribology Conference, IJTC2007-44397, https://doi.org/10.1115/IJTC2007-44397.
29. Dincer , S., Cinar, A., Kepenek, D. A., Asureciler, B., Duran, E. T., Mugan, A., *"A Comparative Study on the Finite Element Models for Spot Welds and Their Verification"*, SAE - 2006-01-0590.
30. Duran, E. T., Aksit, M., Dogu, Y., *"Effect of Shear Heat on Hydrodynamic Lift of Brush Seals in Oil Sealing"*, American Institute of Aeronautics and Astronautics, AIAA-2006-4755, https://doi.org/10.2514/6.2006-4755.
31. Kepenek A., Aşureciler, B., Duran, E. T., Muğan, A., *"Punta Kaynakların Yorulma Ömrü Hesaplarında Kullanılan Sonlu Eleman Modellerinin Karşılaştırılması"*, Otekon 2004, Pages 265-275, Bursa.

REVIEWER DUTIES

* MDPI Applied Sciences 2023
* MDPI Aerospace 2023
* MDPI Ocean Engineering 2023
* Journal of Mechanical Science and Technology, 2022
* Journal of Engineering Tribology, 2022
* Proceedings of Global Power and Propulsion, 2022
* Asme Turbo Expo 2023
* Asme Turbo Expo 2022
* Asme Turbo Expo 2019
* Asme Turbo Expo 2018
* Asme Turbo Expo 2017
* Asme Turbo Expo 2016
* Asme Turbo Expo 2015
* Asme Turbo Expo 2013
* Asme Turbo Expo 2012

R&D PROJECTS

1. **Cross-Drive Transmission Development, 1500 HP (Altay Main Battle Tank), The Head of the Project**
   Cross-Drive transmission design, analyses, test, prototype manufacturing and validation. Full load dyno tests were completed in 2024.

2. **Cross-Drive Transmission Development, 1000 HP (Fırtına, New Generation Light Armored Vehicle), The Head of the Project**
   Cross-Drive transmission design, analyses, test, prototype manufacturing and validation. Initial spin tests were completed in 2024.

3. **V12 Heavy Duty Engine Development, 1500 HP (Altay Main Battle Tank, Marine)**
   Responsible for the analysis and optimization (Durability, CFD, NVH, 1D performance, Combustion, MBSD, Impact). The engine is under qualification stage – the qualification tests planned for 2025.

4. **V8 Heavy Duty Engine Development, 1000 HP (Fırtına, New Generation Light Armored Vehicle)**
   Responsible for the analysis and optimization (Durability, CFD, NVH, 1D performance, Combustion, MBSD, Impact). The qualification tests for the engine were completed in 2024.

5. **Azra - Inline 6 Heavy Duty Engine Development, 600 HP (8x8 Armoured Vehicles, Battle Tank Transporters**
   Responsible for the analysis and optimization (Durability, CFD, NVH, 1D performance, Combustion, MBSD). Qualified engine.

6. **Tuna - Inline 4 Heavy Duty Engine Development, 400 HP (4x4 Heavy Armoured Troop Carriers, Tactical Wheeled Armoured Vehicles)**
   Responsible for the analysis and optimization (Durability, CFD, NVH, 1D performance, Combustion, MBSD). Qualified engine. The first local engine in TSK inventory.

7. **Mavi Batu Marine Engine Development, 1407 HP**
   Responsible for the analysis and optimization (Durability, CFD, NVH, 1D performance, Combustion, MBSD).

8. **Levend Marine Engine Development, 600 HP**
   Responsible for the analysis and optimization (Durability, CFD, NVH, 1D performance, Combustion, MBSD).

9. **Subsystem Test Rig Development for Cross-Drive Transmissions**
   Torque convertor subsystem test rig, Rotary Seal, Dyno adaptation and dynamics (2023 – 2025).

10. **Localization of Transmission Components, The Head of the Project**
    Change Speed Pack components, gears and drive-train, clutches, torque convertor, hydrostatic unit, hydrodynamic unit, fan coupling, transmission housing

11. **Aero-Piston Engine and Transmission Development for UAVs**
    Principal Researcher and Consultant. Principal Researcher and Consultant. Development of Flat-4 aero-engine and transmission (power pack).

