Mustafa Usta

G. W. Woodruff School of Mechanical Engineering
College of Engineering, Georgia Institute of Technology
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Education and Training

2018-2021 Postdoctoral Associate, Mechanical Engineering, **Georgia Institute of Technology**, Atlanta, GA
Focus: Computational, experimental, and data-driven investigation of complex flows

2016-2018 Ph.D. in Mechanical Engineering, **Lehigh University**, Bethlehem, PA
Dissertation: *Desalination by Reverse Osmosis and Membrane Distillation*

2013-2016 Master of Science in Mechanical Engineering, **Lehigh University**, Bethlehem, PA
Thesis: *Analysis of Micromixers on Reverse Osmosis Based Desalination Membranes*

2008-2012 Bachelor of Science (Hons) in Mechanical Engineering, **Yildiz Technical University**, Istanbul, Turkey
Senior Design: *Design, optimization, and cost analysis of a heat exchanger*

Research Highlights and Interest

- Research Faculty at Georgia Tech, School of Mechanical Engineering
- Authored 8 (+5 under review) peer-reviewed journal papers (average impact factor 7.7), 7 peer-reviewed conference papers, 25 conference talks. Helped secure over $4,000,000 in competitive grants (as co-I, co-PI), over 26 million CPU-hour from NSF funded high performance computing centers. Co-founded an industry-funded consortium, and collaborated with many groups from Sandia National Labs, Emory University, Research Institute of Sweden (RISE), Georgia Tech, and Lehigh University on various research projects.
- Applies scientific machine learning, graph theory, computational and experimental methods to problems at the interface of fluid dynamics, biology, chemistry, and thermal sciences, focusing on high-fidelity modeling of large-scale, multiphase, multiphysics, and multiscale problems relevant to the environment, energy, health, and robotics.

Research Experience

2018-Present **Research Faculty (2018-2021 Postdoctoral Associate)**
Georgia Institute of Technology, G. W. Woodruff School of Mechanical Engineering

- *Identification of flow topology using graph theory and graph neural networks (collaborating with two faculties)*
  - Initiated a collaboration with two faculties from two different institutions with the aim of embedding the flow topology using graph theory and graph neural networks
  - Described topology of flow with graph theory in search for low order definitions of the multiscale turbulent flow.
  - Developing unsupervised/semi-supervised learning frameworks and paving the ways to transfer learning of complex flows.
- *Rheology of multiphase flows and multiphase forming of paper products (supervising 2 undergrads, 1 grad student, mentoring 2 grad students)*
  - Designed and constructed a facility and advanced diagnostics to study the rheology and drainage dynamics of high-quality wet foam.
  - Designing and constructing a multiphase forming paper machine to study the energy efficiency and formation quality in multiphase forming technology.
  - Developing solvers and rheological models using machine learning for advanced simulations of complex flows like fiber-laden high-density aqueous foam.
- *Complex blood flow and thrombosis (mentoring 1 grad student)*
  - Managed and contributed to the development of highly parallelized Lattice Boltzmann solvers to simulate blood flow at a very fine resolution.

- Designed and manufactured microfluidic channels to study the vWF conformation in extensional and shear flows.

- *Bladder fluid dynamics (collaborating with a postdoc)*
  - Developing a computational model that takes the segmented MRI images of bladder deformation during micturition as a boundary condition and predicts flow field and stress distribution on bladder walls.
- *Turbulent mixing of high Schmidt number mixing-limited reactions (mentoring 1 grad student)*
  - Developed highly-parallelized computational fluids dynamics solvers, using Large-Eddy simulations (LES) approach, for fast competitive-consecutive chemical reactions to predict mixing limited reaction kinetics in turbulent mixers.
  - Validated LES methods in predicting the mixing of fluids with disparate viscosity first time in the literature.

2013-2018 **Graduate Research Assistant**
Lehigh University, Department of Mechanical Engineering and Mechanics

- *Desalination by Reverse Osmosis and Membrane distillation*
  - Developed custom libraries of OpenFOAM that models temporal flow dynamics and highly coupled membrane flux conditions
  - Developed an MPI/OpenMP parallel Lattice Boltzmann CFD solver using C++ to investigate transient flow effects in spiral wound gas separation and reverse osmosis desalination membrane modules.
  - Developed novel membrane systems that promote mixing, enhance desalination rate, and mitigate fouling.
  - Optimized and utilized large-scale high-performance computing system for high-fidelity simulations
- *Machine Learning – vWF A2 domain unfolding probability*
  - Achieved descriptive analysis using machine learning to identify features affecting A2 domain unfolding probability.
  - Demonstrated the capabilities of machine learning algorithms to help understand the stochastic nature of vWF A2 domain unfolding.
- *Machine Learning – Data-Driven CFD*
  - Characterized and predicted model-based uncertainties by utilizing Python scikit-learn module for machine learning and OpenFOAM for RANS and LES simulations.

