

Asem Hassan

MD, PHD PHYSICS

Research Scientist, University of Arizona

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Education

Northeastern University

PH.D. OF PHYSICS (BIOPHYSICS)

- Advisor: Dr. Paul Whitford

Boston, MA

Sep. 2017 - Dec. 2022

Northeastern University

MASTER OF PHYSICS

- GPA: 4.0

Boston, MA

Sep. 2017 - May. 2019

University of Alexandria

BACHELOR OF MEDICINE AND SURGERY

Alexandria, Egypt

Sep. 2005 - Dec. 2011

Professional Experience

2024 **Research Scientist**, University of Arizona

2023-2024 **Postdoctoral Fellow**, University of Texas at Austin

2019-2022 **Biophysics Research Assistant**, Northeastern University

2017-2019 **Physics Teaching Assistant**, Physics department, Northeastern University

2015-2017 **Physics Teaching Assistant**, Zewail City of Science and Technology - Egypt

2014-2016 **Internal Medicine Resident Physician**, General Naval Hospital - Egypt

2013-2014 **GP physician - Director of Al-Galaa health care unit**, Ministry of Health - Egypt

2012-2013 **House Officer Physician**, Alexandria University Hospitals - Egypt

Publications

PUBLISHED (* co-first author)

Vivek Singh, Yuzuru Itoh*, Samuel Del'Olivo*, **Asem Hassan***, Andreas Naschberger, 3Rasmus Kock Flygaard, Yuko Nobe, Keiichi Izumikawa,4Shintaro Aibara, Juni Andréll, Martijn A Huynen, Paul C Whitford, Antoni Barrientos, Masato Taoka, Alexey Amunts. Structure of mitoribosome reveals mechanism of mRNA binding, tRNA interactions with L1 stalk, roles of cofactors and rRNA modifications. *Nature communications* 15.1 (2024): 4272.

Asem Hassan, Sandra Byju*, Frederico Campos Freitas*, Claude Roc, Nisaa Pender, Kien Nguyen, Evelyn M Kimbrough, Jacob Mattingly, Ruben L Gonzalez, Ronaldo Junio de Oliveira, Christine M Dunham, Paul Charles Whitford. 2023. Ratchet, swivel, tilt and roll: A complete description of subunit rotation in the ribosome. *Nucleic Acids Research*, 51, 2, 919–934

Sandra Byju, **Asem Hassan**, Paul Whitford. The energy landscape of the ribosome. 2023 *Biopolymers reviews.*, e23570

Antonio B de Oliveira Jr, Vinícius G Contessoto, **Asem Hassan**, Sandra Byju, Ailun Wang, Yang Wang, Esteban DoderRojas, Udayan Mohanty, Jeffrey K Noel, Jose N Onuchic, Paul C Whitford. 2022. SMOG 2 and OpenSMOG: Extending the limits of structurebased models. *Protein Science* 31 (1), 158-172

Asem Hassan, Paul Whitford. Identifying strategies to experimentally probe multidimensional dynamics in the ribosome. *J. Phys. Chem. B* 2022, 126, 42, 8460–8471

FC Freitas, S Byju, **A Hassan**, RJ Oliveira, PC Whitford 2022. Quantifying biomolecular diffusion with a “spherical cow” model. 2022. *American Journal of Physics* 90 (3), 225-238

A Hassan, S Byju, PC Whitford. 2021. The energetics of subunit rotation in the ribosome. *Biophysical Reviews*, 1-9

Gomaa, I., Porter, J., Heidari, Z., **Hassan, A.** Impacts of Reservoir Fluids and Pore Geometry on Hydrogen Adsorption and

Diffusion in Rocks with Complex Composition and Pore Structure. SPE/AAPG/SEG Unconventional Resources Technology Conference. URTEC, 2024.

IN PREP (* co-first author)

Asem Hassan, Paul Whitford. An analytical approach to designing single-molecule experiments.

Ahmed Roman, **Asem Hassan***, Mohamed ElKabbash. 2023 Measuring Gravitational force from Femto-gram source masses.