12. **Heavy Duty Diesel Engine – Benchmarking and Comparative Analysis for Integration Brackets for U Type of Engine-Transmission Layout**
    Principal Researcher and Consultant. Engine and transmission connection is one of the most critical issues for the U-type of layout, where tailored fastening components must be used together with specially designed brackets providing axial flexibility. Performance comparison of three heavy duty diesel engines has been done with modal analysis, component level stress simulations and power pack level durability analysis. Customer: BMC, 2022.

13. **Turboshaft Engine / Turbofan Blower Development: Rotor Dynamics, Critical Speed, Structural-Thermal and Fatigue Analysis, Impact Simulations**
    Consultant. Turbofan Blower stress analysis under assembly and operating pressure - thermal loads followed by high cycle fatigue and low cycle fatigue simulations. Rotor dynamic analysis, critical speed determination, bearing analysis and impact simulations have also been conducted within the content of the project. 2021.

14. **V12 – Heavy Duty Diesel Power Pack Development and Integration**
    Principal Researcher and Consultant. Power Pack Critical Frequency Characterization, Static Stress and Random Vibration Analyses followed with fatigue simulations for V12 Heavy Duty Diesel Power Pack development and integration studies. Development and integration studies include design improvement and optimization studies as well. Customer: BMC, 2022.

15. **Heavy Duty Diesel Engine Development – NVH, Durability and Shock Analyses**
    Consultant for R&D roadmap and procedure development. Customer: BMCP, 2020-2021.

16. **V8 – Heavy Duty Diesel Power Pack Development and Integration**
    Principal Researcher and Consultant. Power Pack Critical Frequency Characterization, Static Stress and Random Vibration Analyses followed with fatigue simulations for V8 Heavy Duty Diesel Power Pack development and integration studies. Development and integration studies include design improvement and optimization studies as well. Customer: BMCP, 2021.

17. **Manufacturing Methodology Development and Product Export for Doosan H+ Gas Turbine Hot Section Inter Disc Applications (Patented Tulip Head Two-Sided Cloth Seal Technology)**
    Project Manager and Principal Researcher. Manufacturing methodology has been developed and turbine parts have been exported to Doosan H+ gas turbines. The first and only H+ Gas Turbine products patented, manufactured and exported in Turkey. 2018-2019.

18. **Manufacturing Methodology Development and Product Export for Siemens-SGT 5/6-8000H Gas Turbine Combustor-Transition Pieces (Patented Omega Seal Technology)**
    Project Manager and Principal Researcher. Manufacturing methodology has been developed and turbine parts have been exported to Siemens for SGT 5/6-8000H gas turbines, which are the most efficient turbines in the field. The first and only TP products manufactured and exported for H-Class gas turbine, 2018-2019.

19. **KAMAG - TLM16V185 Heavy Duty Diesel Engine Modernization and Development of New Generation V12 Diesel Engine**
    Project executive. strategy development, scheduling, and project application. Project management, team management, organization, and coordination of different companies within consortium. Project Budget: 64MTL (including manufacturing), 2018-2019.

20. **Thin Section Roller Bearing Prototype Development for Military Applications**
    Project Manager, 2018-2019.

21. **Spring Supported Lip Seal Development for Military Applications**
    Project Manager, 2019.

22. **MILKANAT - Local Manufacturing of Gas Turbine Stator and Rotor Blades**
    Project Executive, Institution Manager and Principal Researcher. Supported by KAMAG – TUBITAK *(The Scientific Research Council of Turkey)*. Project No:113G001, Project Budget: 16 million TL *(~5.3M USD)*, 2014-2019.

23. **Siemens – H Class Gas Turbine Combustor Section Patented Seal Technology Development**
    Project Manager and Principal Researcher. Patented seal technology development, testing and turbine integration H-Class gas turbine transition pieces. Customer: Siemens Gas Turbine *(Germany).* 2017-2018.

24. **Siemens – H Class Gas Turbine Hot Section Material Couples Wear Characterization**
    Project Manager and Principal Researcher. Wear characterization of H-Class gas turbine material couples at combustor, transition piece and turbine sections. Customer: Siemens Gas Turbine *(Germany).* 2017-2018.