3/2008-8/2008 **Visiting Undergraduate Research Assistant**
Virginia Commonwealth University, Department of Mechanical Engineering

- *Micro-scale porous surface*
  - Involved in experimental and analysis activities such as powder compaction of stainless steel and copper powders, metallographic sample preparation and microscopic evaluation, and a variety of measurements of those samples. Used CNC machines to manufacture some auxiliary test equipment.
- *Warm hydroforming of sheet metals*
  - Conducted experiments of warm hydroforming of sheet metals for different die shapes and temperatures.
  - Carried out 3D non-contact optical measurements to investigate deformation profiles by using ARAMIS optical measurement equipment.

Teaching and Mentoring Experience

- *Teaching*

Spring 2019 and 2020 **Lecturer,** Coulter Department of Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA
BMED3310 – Biotransport (3 sections in total)
  - Modified the course syllabus
  - Designed and implemented an interactive problem-solving studio (PSS) to enhance the learning experience
  - Developed and graded assessments

Spring 2020 **Guest Lecturer,** Department of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA
ME7602 – Hydrodynamic Stability (a graduate course)
  - Gave several lectures on the implications of hydrodynamic instabilities.

ME3340 – Fluid Mechanics
  - Gave several lectures on internal and external flows

Spring 2018 **Teaching Assistant,** Department of Mechanical Engineering and Mechanics, Lehigh University, Bethlehem, PA
ME423 – Heat and Mass Transfer
ME322 – Gas Dynamics

Spring 2017 **Teaching Assistant,** Department of Mechanical Engineering and Mechanics, Lehigh University, Bethlehem, PA
ME242 – Mechanical Engineering Systems and Vibration

Fall and Spring 2013 **Lecturer,** Department of Mechanical Engineering, Turkish Military Academy, Ankara, Turkey
ME313 – Heat and Mass Transfer
ME205 – Fluid Mechanics
- Developed these courses which were previously taught as a single course
- Developed and graded assessments.

- *Mentoring and supervising*
  - At Lehigh: Mentored 4 Undergraduate, 2 Master's students.
  - At Georgia Tech: Mentored 6 Undergraduate, 2 Master's, 4 Ph.D. students.
  - At Georgia Tech: Supervising 1 Ph.D. student.
- *Learning to teach and mentor*

Spring 2017 *"Teacher Development Certification"*, 6 Courses, Lehigh University
Spring 2019 *"Fundamentals of Teaching and Learning"*, Workshop, Georgia Institute of Technology

Research Funding Grants

Pending Competitive Research Grants (Concept paper accepted and proposal under review)

* **$2,701,340**, 3-years, The U.S. Department of Energy, Advanced Research Projects Agency-Energy, "*Surfactant-free multiphase forming of fiber composite products for significant reduction in energy and CO2 emission"* (PI: Cyrus K. Aidun, Ph.D., **Co-PI: Mustafa Usta, Ph.D.**)

Competitively Awarded Research Grants (Concept paper accepted and proposal under review)*

2021 **$3,754,673**, 3-years, The U.S. Department of Energy, Energy Efficiency & Renewable Energy, "*Advanced multiphase (MP) forming for enhanced efficiency of drying paper, tissue, and other fiber composite products"* (PI: Cyrus K. Aidun, Ph.D., Co-PI: Devesh Ranjan, Ph.D., **Applicant/Co-I: Mustafa Usta, Ph.D.**)

2021 **5,348,975 SUs (CPU-hour)**, 1-year, Extreme Science and Engineering Discovery Environment (XSEDE), *"Computational Modeling of Complex-Fluid-Structure Interactions and Multiphase Flows"*. (PI: Cyrus K. Aidun, Ph.D., Co-PI: **Mustafa Usta, Ph.D.**)

2020 **5,509,564 SUs (CPU-hour)**, 1-year, Extreme Science and Engineering Discovery Environment (XSEDE), *"Computational Modeling of Complex-Fluid-Structure Interactions and Multiphase Flows"*. (PI: Cyrus K. Aidun, Ph.D., Co-PI: **Mustafa Usta, Ph.D.**)

Proposal Writing Experience (helped secure)

2019 **2,004,300 SUs (CPU-hour)**, 1-year, Extreme Science and Engineering Discovery Environment (XSEDE), *"Computational Modeling of Complex-Fluid-Structure Interactions and Turbulent Mixing with Reaction"*. (PI: Cyrus K. Aidun, Ph.D.)

