

Ebru Demir

Curriculum Vitae

Lehigh University
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Employment

- 10.2021–present **Assistant Professor**, LEHIGH UNIVERSITY
Mechanical Engineering & Mechanics
Bethlehem, PA, USA.
- 05.2021–10.2021 **Inclusive Excellence Postdoctoral Fellow**, SANTA CLARA UNIVERSITY
Mechanical Engineering
Santa Clara, CA, USA.
- 06.2019–05.2021 **Postdoctoral Research Associate**, SANTA CLARA UNIVERSITY
Mechanical Engineering
Santa Clara, CA, USA.
- 04.2019–05.2021 **Postdoctoral Research Fellow**, COMPUTATIONAL SCIENCE RESEARCH CENTER
Mechanics Division
Beijing, China.
- 09.2018–01.2019 **Postdoctoral Research Fellow**, SABANCI UNIVERSITY
Mechatronics Engineering
Istanbul, Turkey.

Education

- 2011–2018 **PhD, Mechatronics Engineering**, SABANCI UNIVERSITY
Istanbul Turkey.
Dissertation: Low Reynolds Number Swimming of Helical Structures and Rigid Spheres
- 2007–2011 **BSc, Mechatronics Engineering**, SABANCI UNIVERSITY
Istanbul Turkey.
Graduation Thesis: Heat Transfer From Enhanced Surfaces
- Minor, Physics**, SABANCI UNIVERSITY
Istanbul Turkey.

Invited Talks

- October 2021 **University of Birmingham**, *Applied Mathematics Seminar Series*, Birmingham UK.
- October 2021 **New Jersey Institute of Technology**, *Mathematical Biology Seminar Series*, New Jersey USA.
- May 2021 **BioActive Fluids Group**, *ECR Seminar Series*, International & Virtual Biweekly Event.

Publications

Journal Articles

- J12 **Wall-induced Translation of a Rotating Particle in a Shear-Thinning Fluid**, *Journal of Fluid Mechanics*, 927, 2021.
Chen*, Y., **Demir***, E., Gao W., Young Y.N., Pak O.S.
<https://doi.org/10.1017/jfm.2021.775>
***Co-first authors listed alphabetically**
- J11 **A 3D-Printed Self-Learning Three-Linked-Sphere Robot for Autonomous Confined-Space Navigation**, *Advanced Intelligent Systems*, 2100039, 2021.
Elder, B., Zou, Z., Ghosh, S., Silverberg, O., Greenwood, T., **Demir, E.**, Su, V.S.-E., Miranda, A., Pak, O.S., Kong, Y.L.
<https://doi.org/10.1002/aisy.202100039>
- J10 **Non-Local Shear-Thinning Effects Substantially Enhance Helical Propulsion**, *Physical Review Fluids*, 5, 111301(R), 2020.
Demir, E., Lordi, N., Ding, Y. and Pak, O.S.
<https://doi.org/10.1103/PhysRevFluids.5.111301>
- J9 **Skin Mountable Capillary Strain Sensor with Ultra-High Sensitivity and Direction Specificity**, *Advanced Materials Technologies*, 2020.
Yepes, L.R., **Demir, E.**, Lee, J.Y., Sun, R., Smuck, M.W. and Araci, I.E.
<https://doi.org/10.1002/admt.202000631>
- J8 **Realization of a Push-Me-Pull-You Swimmer at Low Reynolds Numbers**, *Bioinspiration & Biomimetics*, 15(6), 2020.
Silverberg, O., **Demir, E.**, Mishler, G., Hosoume, B., Trivedi, N.R., Tisch, C., Plascencia, D., Pak, O.S. and Araci, I.E.
<https://doi.org/10.1088/1748-3190/aba2b9>
- J7 **Roads to Smart Artificial Microswimmers**, *Advanced Intelligent Systems*, 2(8), p.1900137, 2020.
Tsang, A.C., **Demir, E.**, Ding, Y. and Pak, O.S.
<https://doi.org/10.1002/aisy.201900137>
- J6 **Low Reynolds Number Swimming of Helical Structures in Circular Channels**, *Journal of Fluids and Structures*, 74, pp. 234-246, 2017.
Demir, E., Yesilyurt, S.
<https://doi.org/10.1016/j.jfluidstructs.2017.07.005>
- J5 **Assessment of Probe-to-Specimen Distance Effect in Kidney Stone Treatment with Hydrodynamic Cavitation**, *ASME Journal of Medical Devices*, 2015.
Uzusen, D., **Demir, E.**, Perk, O.Y., Oral, O., Ekici, S., Unel, M., Gozuacik, D., Kosar, A.
<https://doi.org/10.1115/1.4030274>
- J4 **The Effect of Nanostructure Distribution on Subcooled Boiling Heat Transfer Enhancement on Nanostructured Plates Integrated into a Rectangular Channel**, *Nanoscale and Microscale Thermophysical Engineering*, 18, pp. 313-328, 2014 (**Cover Article**).
Demir, E., Izci, T., Khudhayer, W., Alagoz, A.S., Karabacak, T., and Kosar, A.
<https://doi.org/10.1080/15567265.2014.921748>