25. **Doosan Gas Turbine – Turbine Hot Section Patented Disc-to-Disc Seal Development Project**
    Project Manager and Principal Researcher. Patented technology development for turbine hot section-disc-to-disc interfaces. Customer: Doosan Gas Turbine *(South Korea).* 2017-2018.

26. **Manufacturing Methodology Development, Optimization and Validation for Turbomachinery Brush Seals Technologies**
    Project Manager and Principal Researcher. Manufacturing methodology has been developed for key brush seal technologies for turbomachinery applications. Manufacturing optimization and validation tests have been conducted to become Turkey's only and 5th global player in brush seal manufacturing. 2016-2018.

27. **Turbo Power Tech, Brush Seal Performance Characterization and Validation**
    Project Manager and Principal Researcher. Performance testing and validation of Turbo Power Tech brush seals prior to steam turbine application. Customer: Turbo Power Tech *(South Korea)*. 2016-2018.

28. **Heavy Duty Engine Dyno Test Cell Modernization**
    Strategy and Business Development. Heavy Duty Engine Dyno modernization (up to 3000HP). Customer: Tulomsas *(Turkey)*. 2017-2018.

29. **V6 Heavy Duty Diesel Air Intake System Design and Optimization**
    Project Manager and Principal Researcher. Air Intake System CFD based optimization, design and manufacturing drawings. Customer: Tulomsas *(Turkey)*. 2017.

30. **Single Cylinder Research Engine Development for Heavy Duty Diesel Applications *(900-1200HP)***
    Project Manager and Principal Researcher. The first and only single cylinder research engine developed in Turkey. Customer: Ford Otosan, 2014-2016.

31. **Optical Research Engine Development for Combustion Visualization**
    Project Manager and Principal Researcher. The first and only optical engine developed in Turkey, enables combustion visualization. Customer: Ford Otosan, 2014-2016.

32. **Ultra-High Pressure Advanced Seal Development for Steam Turbines**
    Project Manager and Principal Researcher. Tailored seal technology development and turbine integration for ultra-high-pressure levels up to 900psi. Customer: Doosan Heavy Industries *(South Korea)*. Project Budget: ~5M USD, 2014-2018.

33. **Bucket Tip Seal Development for Steam Turbine Efficiency Improvement**
    Project Manager and Principal Researcher. Bucket tip seal development and turbine integration for DHI steam turbines with power outputs up to 1100MW, having the pressure loads up to 400psi and for transonic blade tip surface speeds. Customer: Doosan Heavy Industries *(South Korea)*. Project Budget: ~ 5M USD, 2014-2016.

34. **Static and Dynamic Test System Development for Advanced Sealing Technologies in Aircraft Engines**
    Project Manager and Principal Researcher. Tailored test rig developments for simulating aircraft engine environment for seal testing. Project Budget: ~1M USD, 2014-2016.

35. **Test Rigs and Facility Development for Leakage/Stiffness Characterization of Roller Bearings, Labyrinth and Brush Seals of a Turboshaft and Turbojet Engines**
    Project Manager and Principal Researcher. Design – Analysis – Manufacturing – Installation – Instrumentation for high speed, high temperature and high pressure test rigs for turbines and aviation engines. 2012-2014.

36. **High Speed and High Temperature Friction-Wear Test System Development**
    Project Manager and Principal Researcher. Test rig development for testing in air and steam environment up to 600^{o}C and 100m/s, 2014-2015.

37. **PEX System Design Optimization for Oil & Gas Applications**
    Project Manager. Customer: Energy Recovery Inc., USA, 2014-2015.

38. **Portable Micro-Power Generator Development**
    Principal Researcher. Supported by KOSGEB. Project No: 2012-121, 2012-2014.

39. **Brush Seal Characterization and Methodology Development**
    Principal Researcher. Supported by TEYDEB – TUBITAK *(The Scientific Research Council of Turkey)*. Project No: 7130891, 2012-2014.

40. **Brush Seal Development for Steam Turbine Efficiency Improvement**
    Project Manager and Principal Researcher. Brush seal development *(design, analyses, testing)* and turbine integration. Customer: Doosan Heavy Industries *(South Korea)*. Project Budget: ~ 10 million TL *(~3.3M USD)*, 2012-2014.

41. **Gas Turbine Combustor Test System Development and Optimization**
    Project Manager and Principal Researcher. Customer: Fortune-500 company, 2013.