2018 **8,000,000 SUs (CPU-hour)**, 1-year, Extreme Science and Engineering Discovery Environment (XSEDE), *"Computational Modeling of Complex Flow Scenarios"*. (PI: Edmund Webb III, Ph.D., Co-PI: Alparslan Oztekin, Ph.D.)

2017 **6,062,637 SUs (CPU-hour)**, 1-year, Extreme Science and Engineering Discovery Environment (XSEDE), *"Computational Modeling of Complex Flow Scenarios"*. (PI: Edmund Webb III, Ph.D., Co-PI: Alparslan Oztekin, Ph.D.)

2017 **$13,000**, 2-years, Deanship of Scientific Research, King Khalid University, *"Numerical and Experimental Study of a Novel Design of Feed Channel in Reverse Osmosis Desalination"*. (PI: Ali E. Anqi, Ph.D.)

2017 **$26,600**, 2-years, Deanship of Scientific Research, King Khalid University, *"Fluid Mechanics and Transport Phenomena"*. (PI: Ali E. Anqi, Ph.D., Co-PI: Alparslan Oztekin, Ph.D.)

Publications (___ : mentored) (* only manuscript-ready works listed below)

Refereed Journals

* M.R.C. Ahmad, **M. Usta**, G. Pathikonda, I. Khan, P. Gillis, S. Dhodapkar, P. Jain, D. Ranjan, and C.K. Aidun. "*Inline Spectroscopic Measurement and LES of Competitive Consecutive Reaction in a Confined Liquid Jet in co-flow*". (*under review* by Dow Chemical Company for submission to Chemical Engineering Journal)

* B. Zhang, **M. Usta**, M.R.C. Ahmad, I. Khan, P. Gillis, D. Ranjan, and C.K. Aidun. "*Chemically reacting turbulent mixing in coaxial miscible liquid jets*". (*under review* by Dow Chemical Company for submission to Chemical Engineering Journal)

* T.B. Le, **M. Usta**, C.K. Aidun, A. Yoganathan, and F. Sotiropoulos. "*Computational methods for fluid-structure interaction simulation of heart valves in patient-specific left heart"*. (*to be submitted on Nov 30th,* an invited paper on MDPI fluids special issue "Computational Biofluiddynamics: Advances and Applications).

* **M. Usta**, M.R.C. Ahmad, G. Pathikonda, I. Khan, P. Gillis, D. Ranjan, and C.K. Aidun. "*Large-eddy simulations of mixing with disparate viscosity in a coaxial jet: mixing and relaminarization characteristics*". (*submitted*, Journal of Fluid Mechanics)

* **M. Usta**, D.T. Karahan, C. Uzay Karahan, and C.K. Aidun. "*Complexities due to gravity and interfacial transport in high-density foam flow*". (*submitted,* an invited paper on Nature Partner Journal – Microgravity)

8. G. Pathikonda, **M. Usta**, M.R.C. Ahmad, I. Khan, P. Gillis, S. Dhodapkar, P. Jain, D. Ranjan, and C.K. Aidun. "*Mixing behavior in a confined jet with disparate viscosity and implications for complex reactions*". *Chemical Engineering Journal* (2021). doi.org/10.1016/j.cej.2020.126300
7. A. Anqi, **M. Usta**, R. Krysko, JG. Lee, N. Ghaffour, and A. Oztekin. "*Numerical Study of Desalination by Vacuum Membrane Distillation: Transient three-dimensional Analysis*". *Journal of Membrane Science* (2020).
6. **M. Usta** and M. Morabito (co-lead), X. Cheng, X.F. Zhang, A. Oztekin, and E.B. Webb. "*Prediction of Sub-Monomer A2 Domain Dynamics of the von Willebrand Factor by Machine Learning Algorithm and Coarse-Grained Molecular Dynamics Simulation*". *Nature Scientific Reports* (2019)
5. **M. Usta**, M. Morabito, A. Anqi, M. Alrehili, A. Hakim, and A. Oztekin. "*Twisted Hollow Fiber Membrane Modules for Reverse Osmosis-Driven Desalination"*. *Desalination* (2018). doi.org/10.1016/j.desal.2018.04.027
4. **M. Usta**, M. Morabito, M. Alrehili, A. Hakim, and A. Oztekin. "*Steady Three-Dimensional Flows Past Hollow Fiber Membrane Arrays – Cross Flow Arrangement*". *Canadian Journal of Physics* (2018). doi.org/10.1139/cjp-2017-0914
3. **M. Usta**, A. Anqi, and A. Oztekin. "*Reverse Osmosis Desalination Modules Containing Corrugated Membranes – Computational Study"*. *Desalination* (2017). doi: 10.1016/j.desal.2017.05.005
2. A. Anqi, M. Alrehili, **M. Usta**, and A. Oztekin. "*Numerical Characterization of Hollow Fiber Membranes for Desalination*". *Desalination* (2016). doi: 10.1016/j.desal.2016.07.019
1. M. Alrehili, **M. Usta**, N. Alkhamis, A. Anqi, and A. Oztekin. "*Flows Past Arrays of Hollow Fiber Membranes – Gas Separation*". *International Journal of Heat and Mass Transfer* (2016). doi: 10.1016/j.ijheatmasstransfer.2016.02.022

