Alicia Boymelgreen (Aron), PhD

•7189384245•aboymelg@fiu.edu

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

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

HONORS AND AWARDS

FIU Top Scholars Award – Young faculty with significant research grants	**2022**
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**

GRANTS

NASA F.23 SMD Bridge Program Seed Funding $42,625 2023-2025

Building a diverse, sustainable, and robust undergraduate-to-graduate STEM network through inter-institutional interdisciplinary research collaborations in complex fluids/soft matter
PI: Jarrod Schiffbauer (CMU), coPI Alicia Boymelgreen (FIU), Boris Khusid (NJIT)

NSF(#2126479) $349,817 2021-2025

ISS: Collaborative Research: Individual and Collective Behavior of Active Colloids in Microgravity
PI: Alicia Boymelgreen, co-PI: Jarrod Schiffbauer (CMU)

NSF(#2038484) $397,120 2020-2023

CAS-MNP: Rela time analysis of impact of nanoplastics on marine species using AI integrated microfluidics
PI: Alicia Boymelgreen, co-PI: Arif Sarwat (ECE,FIU), Terry Bradley (URI)

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COLLABORATORS

Jarrod Schiffbauer (Colorado Mesa University), Boris Khusid (NJIT), Henry K Nahra (NASA), Gilad Yossifon, (Technion, Israel), Touvia Miloh (Tel Aviv University, Israel), Antonio Ramos (Universidad de Seville), Pablo Garcia Sanchez (Universidad de Seville), Arvind Agarwal (FIU), Jessica Ramella (FIU), Blue Scholars Initiative (NFP)

TEACHING

Undergraduate:
EGN 3311, Statics
EML 4140 Fundamentals of Heat transfer,
EML 4930, Senior Design
EML 4911 Undergraduate Research Experience

Graduate:
EGM 5315: Intermediate analysis of mechanical systems

MENTORSHIP

3 PhD Students,
1 MSc student (Graduated Summer 2023),
4 REU students,
6 Senior Design Undergraduate Capstone projects,
3 Undergraduate Research Interns,
Mentor in Golden Scholars program (2019-2022)

SYNERGISTIC ACTIVITES

[1] Participation in National Academies of Sciences Decadal Survey for Biological and Physical Sciences Research in Space: Coauthored an independent white paper with Dr Jarrod Schiffbauer, participated in Soft Matter Grand Challenges workshop (APS March 2021) and contributed to and was signatory on Soft Matter Research Campaign document.

[2] Curriculum Development: Developed applied project component for undergraduate Heat Transfer course and spearheaded a taskforce aimed at aligning prerequisities, objectives and outcomes in thermal fluids courses.

[3] Environmental education outreach: Presented an exhibit on the impacts of nanoplastics on marine wildlife exhibited at Town of Surfside “Third Thursday” community event.

[4] Peer Review: Reviewed for Science Advances, Nat. Comm, RSC Advances, Chem Comm, Phys. Fluids

[5] co-Organized and co-Chaired Nanocolloids and Microfluidics Session at ACS Colloids 23

PEER REVIEWED PUBLICATIONS

Student led publications are marked with an *

[19] Boymelgreen, A, Kunti,G, Garcia-Sanchez, P, Yossifon, G, “The influence of frequency and gravity on the orientation of active metallo-dielecric Janus particles translating under a uniform applied alternating-current electric field”, Soft Matter, 2024 (In press)

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[*18] Dey, P, Bradley, T, Boymelgreen, A, "Real-time assessment of the impacts of polystyrene and silver nanoparticles on hatching process and early-stage development of Artemia using a microfluidic platform", Environmental Sci: Nano, 2024

[17] Boymelgreen,A, Miloh,T "A generalized approach to solving the mixed boundary value problem of self-diffusiophoresis of active patchy particles.", J. Eng. Mathematics, 2024 (In press)

[*16] Dey, P, Bradley, T, Boymelgreen, A, "The impact of selected abiotic factors on Artemia hatching process through real-time observation of oxygen changes in a microfluidic platform", Sci Reports, 2023

[*15] V Kamat,V Dey,P Bodas, D, Kaushik, A, Boymelgreen, A, Bhansali, S "Active microfluidic reactor-assisted controlled synthesis of nanoparticles and related potential biomedical applications", Journal of Materials Chemistry B, 2023

[14] Wu, Y, Boymelgreen AM, Yossifon G, "*Micromotor mediated label free cargo manipulation"*, COCIS, 2022

[13] Boymelgreen AM, Schiffbauer J, Khusid B, Yossifon G, "Synthetic electrically driven colloids: a platform for understanding collective behavior in soft matter", COCIS, 2022

[12] Boymelgreen AM , Kunti G, Garcia-Sanchez, P, Ramos, A, Yossifon G, Miloh, T The role of particle-electrode wall interactions in mobility of active Janus particles driven by electric fields, JCIS, 2022

[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

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LECTURES IN CONFERENCES & WORKSHOPS

Student led lectures are marked with an *

[*19] Dey, P, Bradley, T, Boymelgreen, A, NanoToxChip: A novel microfluidic chip for in-vivo assessment of nanoplastics toxicity, Lab-on-a-Chip & Microfluidics World Congress, Laguna Hills, USA 2023

[18] Boymelgreen, A, Miloh, T, "A generalized approach to modelling self-diffusiophoresis of active patchy particles", ACS Colloids, 2023

[17] Boymelgreen AM , Kunti G, Garcia-Sanchez, P, Ramos, A, Yossifon G, Miloh, T, "The effect of particle-wall proximity on the mobility of electrokinetically driven active colloids" ELKIN,2022

[*16] Dey, P, Bradley, T, Boymelgreen, A, "Quantification of the Effect of Nanoplastic on the Hatching Process of a Zooplankton in a Milifluidic Platform ", ACS Colloids, 2022

[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)

[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)

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POSTERS IN CONFERENCES & WORKSHOPS

[*4] Dey, P, Bradley, T, Boymelgreen, A, NanoToxChip: A novel microfluidic chip for in-vivo assessment of nanoplastics toxicity, AICHE, Orlando 2023

[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

INVITED LECTURES

[1] Beyond Propulsion: The importance of modelling the metallic coating on active colloids, Seminar at City College of New York, 2024

ORGANIZED CONFERENCE SESSIONS

[1] Co-organized and co-chaired Nanocolloids and Microfluidics Session at ACS Colloids 23