42. **Foil Seal Test Disc Design & Analysis**
    Project Manager and Principal Researcher. Customer: Fortune-500 company, 2013.

43. **Rotating Brush Seal Test Rig & Setup Design, Analysis & Development**
Project Manager and Principal Researcher. Customer: Fortune-500 company, 2013.

44. **Wind Turbine Hub Durability**
Project Manager and Principal Researcher, 2013.

45. **Design, Analysis & Development of New Generation Turbomachinery Engine Test Configuration *(800 psi @ 1000 degF & 22K RPM @ 15.2 in Dia.)***
Project Manager and Principal Researcher. Customer: Fortune-500 company. Project Budget: ~ 6 million TL *(~2M USD)*, 2012-2013.

46. **Sternum Cutting Tool Development for Cardiac Surgery**
Consultant, Supported by Tedyeb – Tubitak *(The Scientific Research Council of Turkey)*, Project No: 7130374, 2010-2012.

47. **Trunnion Plate Ball Valve Mechanism for Under Ocean Oil & Gas Applications**
Principal Researcher. Customer: Fortune-500 company, 2012.

48. **Design, Analysis & Development of C-Seals for Gas Turbine Dovetail Sealing**
Principal Researcher. Customer: Fortune-500 company, 2011.

49. **Near Flow Path Test System Design, Analysis and Development**
Principal Researcher. Customer: Fortune-500 company, 2011.

50. **High Speed & Temperature Rub Rig Test Setup Design, Analysis & Development**
Principal Researcher. Customer: Fortune-500 company, 2011.

51. **New Generation Aircraft Engine-High Speed Seal Test Rig Design, Analysis and Development**
Principal Researcher. Customer: Fortune-500 company, 2011.

52. **Wind Turbine Gear Box Test System, Design and Analyses**
Principal Researcher. Customer: Fortune-500 company, 2011.

53. **Oil & Gas Mud Rig Test Setup Design, Analysis & Development**
Principal Researcher. Customer: Fortune-500 company, 2011.

54. **Compliant Single Leaf Seal Test System Design, Analysis, Development & Testing**
Principal Researcher. Customer: Fortune-500 company, 2010.

55. **Test Facility and Test Rig Development for Turbomachinery Subsystems (Turn-key)**
Principal Researcher. Customer: Fortune-500 company, 2010. Design – Analysis – Manufacturing – Installation – Instrumentation. Key outputs / Test rigs developed – **Global Leading Facility at its Field**:
    - High Pressure Static Leakage Performance Test Rig – Air Environment, 400 psi, RT
    - High Temperature Static Leakage Performance Test Rig – Steam and Air Environment, 900 psi, 400^{o}C
    - Dynamic Leakage and Stiffness Test Rig – Air and Oil Environment, 400 psi, RT, 45000 rpm
    - High Temperature Dynamic Leakage Test Rig – 900 psi, 400^{o}C, 45000 rpm
    - Shoe stiffness test rig – RT
    - In-plane Leakage Characterization Test Rig for Combustor, Transition Piece, Nozzle Shroud, Shroud-Shroud and Disc-to-disc seals
    - Out-of-plane Leakage Characterization Test Rig for Combustor, Transition Piece, Nozzle Shroud, Shroud-Shroud and Disc-to-disc seals
    - Static Seals Pressurized (20 bar) Leakage Characterization Test Rig for Combustor, Transition Piece, Nozzle Shroud, Shroud-Shroud and Disc-to-disc seals
    - Rotating High Speed and High-Pressure Leakage Test System (Pressurized Discs) for Disc-to-Disc Seals
    - High Temperature Oxidation and Corrosion Test Rig
    - High Temperature Accelerated Wear Test Rig, 0-3 Hz, 700^{o}C
    - High Temperature Sliding Wear Test Rig, 0-8 Hz, 600^{o}C
    - High Temperature Pin-on-Disc Friction and Wear Test Rig, Steam and Air Environment, Up to 6 m/s, 600^{o}C
    - High Speed – High Temperature Temperature Pin-on-Disc Friction and Wear Test Rig, Steam and Air Environment, Up to 170 m/s, 400^{o}C
    - High Temperature Fretting Wear Test Rig, Steam and Air Environment, 50 Hz

56. **FEAD Bracket Topology Based NVH Optimization for WCAC System of a New Generation Gasoline Engine**
    Principal Engineer. Customer: Ford of Europe, 2010.