Refereed Conference Proceedings

7. G. Pathikonda, **M. Usta**, M.R.C. Ahmad, V. Lee, I. Khan, P. Gillis, C.K. Aidun, and D. Ranjan. "*The Effect of Viscosity on Turbulent Mixing in a Co-Flowing Jet Mixer*". *Proceedings of the 11th International Symposium on Turbulence and Shear Flow Phenomenon, Southampton* (2019)
6. **M. Usta**, and A. Tosyali. "*Characterization of Model-Based Uncertainties in Incompressible Turbulent Flows by Machine Learning". ASME International Mechanical Engineering Congress and Exposition* (2018).
5. **M. Usta**, R. Krysko, A. Anqi, A. Alshwairekh, and A. Oztekin. "*The Effect of PTFE Membrane Properties on Vacuum Membrane Distillation Module Performance". ASME International Mechanical Engineering Congress and Exposition* (2018).
4. A. Alshwairekh, A. Alghafis, **M. Usta**, A. Alwatban, R. Krysko, and A. Oztekin. "*The Effect of Porous Support Layer in Forward Osmosis Membranes – A Computational Fluid Dynamics Simulations". ASME International Mechanical Engineering Congress and Exposition* (2018).
3. **M. Usta**, A. Anqi, M. Morabito, A. Hakim, M. Alrehili, and A. Oztekin. "*Computational Study of Reverse Osmosis Desalination Process: Hollow Fiber Module*". *ASME International Mechanical Engineering Congress and Exposition* (2017). doi: 10.1115/IMECE2017-70884
2. A. Anqi, **M. Usta**, M. Alrehili, N. Alkhamis, and A. Oztekin. "*Reverse Osmosis Desalination Module – Three-Dimensional Transient Analyses*". *ASME International Mechanical Engineering Congress and Exposition* (2016). doi: 10.1115/IMECE2016-65890
1. M. Alrehili, **M. Usta**, N. Alkhamis, A. E. Anqi, and A. Oztekin. "*Gas Separation by Using Spiral Wound Membrane*". *ASME International Mechanical Engineering Congress and Exposition* (2015). doi:10.1115/IMECE2015-51852.

Invited* and Conference Talks (___ : mentored)

25. I. Khan, **M. Usta**, C.K Aidun, M.R.C. Ahmad, B. Zhang, G. Pathikonda, and D. Ranjan. "*The effect of mixing of miscible liquids with disparate viscosity in co-axial flow on chemical reactions*". 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ (2021).
24. **M. Usta**, M.R.C. Ahmad, G. Pathikonda, I. Khan, D. Ranjan, and C.K Aidun. "*The physics of mixing and relaminarization characteristics of a co-axial jet with disparate viscosity*". 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ (2021).
23. D.T. Karahan, **M. Usta**, and C. K. Aidun. "*Computational Modeling of Multiphase Forming Processes*", TAPPICon, October 3-6, 2021, Atlanta, GA
22. **M. Usta**, D.T. Karahan, and C. K. Aidun. "*Multiphase forming; advantages and challenges*", TAPPICon, October 3-6, 2021, Atlanta, GA
21. D.E. Oztekin, Z. Liu, Y. Zhu, **M. Usta**, C.K. Aidun. *"Behavior of von Willebrand Factor in the near-wall region of a channel flow"*. 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (2020).
20. J. Sebastian, **M. Usta**, C.K. Aidun. *"Rheology of flexible fiber suspensions with foam flows"*. 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (2020).
19. D.T. Karahan, **M. Usta**, D. Ranjan, C.K. Aidun. *"Transitional flow of Herschel-Bulkley fluids in pipes"*. 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (2020).
18. M.R.C. Ahmad, G. Pathikonda, **M. Usta**, I. Khan, D. Ranjan, and C.K. Aidun. *"Non-reacting and reacting experimental investigation of disparate viscosity turbulent mixing in a coaxial jet mixer to investigate mixing-limited consecutive competitive reaction systems"*. 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (2020).
17. G. Pathikonda, **M. Usta**, M.R.C. Ahmad, I. Khan, D. Ranjan, and C.K. Aidun. *"Experimental investigation of disparate viscosity turbulent mixing structures in a coaxial jet mixer"*. 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (2020).

