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Engineering & Scientific Consulting

Mark Menesses, Ph.D.

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Professional Profile

Dr. Menesses's background is in mechanical engineer focusing on fluid mechanics, heat transfer, and experiment design. He applies his expertise to complex engineering challenges across scales, from microscale liquid handling platforms to industrial process optimization. His technical background is complemented by his skilled design of experiments where he exercises his expertise particle image velocimetry (PIV), IR thermography, schlieren imaging, high speed photography and image processing.

Dr. Menesses received his PhD in Mechanical Engineering from Boston University where he focused on interfacial fluid mechanics. In collaboration with the Naval Undersea Warfare Center, Dr. Menesses designed and executed complementary field and laboratory experiments to study bubbly flows and their role in marine biofouling mitigation. Additionally, he investigated evaporation and thermocapillary flows in liquid films regarding their resistance to spontaneous rupture. Following his graduate studies, Dr. Menesses trained as a Postdoc at Harvard University. Leveraging device geometry and surface chemistry, he developed a versatile and scalable liquid handling device capable of high precision and high throughput operation. Prior to joining Exponent, Dr. Menesses worked as a senior mechanical engineer in research and development at Impossible Foods where he designed and fabricated novel equipment for protein texturization using fiber spinning and extrusion technologies and performed CFD modeling of non-Newtonian flows for food manufacturing.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Boston University, 2019

M.S., Mechanical Engineering, Boston University, 2017

B.S., Nuclear Engineering, North Carolina State University, 2011

NSF Graduate Research Fellowship Program

Chateaubriand Fellow

North Carolina State University Caldwell Fellow

Academic Appointments

Postdoctoral Fellow, Rowland Institute at Harvard University, 2019-2020

Teaching Assistant for Fluid Mechanics, Dept of Mechanical Engineering, Boston University, 2015-2016

Teaching Assistant for Heat Transfer, Dept of Mechanical Engineering, Boston University, 2014-2015

Prior Experience

Senior Mechanical Engineer - R&D, Impossible Foods, 2021-2024

Publications

Dubitsky, L., Menesses, M., Belden, J., & Bird, J. (2021). Using aeration to probe the flow characteristics associated with long-term marine macrofouling growth and suppression. Biofouling, 37(3), 289–298.

Menesses, M., Roché, M., Royon, L., & Bird, J. C. (2019). Surfactant-free persistence of surface bubbles in a volatile liquid. Physical Review Fluids, 4(10), 100506.

Menesses, M., Belden, J., Dickenson, N., & Bird, J. (2017). Measuring a critical stress for continuous prevention of marine biofouling accumulation with aeration. Biofouling, 33(9), 703–711.

Presentations

M. Menesses, M. Roché, L. Royon, J. Bird. Evaporation induced stabilization of bubbles at the free surface of volatile liquids. Contributing Talk, 77th New England Complex Fluids Meeting, Boston, MA. November 2018.

M. Menesses, M. Roché, L. Royon, J. Bird. Evaporation can stabilize a bubble at a free surface without surfactants. Contributing Talk, American Physical Society - Division of Fluid Dynamics 71th Annual meeting, Atlanta, GA. November 2018.

M. Menesses, J. Belden, N. Dickenson, J. Bird. Aeration can prevent biofouling provided the wall sheer stress meets a critical value. Contributing Talk, 19th International Congress on Marine Corrosion and Fouling, Melbourne, FL. June 2018.

M. Menesses, M. Laurent, J. Bird. Modeling the initial contact line dynamics of dewetting bubbles. Contributing Talk, American Physical Society - Division of Fluid Dynamics 69th Annual meeting, Portland, OR. November 2016.

M. Menesses, J. Belden, N. Dickenson, J. Bird. Exploring the mechanisms of rising bubbles in marine biofouling prevention. Contributing Talk, American Physical Society - Division of Fluid Dynamics 68th Annual meeting, Boston, MA. November 2015.