57. **Flywheel Induced Boom Noise Inspection and Optimization for a 1.6L GTDI Power Pack**
    Principal Engineer. Customer: Ford of Europe, 2010.

58. **Power Train NVH Characterization with Hyperstudy**
    Black Belt. Customer: Ford Otosan, 2009.

59. **Ford of Europe and Ford Otosan Full NVH CAE Responsibility for 20+ Power Trains, 2008-2010**
    Supervisor and Principal Engineer. NVH Modeling, Modal Analyses, Frequency Response Analyses, Project Management and Global PAT. Responsibility for 20+ Power Trains as listed below:
    - 1.0L Ecoboost 3-cylinder inline engine with two different transmission variants – manual and automated transmissions (Vehicle Platforms: Ford Focus, Ford B-Max, Ford C-Max, Ford Fiesta, Ford Ecosport, Ford Transit Courier)
    - 1.6L GTDI Ecoboost 4-cylinder inline engine with two different transmission variants – manual and automated transmissions (Vehicle platforms: Ford C-MAX, Ford Focus, Ford Mondeo, Ford S-Max, Ford Galaxy, Ford Escape, Ford Transit Connect, Ford Fiesta ST, Ford Fusion, Volvo S60, Volvo V60, Volvo V40, Volvo V70, Volvo S80)
    - 2.2L FWD – Diesel 4-cylinder inline engine and different transmission variants (Vehicle platforms: Ford Mondeo, Ford Transit, Ford Ranger (T6))
    - 2.2L RWD – Diesel 4-cylinder inline and different transmission variants (Vehicle platforms: Ford Mondeo, Ford Transit, Ford Ranger (T6))
    - 3.2L RWD – Diesel 5-cylinder inline and different transmission variants (Vehicle platforms: Ford Transit, Ford Ranger)
    - 1.6 4-cylinder inline engine with three different transmission variants – manual and automated transmissions (Vehicle platforms: Ford Fiesta, Ford Focus, Ford C-Max, Ford Figo)
    - 2.0L 4-cylinder inline engine in with three different transmission variants – manual and automated transmissions (Vehicle platforms: Mk IV Mondeo, Ford Focus, Ford C-Max, Ford S-Max, Ford Galaxy, Ford Kuga, Peugeot 307, Peugeot 308, Peugeot 3008, Peugeot 5008, Peugeot 407, Peugeot 607, Citroën C4, Citroën C4 Picasso, Citroën C5, Volvo C30, Volvo S40, Volvo V50, Volvo V70, Volvo S80)
    - 2.2L 4-cylinder inline engine with four different transmission variants – manual and automated transmissions (Vehicle platforms: Mk IV Mondeo, Ford S-Max, Ford Galaxy, Peugeot 407, Peugeot 4007, Peugeot 607, Citroën C5, Citroën C6, Citroën C-Crosser, Land Rover Freelander, Mitsubishi Outlander, Range Rover Evoque)
    - 1.4L DV4C, 1.4L DV4D, 1.6L DV6D, 1.6L DV6FC (Ford Fiesta, Fusion, Focus, C-Max, Figo).

60. **2.2L Diesel Engine Power Train Modal Analyses**
    R&D Engineer, Ford Otosan, 2008.

61. **2.2L Diesel Engine Power Train Frequency Response Analyses Under Engine Operating Conditions**
    R&D Engineer, Ford Otosan, 2008.

62. **4-Cylinder Inline Gasoline Engine Dynamic Simulations in AVL-Excite and Engine Mount Vibration Inspection**
    R&D Engineer, Customer: Ford of Europe, 2008.

63. **Inspection of 2-Piece vs. 3-Piece Prop-shaft Effect on High-Speed Boom Noise in a 2.2L RWD Diesel Power Train**
    R&D Engineer, Customer: Ford of Europe, 2008.

64. **2.0L Diesel Engine Power Train Modal Analyses**
    R&D Engineer, Ford Otosan, 2008.

65. **2.0L Diesel Engine Power Train Frequency Response Analyses Under Engine Operating Conditions**
    R&D Engineer, Ford Otosan, 2008.

