Alicia Boymelgreen, PhD

9173 Carlyle Ave, Surfside, FL 33154•7189384245•aboymelg@fiu.edu

SUMMARY OF RESARCH INTERESTS:

I am interested exploring fundamental physical phenomena at the micro/nanoscale using a combination of theory, experiment and numerics and finding new applications for micro/nanofluidic technology through multidisciplinary collaboration. Although based in Mechanical Engineering, my work traverses soft matter physics and materials science. Specific active projects include examining the fundamental driving mechanism of active colloids at the single particle level in dilute systems and collective motion in concentrated suspension, characterization and optimization of microscale cargo transport. A novel multidisciplinary application I am developing is the integration of AI and micro/nanofluidic systems to perform quantitative real time analysis of impact of nanoplastics on marine species Experimental techniques include epifluorescent and confocal microscopy, particle tracking and micro particle image velocimetry, cleanroom fabrication of micro/nano scale Janus particles and microfluidic devices and automated data and imaging analysis.

EDUCATION

PhD in Mechanical Engineering **2012-2017**
Technion, Israel Institute of Technology, Israel
Dissertation title: Symmetry breaking in non-linear electrokinetic colloidal transport at the micro/nano scale
Advisors: Prof Touvia Miloh and Prof. Gilad Yossifon

MSc in Mechanical Engineering, *summa cum laude* **2008-2012**
Tel Aviv University, Israel
Dissertation title: Dipolophoresis of hydrodynamically asymmetric and dielectric Janus particles
Advisor: Prof Touvia Miloh

B.Eng (Mech), *Honors* **2002-2007**
Monash University, Australia

CURRENT POSITION

Assistant Professor **2021-Present**
Department of Mechanical and Materials Engineering, Florida International University

PREVIOUS POSITION

Visiting Research Assistant Professor **2019-2021**
Department of Mechanical and Materials Engineering, Florida International University

HONORS AND AWARDS

Aryeh and Rivkah Shotosovsky award for outstanding Doctoral thesis	**2017**
First prize - Langmuir Graduate Student Oral Presentation Award (ACS Colloids, Boston)	**2016**
RBNI scholarship for excellence	**2015-2016**
RBNI scholarship for excellence	**2014-2015**
Gutwirth fellowship	**2014-2015**
AES Travel award (Excellence based)	**2014**
Poster represented Mechanical Engineering at Technion Board of Governors meetin	**2014**
RBNI scholarship for excellence	**2013-2014**
RBNI Travel grant	**2013**

Alicia Boymelgreen, PhD

9173 Carlyle Ave, Surfside, FL 33154•7189384245•aboymelg@fiu.edu

PUBLICATIONS

[11] Huo,X, Wu,Y, Boymelgreen,A.M., Yossifon, G., "Analysis of cargo loading modes and capacity of an electrically powered active carrier", Langmuir, 2019

[10] Boymelgreen, A.M, Balli, T, Miloh, T, Yossifon, G., "Active Colloids as mobile microelectrodes for unified label free selective cargo transport", Nat. Comm, 9, 2018

[9] Boymelgreen, A.M, Yossifon, G., Miloh, T., "Propulsion of active colloids by self-induced field gradients", Langmuir, 32, 9540, 2016

[8] Zehavi, M, Boymelgreen, A.M, Yossifon,G, "Competition between Induced-Charge Electro-Osmosis and Electro-Thermal Effects around a Weakly-Polarizable Microchannel Corner", Phys. Rev. Applied 5, 044013, 2016

[7] Boymelgreen, A.M, Yossifon,G, "Observing electrokinetic Janus-particle wall interaction using micro-particle-image-velocimetry", Langmuir 31, 8243, 2015

[6] Ben-Bassat, D, Boymelgreen, A.M., Yossifon, G "The Influence of Flow Intensity and Field Frequency on Continuous-Flow Dielectrophoretic Trapping", J. Coll. Inter. Sci.,15,442, 2015

[5] Miloh, T, Boymelgreen, A.M., "Travelling wave dipolophoresis of ideally polarizable nanoparticles with double layer overlap", Phys. Fluids, 26, 072101, 2014

[4] Boymelgreen, A.M, Park,S, Yossifon,G, Miloh,T, "Spinning Janus doublets in uniform AC fields", Phys.Rev.E (Rapid Comm.), 89, 011003R, 2014

[3] Boymelgreen, A.M, Miloh, T, "Alternating current induced-charge electrophoresis of leaky dielectric Janus particles", Phys. Fluids, 24, 082003, 2012.

