Motasem ElGamel

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Research Interests: Theoretical Biophysics, Complex Systems, Emergent Phenomena, Stochastic Physics, Statistical Mechanics, Cell Size Control, and Microbial Ecology.

Education

University of Pittsburgh **2021 - Present**
Physics - Ph.D. (expected 2025) *Pittsburgh, PA*
Advisor: Prof. Andrew Mugler.

University of Pittsburgh **2019 - 2021**
Physics - M.Sc. *Pittsburgh, PA*

University of Science and Technology at Zewail City **2015 - 2019**
Physics - B.Sc. (Graduated Magna Cum Laude) *Giza, Egypt*

Fellowships and Awards

Outstanding Presentation Award Pitt Grad Expo 2024 **2024**
Dietrich School of Arts and Sciences, University of Pittsburgh
- Awarded to the talk: "Clone size statistics of tumor-inhabiting bacteria".

Andrew W. Mellon Predoctoral Fellowship **2023-2024**
University of Pittsburgh
- Awarded school-wide to doctoral students of exceptional promise and ability across the disciplines.

Best Poster Award at the Physics of Life 2023 Conference, Harrogate, UK **2023**
- Awarded to the poster presentation: "Effects of molecular noise on cell size control".

Pitt Graduate and Professional Student Government (GPSG) Travel Grant **2023**
University of Pittsburgh

Thomas-Lain Fund Scholarship Essay Competition **2023**
Department of Physics and Astronomy, University of Pittsburgh

Competitive Programs

Finalist in the DBIO Early Career Prize Session **March 2024**
APS March Meeting 2024 *Minneapolis, MN*

Les Houches Theoretical Biophysics Summer School 2023 **July 2023**
École de physique des Houches *Les Houches, France*

NSF Center for the Physics of Biological Function - Physics of Life Symposium **November 2022**
CUNY and Princeton University *New York City, NY*

Publications

Published

2. **M. ElGamel** and A. Mugler. Effects of molecular noise on cell size control. *Phys. Rev. Lett.*, 132:098403, 2024
   - Press release: **"Pitt researchers are solving a mini mystery of cell division "**, Phys.org (link)
1. **M. ElGamel**, H. Vashistha, H. Salman, and A. Mugler. Multigenerational memory in bacterial size control. *Physical Review E*, 108(3):L032401, 2023

Workshops and Summer Schools

Les Houches Theoretical Biophysics Summer School 2023 **July 2023**
École de physique des Houches *Les Houches, France*

NITMB Ecological Dynamics of Microbial Communities: New Approaches Workshop **May 2024**
National Institute of Theory and Mathematics in Biology *Chicago, IL*

Talks and Presentations

Invited talks

SIAM Conference on the Life Sciences 2024 **June 2024**
Invited talk: "Clone size statistics of tumor-inhabiting bacteria" *Portland, OR*

Competitively selected talks

APS March Meeting 2024 **March 2024**
Selected talk for DBIO Early Career Prize Session: "Clone size statistics of tumor-inhabiting bacteria". *Minneapolis, MN*

Gordon Research Conference and Seminar **January 2023**
Selected talk and poster presentation: "Effects of molecular noise on cell size control". *Ventura, CA*

NSF Center for the Physics of Biological Function - Physics of Life Symposium **November 2022**
Selected talk: "Theory of cell size homeostasis". *New York City, NY*

The 2nd Biology for Physics Conference **July 2022**
Selected talk: "Multigenerational memory in bacterial size control". *Barcelona, Spain*

Contributed, seminar, and poster presentations

NITMB Ecological Dynamics of Microbial Communities: New Approaches Workshop **May 2024**
Lightning talk: "Clone size statistics of tumor-inhabiting bacteria" *Chicago, IL*

University of Pittsburgh Grad Expo 2024 **March 2024**
Contributed talk: "Clone size statistics of tumor-inhabiting bacteria" *Pittsburgh, PA*

Applied Math Seminar, Department of Mathematics, University of Pittsburgh **March 2024**
Seminar: "Growth Dynamics of Tumor-Inhabiting Bacteria" *Pittsburgh, PA*

Les Houches Theoretical Biophysics Summer School 2023 **July 2023**
Poster presentation: "Theory of noisy population growth in bacteria". *Les Houches, France*

Physics of Life 2023 Conference **March 2023**
Poster presentation: "Effects of molecular noise on cell size control". *Harrogate, UK*

APS March Meeting 2023 **March 2023**
Contributed talk: "Adder minimizes cell size noise in bacteria". *Las Vegas, NV*

APS March Meeting 2022 **March 2022**
Contributed talk: "Multigenerational memory in cell size homeostasis". *Chicago, IL*

Teaching Experience

Graduate Teaching Assistant
University of Pittsburgh

- PHYS 0110: Introduction to Physics 1.
- PHYS 0111: Introduction to Physics 2.
- PHYS 0174: Basic Physics for Science and Engineering 1.
- Lead recitations, held office hours, prepared quizzes, graded exams and wrote up homework solutions.

Undergraduate Junior Teaching Assistant
University of Science and Technology at Zewail City

- PHYS 101: Introduction to Physics 1.
- PEU 438: Compact Objects.

Mentoring, Outreach and Service

Journal Reviewer

- Reviewed articles for *Physical Review Letters*, *Physical Review E*, *Physical Review X Life*, *Physical Review X*, and *Springer's Bulletin of Mathematical Biology.*

Research Mentor

Department of Physics and Astronomy, University of Pittsburgh

- Mentored undergraduate students Jianan Zhao and Lucas Ribaudo* in research.

* Awarded the Emil Sanielevici Undergraduate Research Scholarship for his research on concentration-based cell size control in yeast.

Peer-Mentor in the Alumni Mentorship Program

Zewail City Alumni Association

- Mentored one undergraduate student.

Graduate Student Mentor

Department of Physics and Astronomy, University of Pittsburgh

- Mentored two incoming graduate students.

Zewail City Science Festival

University of Science and Technology at Zewail City

- A public event that aims to deliver scientific concepts in a simplified manner to the public and spread the culture of science.
- Participated as an organizer, wrote a scientific talk for the public audience, and gave a mathematics talk.

Skills

Programming Languages: C++, Python, Matlab, Mathematica, LabVIEW.
Techniques: Monte Carlo, Stochastic Simulation Algorithm.
Certificates: Neural Networks and Deep Learning (link).