Presentations

TALKS * *presenting author*

Feb. 2023. Ailun Wang, **Asem H Hassan**, Frederico C Freitas, Vivek Singh, Alexey Amunts, Paul C Whitford*. *Understanding the energetics of translation in bacterial and eukaryotic ribosomes*. BPS 2023

March 2022. **Asem Hassan***, Paul Whitford. *Identifying precise probes for ribosome dynamics*. RNA symposium 2022, Albany, NY

June 2020. **Asem Hassan***, Paul Whitford. *Using simulations to identify single-molecule probes for ribosome dynamics*. iPOLS 2020

Feb. 2020. Mariana Levi, Jeffrey Noel, Huan Yang, Trung Kien Nguyen, **Asem Hassan**, Kelsey N Walak, Jonathan Perrier, Liah Dukaye, Ransom Horne, Paul C Whitford*. *Precisely Quantifying the Energetics of the Ribosome*. BPS 2020, San Diego, CA.

Sep. 2019. **Asem Hassan***, Paul Whitford. *Describing collective motion in a large biomolecular assembly*. Energy Landscapes meeting, 2019, Belgrade, Serbia.

POSTER PRESENTATIONS

Feb. 2022. *Simulations and geometric analysis of the ribosome reveal precise single-molecule strategies for monitoring head dynamics during translocation*. Poster: BPS 2022, San Francisco, CA

Feb. 2020. *Using simulations to identify single-molecule probes for ribosome dynamics*. Poster: BPS 2020, San Diego, CA.

Nov. 2019. *Using simulations to identify single-molecule probes for ribosome dynamics*. Poster: Molecular biophysics in the Northeast, 2019, Boston, MA.

Oct. 2019. *Using simulations to identify single-molecule probes for ribosome dynamics*. Poster: Gibbs biothermodynamics, 2019, Carbondale, IL.

Teaching Experience

Spring 2019	Graduate Quantum Mechanics 2 , Teaching Assistant	NU
Fall 2018	Graduate Classical Mechanics , Teaching Assistant	NU
Summer 2018	Advanced Physics Lab , Teaching Assistant	NU
Spring 2018	General Physics 2 , Teaching Assistant	NU
Fall 2017	General Physics 1 , Teaching Assistant	NU
2017-2019	Introductory Physics Lab , Teaching Assistant	NU
Spring 2017	Modern Physics Lab , Teaching Assistant	ZCST
Spring 2017	Stellar structure and evolution , Teaching Assistant	ZCST
Spring 2017	Quantum Mechanics 2 , Teaching Assistant	ZCST
Fall 2016	Quantum Mechanics 1 , Teaching Assistant	ZCST
Fall 2016	Biophysics , Teaching Assistant	ZCST
Fall 2016	Compact objects and high energy astrophysics , Teaching Assistant	ZCST
Spring 2016	Computational chemistry & drug design , Teaching Assistant	ZCST
Spring 2016	Modern Physics , Teaching Assistant	ZCST
Fall 2015	Physics Lab , Teaching Assistant	ZCST
Fall 2015	General Physics 3 , Teaching Assistant	ZCST

Awards, Fellowships

- 2019 **Academic Excellence Award**, Physics Department, NU
Travel Award, College of Science, NU
- Summer
2018 **Graduate Research Fellowship**, Physics Department, NU
- 2018 **Academic Excellence Award**, Physics Department, NU

Mentoring, Professional activities & Outreach

- April 2022. **Presenter:** Introduction to research seminar, physics department, *Northeastern University*
- Summer
2021 **Primary Mentor** for Isaac Busaleh, Physics Undergraduate Student, University of Houston.
For 10 weeks during Frontiers in Science (FIS) program
- Feb. 2021. **Presenter:** Frontiers in Science (FIS) recruitment talk,
- March
2020. **Presenter:** Introduction to research seminar, physics department, *Northeastern University*
- Jan. 2020. **Lead organizer:** Quantum Materials Workshop, physics department, *Northeastern University*
- Nov. 2019. **Presenter:** Chemical biology seminar, Chemistry department, *Northeastern University*
- May 2019. **Presenter:** Biophysics seminar, physics department, *Northeastern University*
- March
2019. **Assistant:** RNA simulations workshop, RNA symposium 2019. RNA institute, Albany, NY, *RNA institute*

Service & Professional Development

SERVICE

- 2019-current **GradPhi: Physics Graduate Student Association**, President *Northeastern University*
- 2018-2019 **GradPhi: Physics Graduate Student Association**, Treasurer *Northeastern University*
- 2020-2021 **EDIJ: College of Science Equity, Diversity, and Inclusion Committee**, Physics Graduate Students Representative *Northeastern University*

DEVELOPMENT

- 2016 **Mini MBA diploma**, Notthing Hill College *Alexandria, Egypt*

PROFESSIONAL MEMBERSHIPS

- American Physical Society (APS)
Biophysical Society (BPS)
Protein Society