[2] Boymelgreen, A.M, Miloh, T, "Induced-charge electrophoresis of uncharged dielectric spherical Janus particles", Electrophoresis, 33, 870-879, 2012

[1] Boymelgreen, A.M, Miloh, T, "A Theoretical Study of Induced-Charge Dipolophoresis of Ideally Polarizable Asymmetrically Slipping Janus Particles", Phys.Fluids, 23, 072007, 2011

PATENTS

[1] Boymelgreen, A.M, Yossifon, G., "Device and method for dielectrophoresis", Patent filed with ISPTO 5/6/16

LECTURES IN CONFERENCES & WORKSHOPS

[15] Boymelgreen, A.M, Balli, T, Yossifon, G, Miloh, T "Mobile Microelectrodes:", ACS-Colloids, New York, USA (November 2017)

[14] Boymelgreen, A.M, Balli, T, Yossifon, G, Miloh, T "Novel propulsion of active colloids by self-induced field gradients with potential for cargo transport", APS-DFD, Portland, USA (November 2016)

[13] Boymelgreen, A.M, Balli, T, Yossifon, G, Miloh, T "Novel propulsion of active colloids by self-induced field gradients with potential for cargo transport", ACS - Colloids, BOSTON, USA (June 2016)

[12] Boymelgreen, A.M, Balli, T, Yossifon, G, Miloh, T "Frequency dispersion of electrokinetically activated Janus particles", APS-DFD, BOSTON, USA (November 2015)

[11] Boymelgreen, A.M, Balli, T, Yossifon, G, Miloh, T "Frequency dispersion of electrokinetically activated Janus particles", AICHE, Salt Lake City, USA (November 2015)

[10] Boymelgreen, A.M, Yossifon, G, Miloh, T , "Spinning Janus doublets driven in uniform AC electric fields", Belfer Symposium, Israel (January, 2015)

Alicia Boymelgreen, PhD

9173 Carlyle Ave, Surfside, FL 33154•7189384245•aboymelg@fiu.edu

[9] Boymelgreen, A.M, Yossifon, G, Miloh, T , "On the effect of competition between dielectrophoresis and induced-charge electrophoresis on JP mobility.", Israel Society of Theoretical and Applied Mathematics, Tel Aviv, Israel (December 2014)

[8] Boymelgreen, A.M, Zehavi, Yossifon,G, "3D experimental investigation of the interplay between dielectrophoresis and induced-charge electroosmosis around Janus particles", American Physical Society: Division of Fluid Dynamics, San Francisco, USA (November 2014)

[7] Boymelgreen, A.M, Zehavi, M, Yossifon,G, "Examining frequency dispersion in non-linear electrokinetic flow using μPIV", AICHE, Atlanta, USA (November 2014)

[6] Boymelgreen, A.M, Yossifon, G, Miloh, T , "Frequency dispersion in dipolophoresis of Janus particles", Israel Society of Theoretical and Applied Mathematics, Tel Aviv, Israel (December 2013)

[5] Boymelgreen, A.M, Yossifon, G, Miloh, T, "Frequency dispersion in dipolophoresis of Janus particle"s, American Physical Society: Division of Fluid Dynamics, Pittsburgh, USA (November 2013)

[4] Boymelgreen, A.M, Yossifon, G, Miloh, T, "An electrokinetically driven Janus micromixer: Stability and Rotation", Society of Engineering Science, ASME Summer meeting, Rhode Island, USA (July 2013)

[3] Boymelgreen, A.M, Yossifon, G, Miloh, T, "Stability and Rotation of Metallodielectric Janus particles", Bifurcations and Instabilities in Fluid Dynamics, Haifa, Israel (July 2013)

[2] Boymelgreen, A.M, Yossifon, G, Miloh, T, "Stability of Metallodielectric Janus spheres in AC electric fields", Advances in Micro and Nano Fluidics, Notre Dame, USA (May 2013)

[1] Boymelgreen, A.M, Miloh, T "Induced-Charge Electrophoresis of hydrodynamically asymmetric and dielectric Janus particles", ICREA Symposium, Barcelona, Spain (July 2012)

POSTERS IN CONFERENCES & WORKSHOPS

[3] Boymelgreen, A.M, Park,S, Yossifon,G, Miloh,T, "Persistently spinning Janus micromotors driven by induced-charge electrophoresis", Technion Board of Governors meeting, Israel, 2014

[2] Boymelgreen, A.M, Park,S, Yossifon,G, Miloh,T, "Persistently spinning Janus micromotors driven by induced-charge electrophoresis", NanoIsrael, Israel, 2014

[1] Boymelgreen, A.M, Park,S, Yossifon,G, Miloh,T, "Persistent Janus Micromotors Driven by Dipolophoresis", Technion Research Day, Israel, 2013

*Underline denotes presenting author