16. **M. Usta**, G. Pathikonda, M.R.C. Ahmad, I. Khan, D. Ranjan, and C.K Aidun. "The physics of mixing and reaction of co-axial and cross-flow jets with disparate viscosity. 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (2020).
15. **M. Usta**, G. Pathikonda, M.R.C. Ahmad, I. Khan, D. Ranjan, and C.K. Aidun. *"Competitive-consecutive reaction of liquids with disparate viscosity"*. 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA (2019).
14. M.R.C. Ahmad, G. Pathikonda, **M. Usta**, I. Khan, D. Ranjan, and C.K. Aidun. *"Experimental investigation of disparate viscosity turbulent mixing in a coaxial jet mixer"*. 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA (2019).
13. G. Pathikonda, M.R.C. Ahmad, **M. Usta**, I. Khan, D. Ranjan, and C.K. Aidun. *"In-line spectroscopic diagnostics to investigate mixing-limited consecutive-competitive reaction systems"*. 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA (2019).
12. G. Pathikonda, **M. Usta**, M.R.C. Ahmad, V. Lee, I. Khan, P. Gillis, D. Ranjan, and C.K. Aidun. The Effect of Viscosity on Turbulent Mixing in a Co-Flowing Jet Mixer. Proceedings of the 11th International Symposium on Turbulence and Shear Flow Phenomenon, Southampton, UK (2019).
11. V. Lee, **M. Usta**, G. Pathikonda, M.R.C. Ahmad, I. Khan, D. Ranjan, and C.K. Aidun. *"Simulation of turbulent mixing of confined co-axial jets with disparate viscosity"*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA (2018).
10. M.R.C. Ahmad, G. Pathikonda, **M. Usta**, I. Khan, D. Ranjan, and C.K. Aidun. *"Turbulent mixing of co-annular flows with disparate viscosities".* 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA (2018).
9. M.R.C. Ahmad, G. Pathikonda, **M. Usta**, I. Khan, D. Ranjan, and C.K. Aidun. *"Experimental investigations of turbulent mixing between liquids of disparate viscosity in a co-axial jet mixer".* 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA (2018).
8. **M. Usta,** V. Lee, D.E. Oztekin, G. Pathikonda, I. Khan, M.R.C. Ahmad, D. Ranjan, and C.K. Aidun. *"Mixing of confined reacting co-axial jets with disparate viscosity"*. 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA (2018).
7. **M. Usta**, and A. Tosyali. *"Characterization of Model-Based Uncertainties in Incompressible Turbulent Flows by Machine Learning"*. ASME International Mechanical Engineering Congress and Exposition, Pittsburgh, PA (2018).
6. **M. Usta**, R. Krysko, A. Anqi, A. Alshwairekh, and A. Oztekin. *"The Effect of PTFE Membrane Properties on Vacuum Membrane Distillation Module Performance"*. ASME International Mechanical Engineering Congress and Exposition, Pittsburgh, PA (2018).
5. A. Alshwairekh, A. Alghafis, **M. Usta**, A. Alwatban, R. Krysko, and A. Oztekin. *"The Effect of Porous Support Layer in Forward Osmosis Membranes – A Computational Fluid Dynamics Simulations"*. ASME International Mechanical Engineering Congress and Exposition, Pittsburgh, PA (2018).
*4. **M. Usta**, *"Prediction of Sub-Monomer A2 Domain Dynamics of the von Willebrand Factor by Machine Learning Algorithm and Coarse-Grained Molecular Dynamics Simulation"*. Georgia Institute of Technology, (Jul 2018).
3. **M. Usta**, A. Anqi, M. Morabito, A. Hakim, M. Alrehili, and A. Oztekin. *"Computational Study of Reverse Osmosis Desalination Process: Hollow Fiber Module"*, ASME International Mechanical Engineering Congress and Exposition, Tampa, FL (2017).
2. **M. Usta**, A. Anqi, M. Alrehili, N. Alkhamis, and A. Oztekin. *"Reverse Osmosis Desalination Module – Three-Dimensional Transient Analysis"*, ASME International Mechanical Engineering Congress and Exposition, Phoenix, AZ (2016).
1. **M. Usta**, M. Alrehili, N. Alkhamis, A. E. Anqi, and A. Oztekin. *"Gas separation by using spiral wound membrane"*, ASME International Mechanical Engineering Congress and Exposition, Houston, TX (2015).

