

Hakan Osman Çaldağ

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Sinan Ercan St. 19 Mayıs Konaklari 15/3 No: 10 Kadıköy/İstanbul/TURKEY

EDUCATION

- 2016-2020 Sabanci University (Full Scholarship), İstanbul, Turkey**
Mechatronics Engineering, PhD - Faculty of Engineering and Natural Sciences
Awarded with The Scientific and Technology Research Council (TUBITAK) BİDEB scholarship for past academic records
GPA: 4.00/4.00
- 2014-2016 Sabanci University (Full Scholarship), İstanbul, Turkey**
Mechatronics Engineering, M. Sc. - Faculty of Engineering and Natural Sciences
Awarded with full tuition waiver for past academic records.
GPA: 3.91/4.00
- 2010-2014 Sabanci University (Honor Scholarship), İstanbul, Turkey**
Mechatronics Engineering, B. Sc. - Faculty of Engineering and Natural Sciences
Awarded with Honor Scholarship for 4 years of undergraduate education
GPA: 3.76/4.00

RESEARCH

Journal Publications

- Caldag, H. O. & Yesilyurt, S. (*in preparation*). Rolling and Sliding of Spheres Inside Cylindrical Channels.
- Caldag, H. O. & Yesilyurt, S. (2020). Acoustic Radiation Forces on Magnetically Actuated Helical Swimmers. *Physics of Fluids*, 32, 092012 <https://doi.org/10.1063/5.0020930>.
- Caldag, H. O., & Yesilyurt, S. (2019). Trajectories of magnetically-actuated helical swimmers in cylindrical channels at low Reynolds numbers. *Journal of Fluids and Structures*, 90, pp. 164-176. <https://doi.org/10.1016/j.jfluidstructs.2019.06.005>
- Caldag, H. O., Acemoglu, A., & Yesilyurt, S. (2017). Experimental characterization of helical swimming trajectories in circular channels. *Microfluidics and Nanofluidics*, 21(8). <http://doi.org/10.1007/s10404-017-1973-9>

Conference Proceedings

- Caldag, H. O. & Yesilyurt, S. (2020). A Simple Numerical Tool for the Evaluation of Acoustic Radiation Force on Helices. *In: International Ultrasonics Symposium (IUS 2020), Las Vegas, Nevada* <https://doi.org/10.1109/IUS46767.2020.9251472>
- Caldag, H. O. & Yesilyurt, S. (2020). Steering control of magnetic helical swimmers in swirling flows due to confinement. *In: International Conference on Robotics and Automation (ICRA 2020), Paris, France.* <https://doi.org/10.1109/ICRA40945.2020.9196521>
- Caldag, H. O. & Yesilyurt, S. (2018). Stability of helical microswimmers under confinement. *In: 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, Georgia.*
- Caldag, H. & Yesilyurt, S. (2018) Dynamics of Artificial Helical Microswimmers Under Confinement. ASME. *International Conference on Nanochannels, Microchannels, and Minichannels, ASME 2018 16th International Conference on Nanochannels, Microchannels, and Minichannels ():V001T13A001.* <http://doi.org/10.1115/ICNMM2018-7632>.
- Caldag, H. O., & Yesilyurt, S. (2016). Trajectories of artificial microswimmers with helical tails inside circular channels. *In: 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, Oregon*
- Caldag, H. O., & Yesilyurt, S. (2015) Position and trajectories of helical microswimmers inside circular channels. *In: 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, Massachusetts*

PROJECTS

- Sept 2020 – present** **Rolling and Sliding of Rotating Spheres in Confinement:** Experimental and numerical investigation of rolling and sliding behaviors of magnetically rotated spheres in cylindrical channels
- Nov 2018 – present** **Acoustic Manipulation of Artificial Swimmers:** Experimental and computational studies on acoustic manipulation of non-helical and helical magnetic swimmers for improved swimming.
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- June 2017 – Nov 2018** **The Trajectories of Magnetized Helical Swimmers Under Confinement:** Development of a novel simulation model that employs computational fluid dynamics solutions to kinematically integrate the complete 3D trajectories of confined artificial swimmers. Characterization of the stability of helical swimmers under confinement.
- Feb 2017 – Sept 2019** **Helical Swimmer Control via Magnetic Steering:** Development of a control algorithm with magnetic steering based on swimmer position relative to the reference path. Demonstration of the capabilities of the control algorithm through experimental and numerical studies.
- Sept 2014 – June 2017** **Experiments on Magnetically Actuated Helical Swimmers under Confinement:** Development of image processing tools to extract position and orientation of recorded images of micro swimmers with helical tails swimming in circular channels. Characterization of swimmer trajectories over a wide range of geometric and physical parameters.
- Nov 2012 – Feb 2014** **Nano-scale Antenna Design for Solar Panels:** Computer simulations of nano-scale antennas for increasing the efficiency of solar panels using the principles of plasmonics.
- June – Aug 2013** **École Polytechnique de Montréal (Internship):** Required summer internship. Research on systems engineering. Preparation of a tutorial on system diagram software for future studies.

SKILLS

Software

Advanced MATLAB, MS Office, COMSOL Multiphysics

Intermediate Solidworks, Rhinoceros 3D, Ansoft HFSS, National Instruments LabVIEW, LaTeX, Microsoft Visual C++, Simulink

Languages Turkish (Native), English (Advanced)

SELECTED COURSE PROJECTS

- Fall 2017** **IE 566 Computer-Aided Biomodeling and Fabrication – Hip Implant Design:** Design of a hip implant from computer tomography (CT) image of a patient. Rebuilding a 3D model from CT images and implementation of the implant onto the model.
- Spring 2016** **ENS 514 – Experimental Methods in Nanoscience II – Manufacturing Thin Film Structures and Measuring Optical Properties:** Microfabrication of thin films made of various dielectrics by plasma enhanced chemical vapor deposition (PECVD), measurement of the thickness of thin films with ellipsometry device and validation of the thicknesses with surface profilometry.

REFEREES

- Prof. Serhat Yesilyurt** Professor (PhD and MSc thesis advisor), Mechatronics Engineering, Sabanci University, Turkey. syesilyurt@sabanciuniv.edu, +902164839579
- Assoc. Prof. Ayhan Bozkurt** Associate Professor, Electronics Engineering, Sabanci University, Turkey. abozkurt@sabanciuniv.edu, +902164839537