- J3 **Effect of Silicon Nanorod Length on Horizontal Nanostructured Plates in Pool Boiling Heat Transfer with Water**, *International Journal of Thermal Sciences*, 82, pp.111-121, 2014.
Demir, E., Izci, T., Alagoz, A.S., Karabacak, T., and Kosar, A.
<https://doi.org/10.1016/j.ijthermalsci.2014.03.015>
- J2 **Hydrodynamic Cavitation Kills Prostate Cells and Ablates Benign Prostatic Hyperplasia Tissue**, *Experimental Biology and Medicine*, 2013.
Itah, Z., Oral, O., Perk, O. Y., Şeşen, M., Demir, E., Erbil, S., Dogan-Ekici A.I., Ekici S., Kosar, A., Gozuacik, D.
<https://doi.org/10.1177/1535370213503273>
- J1 **Jet Impingement Cooling of Nanostructured Plates**, *International Journal of Heat and Mass Transfer*, 59, pp. 414-422, 2013.
Sesen, M., Demir, E., İzci, T., Khudhayer, W., Karabacak, T., Kosar A.
<https://doi.org/10.1016/j.ijheatmasstransfer.2012.12.039>
- Conference Proceedings
- C9 **The Effect of Particle Geometry on Swimming in a Shear-Thinning Fluid**, *Bulletin of the American Physical Society* 2021.
Van Gogh. B., Demir, E., Palaniappan, D., and Pak, O.S.
<https://meetings.aps.org/Meeting/DFD21/Session/T13.11>
- C8 **Modeling Helical Swimming in Shear-Thinning Fluids**, *Bulletin of the American Physical Society*, 64 2019.
Lordi, N., Demir, E., Ding, Y. and Pak, O.S.
<https://ui.adsabs.harvard.edu/#abs/2019APS..DFDA30005L/abstract>
- C7 **Rolling and Sliding of Spheres Inside Horizontal Channels**, *International Conference on Manipulation, Automation and Robotics at Small Scales*, Nagoya Japan, July 2018.
Demir, E., and Yesilyurt, S.
<https://doi.org/10.1109/MARSS.2018.8481219>
- C6 **Propulsion by Helical Strips in Circular Channels**, *Bulletin of the American Physical Society*, 61 2016.
Demir, E., and Yesilyurt, S.
<https://ui.adsabs.harvard.edu/#abs/2016APS..DFDR21009Y/abstract>
- C5 **Geometric Optimization of Helical Tail Designs to Calibrate Swimming Velocities of Microswimmers**, *Bulletin of the American Physical Society*, 59 2014.
Demir, E., and Yesilyurt, S.
<http://meetings.aps.org/Meeting/DFD14/Event/228007>
- C4 **Subcooled Flow Boiling Over Nanostructured Plate Integrated into a Rectangular Channel**, *Proceedings of the ASME 2013 11th International Conference on Nanochannels, Microchannels, and Minichannels*, Sapporo Japan, June 2013.
Demir, E., Izci, T., Sesen, M., Khudhayer, W., Karabacak, T., and Kosar, A.
<https://doi.org/10.1115/ICNMM2013-73154>