66. **3.2L Diesel Engine Power Train Modal Analyses**
    R&D Engineer, Ford Otosan, 2008.

67. **3.2L Diesel Engine Power Train Frequency Response Analyses Under Engine Operating Conditions**
    R&D Engineer, Ford Otosan, 2008.

68. **1.6L DV6C Power Train Dynamic Simulations for Vibration Characterization and Comparison with Frequency Response Analyses in Nastran**
R&D Engineer, Customer: Ford of Europe, 2008.

69. **Ford Transit – I5 Diesel Engine Dynamic Simulations, Cylinder Block High Cycle Fatigue and Main Bearing Analysis for EU4 and EU5 Emission Regulations**
R&D Engineer, Customer: Ford of Europe, 2007.

70. **5-Cylinder Inline Diesel Engine for Transit Vehicles - Crankshaft Durability Analyses under Engine Operating Conditions and Inspection of Flywheel Configuration and Material Type on Fatigue Safety Factors**
R&D Engineer, Customer: Ford of Europe, 2007.

71. **Ford Transit I5 Diesel Engine - Crankshaft Bending Fatigue Test Rig Simulations and Correlation**
R&D Engineer, Customer: Ford of Europe, 2007.

72. **Flywheel – Clutch Engagement and Transient Thermo-Mechanical Analyses for Durability Inspection**
R&D Engineer, Customer: Ford of Europe, 2007.

73. **4-Cylinder Inline Engine Con-rod Analyses under Engine Operating Conditions and Optimization Using Genetic Algorithm**
R&D Engineer, Ford Otosan, 2007.

74. **Power Spectral Density Analyses for Durability Inspection of Jaguar Engine Component**
R&D Engineer, Customer: Jaguar, 2007.

75. **Puma I5 Oil Pan Topography Optimization for NVH and Engine Dynamic Simulations**
R&D Engineer, Ford Otosan, 2006-2007.

76. **Arm Bracket Design Topology Optimization for Ecotorq Engine (Heavy-Duty Truck)**
R&D Engineer, Ford Otosan, 2006.

THESIS PROJECTS

Stiffness and Friction Characterization of Brush Seals – PhD Thesis

Brush seals play important role in turbomachinery for improving total efficiency output. Due to their superior leakage characteristics and stability performance under harsh rotor transients, brush seals are widely used in aircraft engines, gas turbines and steam turbines. Since brush seals are contact type seals and rubs against turbine rotating components under transients, developing proper design for seal stiffness is crucial. Brush seal design with improper stiffness will result in seal failure, rotor instability, thermo-mechanical fatigue of turbine rotor/blades, excessive wear of turbine/brush seal, bristle tip melting and turbine stall. Literature survey reveals the lack of test data and analysis methods for evaluating seal stiffness and stress levels under turbine operating conditions. In an attempt to meet this need, custom test rig design and methodology has been developed to perform stiffness tests at turbine operating conditions. The test rig, which is capable of testing brush seals up to 400psi and 45,000rpm shaft speeds, has been designed, analyzed, manufactured, assembled and instrumented within the content of this thesis project. Analytical studies and finite element simulation methodologies have been developed for analyzing brush seals under turbine operating conditions. The complex contact behaviour of fine diameter bristles *(~100μm)* with high number of fibers on a small area *(~2000 bristles per rotor circumferencial inhes)* have been succesfully modeled and solved by using Hyperworks and Abaqus softwares. The rotor-bristle and bristle-backing plate contacts have also been defined for simulating real operating conditions. The advanced CAE methodologies developed in this study are new to seal literature and those methodologies have been correlated with the stiffness measurements of high speed dynamic test rig. Furthermore, stiffness and friction characterization of brush seals has been conducted through correlated FE models, and MATLAB based code has been developed for automatic brush seal FE model generation for ABAQUS simulations.