Honors and Awards

2020 **Award in support of a NeurIPS 2020 workshop**, *Simon Foundation*
Ph.D. degree scholarship including tuition and a monthly stipend

2020 **Professional Development Award**, W.H.C. Department of Biomedical Engineering, *Georgia Tech*

2019 **Professional Development Award**, W.H.C. Department of Biomedical Engineering, *Georgia Tech*

2017 **Conference Travel Award**, for excellence in Graduate Research, *Lehigh University*

2013 **Full Scholarship Award**, *Ministry of National Defense (Turkey)*
Ph.D. degree scholarship including tuition and a monthly stipend

2012 **Graduate Scholarship Award**, Ministry of Education (Turkey)

2012 **Scholarship Award** for honor students pursuing an MS degree by *The Scientific and Technological Research Council of Turkey (TUBITAK)*

2012 **BS Honor Degree Graduation**, Yildiz Technical University, Istanbul, Turkey

Professional Experience

2021-Present **Research Faculty**, G. W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA

2018-2021 **Postdoctoral Associate**, G. W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA

2013-2018 **Graduate Research Assistant**, Department of Mechanical Engineering and Mechanics, Lehigh University, Bethlehem, PA

2012-2013 **Lecturer,** Department of Mechanical Engineering, Turkish Military Academy, Ankara, Turkey

1/2012-7/2012 **Project Engineer - Consultant,** Research and Development Department, Motus Crankshaft Inc. Konya, Turkey
In charge of the entire 6 months-long projects to modernize the crankshaft manufacturing process.
- Led a team of technicians to determine required improvements
- Visited leading machinery suppliers located in Germany and Sweden to acquire necessary equipment such as grinding and milling machines.
- Managed a team to implement new machinery into the production line.

5/2011-8/2011 **Intern Engineer**, Research and Development Department, Bus Plant, Mercedes-Benz Turk Inc, Esenyurt, Istanbul, Turkey
- Participated in part-design meetings and performed draft drawings using CATIA CAD software. Gained experience in the organizational flow chart of research and development process.

5/2008-8/2008 **Visiting Undergraduate Research Assistant**, Department of Mechanical Engineering, Virginia Commonwealth University, Richmond, VA

Institutional and Professional Service

- Journal Reviewer
  - International Journal of Heat and Mass Transfer
  - International Journal of Heat and Fluid Flow
  - Desalination
  - Journal of Membrane Science
  - Canadian Journal of Physics
  - Journal of rheology
- Co-founder and member, Next Generation Paper Machine Multiphase Forming Consortium, 2020 – present
- Participated in DOE Industrial Assessment Center at Lehigh, 2017-2018

- Abstract sorting and in-charge of student volunteering, APS DFD 2018, Atlanta
- Member, American Physical Society, 2017 – present
- Elected member of Student Council, Yildiz Technical University, 2010-11
- Proposed a workshop for NeurIPS 2020 titled "*Machine Learning for Computational Fluid Dynamics*".

List of Professional References

- Alparslan Oztekin, Ph.D.
  - Professor of Mechanical Engineering,
  - Lehigh University, Bethlehem PA
  - alo2@lehigh.edu
- Cyrus K. Aidun, Ph.D.
  - Professor of Mechanical Engineering,
  - Georgia Institute of Technology, Atlanta GA
  - cyrus.aidun@me.gatech.edu
- Devesh Ranjan, Ph.D.
  - Professor of Mechanical Engineering,
  - Incoming Chair for the School of Mechanical Engineering
  - Georgia Institute of Technology, Atlanta GA
  - devesh.ranjan@me.gatech.edu