- C3 **Multiphase Submerged Jet Impingement Cooling Utilizing Nanostructured Plates**, *Proceedings of the ASME 2012 10th International Conference on Nanochannels, Microchannels, and Minichannels* Puerto Rico, July 2012.
Demir, E., Izci, T., Perk, O.Y., Sesen, M., Khudhayer, W., Karabacak, T., and Kosar, A.
<https://doi.org/10.1115/ICNMM2012-73062>
- C2 **A Compact Pool Boiler Utilizing Nanostructures for Microscale Cooling Applications**, *Proceedings of 8th ECI International Conference on Boiling and Condensation*, Lausanne Switzerland, June 2012.
Izci, T., Demir, E., Izci, T., Alagoz, A.S., Karabacak, T. and Kosar, A.
<http://research.sabanciuniv.edu/23602/>
- C1 **Jet Impingement Cooling of Nanostructured Plates**, *ASME International Mechanical Engineering Congress & Exposition*, Vancouver Canada, November 2010.
Sesen, M., Kosar, A., Demir, E., Kurtoglu, E., Kaplan, N., Erk, H.C., Khudhayer, W. and Karabacak, T.
<https://doi.org/10.1115/IMECE2010-39055>
- Presentations and Posters
- P4 **Rolling, Sliding and Focusing of Magnetically Rotated Rigid Spheres Inside Cylindrical Channels (Oral Presentation)**, *Bio-inspired Magnetic Systems Workshop*, Exeter United Kingdom, July 2018.
Demir, E., and Yesilyurt, S.
- P3 **Controlling the Radial Position of Artificial Helical Swimmer inside a Cylindrical Channel (Oral Presentation)**, *Bio-inspired Magnetic Systems Workshop*, Exeter United Kingdom, July 2018.
Caldag, H.O., Demir, E., and Yesilyurt, S.
- P2 **Subcooled Flow Boiling Over Nanostructured Plate Integrated into a Rectangular Channel (Oral Presentation)**, *NanoTR 9th Nanoscience and Nanotechnology Conference*, Erzurum Turkey, June 2013.
Demir, E., Teksen, Y., Alagoz, A.S., Karabacak, T. and Kosar, A.
- P1 **Jet Impingement Cooling of Nanostructured Plates (Poster)**, *ASME Society-Wide Micro and Nanotechnology Forum*, Vancouver Canada, November 2010.
Sesen, M., Kosar, A., Demir, E., Kurtoglu, E., Kaplan, N., Erk, H.C., Khudhayer, W. and Karabacak, T.

Experience

Academic

06.2014–09.2018 **Assistant to Dean's Office**, SABANCI UNIVERSITY
Istanbul, Turkey.

Responsibilities: Tasks related to the international accreditation process of the Mechatronics Engineering Program, mentoring Mechatronics Engineering students, assisting the professors in determining the course capacities and lecture hours, writing or translating protocols for new agreements between Sabanci University and other institutions, such as double diploma programs.

02.2011–06.2018 **Teaching Assistant**, SABANCI UNIVERSITY
Istanbul, Turkey.
Courses: Calculus I/II (2014 Fall through 2018 Spring), Computational Analysis and Simulation (2013 Spring, 2014 Spring), Foundations of Microsystems (2012 Fall, 2013 Fall), Manufacturing Processes (2011 Fall, 2012 Spring), Heat and Mass Transfer (2011 Spring).

Industrial

08.2010–12.2010 **R&D Engineer**, MERCEDES-BENZ TURK
Istanbul Turkey.
Heating, Ventilation and Air Conditioning Department

06.2010–07.2010 **Engineering Intern**, TURKISH AEROSPACE INDUSTRIES
Kazan Ankara.
Manufacturing and mounting processes in airplane production

Diversity, Equity and Inclusion

- Member Society of Women Engineers (SWE) Mentor Network
- Member SCU Inclusive Excellence Postdocs Cohort
- Member Women in Fluids Network of American Physical Society (APS)
- Completed SCU Safe Space Training
- Completed Turkish Sign Language Interpreter Training

Awards & Honors

- 2018 **Gursel Sonmez Research Award**, SABANCI UNIVERSITY
Istanbul Turkey.
Awarded to best graduate researcher(s) of the graduating class.
- 2018 **3MT® Three Minute Thesis–Winner**, SABANCI UNIVERSITY
Istanbul Turkey.
- 2018 **Best Student Paper Award–Nominee**, INTERNATIONAL CONFERENCE ON MANIPULATION, AUTOMATION AND ROBOTICS AT SMALL SCALES
Nagoya Japan.
- 2013 **TUBITAK BIDEB 2224 International Scientific Meetings Fellowship Program**, 2013/6.
- 2011 **TUBITAK BIDEB PhD Scholarship**.
- 2009 **Sabancı University Incentive Scholarship**, SABANCI UNIVERSITY
Istanbul Turkey.
- 2007 **Sabancı University High Merit Scholarship**, SABANCI UNIVERSITY
Istanbul Turkey.

Skills

- Cleanroom UV Lithography, Soft Lithography, CVD/PECVD, RIE/DRIE, Etching
- Prototyping 3D Printing, Laser Cutter, Wafer Dicer
- Software COMSOL, MATLAB, SolidWorks, CATIA, NI LabView, Cura, Preform, LaserWork
- Programming & Typesetting C++, Python, L^AT_EX, Mendeley

Memberships in Professional Societies

American Physical Society (APS), American Society of Mechanical Engineers (ASME),
Society of Women Engineers (SWE)