Analysis of Shear Heating and Effect of Temperature Dependent Viscosity on Hydrodynamic Lift of Oil Brush Seals – MSc Thesis

Oil brush seals are critical for turbine technology for improving efficiency by avoiding secondary leakage flows as well as avoiding oil and oil mist to mix with main leakage flow. The change of oil viscosity with shear heat dissipation is critical for determining seal performance under operating conditions of oil brush seals. In the literature, there is limited data for oil brush seal applications and shear heat dissipation has not been inspected through analyses and tests. In this study, analytical solutions to oil temperature rise due to shear heating has been developed. Continuity and Navier-Stokes equations have been coupled with thermal energy equations to obtain

the thermal profile for the oil brush seal. The hydrodynamic lift force relation has been expanded to include oil temperature and viscosity variability due to rotor speed and lift clearance. A dynamic leakage characterization test rig has been developed for leakage testing of brush seal under oil environment and operating surface speeds. Results of analyses have also been compared with the experimental data obtained from the dynamic oil seal test rig. In addition to temperature analysis, three different methodologies have been developed to derive pressure distribution for the brush seal. The pressure profile outputs of three different brush seals give consistent results with each other as well as with the field experience. Derivation of shear heat included lift clearance, which is the most important parameter for leakage performance of brush seals, has also been conducted and compared with experimental lift clearance data.

Finite Element Models for Spot Welds, Their Verification and Structural Analysis of LA-arm Mechanism – BSc Thesis

Spot welding is the most common welding methodology in automotive industry, and accurate finite element modeling of spot welds is critical for durability inspection of automotive components. In this study, assembly of sheet metals with U-Profiles have been modeled by using four different spot weld models: 9-point contact, Umbrella, Rigid Beam and Elastic Beam. Finite element models have been pre-processed in Hyperworks, and stress analyses have been conducted by using Nastran software. Test samples have also been manufactured, and results of finite element analyses have been compared with the strain-gauge measurements of test samples under pre-defined loads. The verification studies have been followed by modeling and stress analyses of a selected LA-arm mechanism of a commercial vehicle. The BSc project has been supported by Ford Otosan.

GRADUATION PROJECTS SUPERVISED

* Design of a Surveillance Drone with Computer Aided Durability and Modal Analysis, Spring.2023.
  1st place in Senior Day Exhibition, Top 3 in Senior Day Presentation
* Reciprocating Engine Desing: CAE Based Connecting Rod-Piston Assembly Development, Spring.2023.
* Computer Aided High Cycle Fatigue Characterization of Spot-Welded Joints, Fall.2022.
* Computer Aided Engineering in the Design of a Small UAV, Fall.2022.
* Finite Element Based Durability and NVH Characterization of a Vertical Take-off and Landing Unmanned Aerial Vehicle, Spring.2022.
  Top 5 place in Senior Day Exhibition and in Senior Day Presentation
* Multidisciplinary Design Optimization with Genetic Algorithm and Durability Analyses for Piston Engine Connecting Rod-Piston Assembly, Spring.2022.
* Comparative Study for Spot Weld Stress Analysis: Analytical Calculations vs. FEM Methods, Spring.2022.
* Spot Weld Modeling – Methodology Development for Stress and High Cycle Fatigue Analyses, Fall.2021.
* Piston-Conrod Assembly: CAE Based Optimization and Durability Analyses, Spring.2021.
* Multi-Objective Design Optimization and Structural Analyses for Internal Combustion Engine Connecting Rod, Fall.2020.
* Spot Weld CAE Modeling Methodologies, Tests and Application, Spring.2020.
* Finite Element Based Methodology Development for Piston Engine Conrod Optimization, Spring.2020.
* Methodology Development for Conrod Design with Minimum Mass, Fall.2016.

COMPUTER SKILLS

Hypermesh – *Expert*	Radioss – *Expert*	Optistruct – *Expert*	Abaqus - *Expert*
Nastran – *Expert*	AVL/Excite – *Expert*	Femfat – *Expert*	FeSafe – *Good*
Ansys – *Good*	Comsol – *Good*	Recurdyn – *Good*	Solidworks – *Good*
Matlab – *Good*	Office – *Expert*	MS Project – *Expert*	Teamcenter – *Good*
Hyperstudy – *Good*			

Experienced in multi body dynamics, nonlinear contact analysis, durability, fatigue, power spectral density analysis, thermal and Noise-Vibration-Harshness analysis, sequential and coupled simulations of different disciplines, CAE based optimization *(Size, Shape, Topology and Topography)*, advanced pre-processing and geometric clean up.

SOCIAL ACTIVITIES

Football, Basketball, Fitness.

LANGUAGE SKILLS

English Proficient

REFERENCES

Provided upon request.