HANA K JAAFARI

hkj1@rice.edu
Google Scholar ⋄ Github

EDUCATION

Ph.D., Applied Physics *2020-2024*
Rice University, Houston, TX Advisor: Peter G. Wolynes

M.Sc. Applied Physics *2017-2020*
Rice University, Houston, TX Advisor: Peter G. Wolynes

B.Sc. Physics; Minors in Mathematics, Biology *2013-2017*
Texas Christian University, Fort Worth, TX

RESEARCH EXPERIENCE

Graduate Research Assistant *2018-2024*
Rice University, Houston, TX Advisor: Peter G. Wolynes

Studied the physical and evolutionary energy landscapes of proteins experiencing different selection pressures using coarse-grained physical and inverse statistical mechanics Hamiltonians.

Undergraduate Research Assistant *2013-2017*
Texas Christian University, Fort Worth, TX Advisor: Hana Dobrovolny

Fitted ODEs to experimental breast cancer data to develop a descriptive model of tumor growth over time.

Undergraduate Research Assistant *2014-2017*
Texas Christian University, Fort Worth, TX Advisor: Zygmunt Gryczkynski

Performed fluorescence absorption, emission, and lifetime measurements on Bodipy molecules in solution and PVA film.

Undergraduate Summer Intern *2016*
UT Southwestern Medical Center, Dallas, TX Advisor: Yunsun Nam

Assisted protein crystallization studies by culturing bacteria, as well as extracting and purifying proteins via affinity chromatography.

Undergraduate Summer Intern *2015*
National Institute of Health, Bethesda, MD Advisor: Jay Chung

Isolated and amplified mitochondrial DNA using PCR techniques.

PUBLICATIONS

Ezequiel A. Galpern, Hana Jaafari, Carlos Bueno, Peter G. Wolynes, Diego U. Ferreiro, 2024, "Reassessing the Exon-Foldon correspondence using Frustration Analysis," *PNAS*, 121 (28) e2400151121

Hana Jaafari, Carlos Bueno, Nicholas P. Schafer, Jonathan Martin, Faruck Morcos, Peter G. Wolynes, 2024, "The Physical and Evolutionary Energy Landscapes of Devolved Protein Sequences Corresponding to Pseudogenes," *PNAS*, 121 (21) e2322428121

Hope Murphy, Hana Jaafari, Hana Dobrovolny, 2016, "Differences in predictions of ODE models of tumor growth: A cautionary example," BMC Cancer, 16(163).

Sangram L. Raut, Joseph D. Kimball, Rafal Fudala, Ilkay Bora, Rahul Chib, Hana Jaafari, Marlius K.

Castillo, Nicholas W. Smith, Sergei V. Dzyuba, Zygmunt Gryczynski, 2015, "Triazine-based BODIPY trimer as a molecular viscometer," Physical Chemistry Chemical Physics, 18(6).

CONFERENCE TALKS

iPoLS 2024 Annual Meeting *2024*
Trieste, Italy

"Measuring Physical and Evolutionary Local Frustration Signals in Proteins"

iPoLS 2023 Annual Meeting *2023*
Atlanta, GA, USA

"Characterizing Evolutionary and Physical Energy Landscapes of Evolving, Devolving, and Random Sequences"

POSTER PRESENTATIONS

Protein Folding Dynamics Gordon Conference *2022*
Ventura, CA, USA

Jaafari, H., Schafer, N. P., Bueno, C., Martin, J., Faruck, M., and Wolynes, P. G., "Characterizing Evolutionary and Physical Energy Landscapes of Evolving, Devolving, and Random Sequences"

Annual Meeting of the International Physics of Living Systems (iPoLS) Network *2022*
Montpellier, France

Jaafari, H., Schafer, N. P., Bueno, C., Martin, J., Faruck, M., and Wolynes, P. G., "Characterizing Evolutionary and Physical Energy Landscapes of Evolving, Devolving, and Random Sequences"

American Physical Society (APS) March Meeting *2022*
Chicago, IL, USA

Jaafari, H., Schafer, N. P., Bueno, C., Martin, J., Faruck, M., and Wolynes, P. G., "Characterizing Evolutionary and Physical Energy Landscapes of Evolving, Devolving, and Random Sequences"

SCI Transdisciplinary Symposium *2021*
Rice University, Houston, TX, USA

Jaafari, H., Schafer, N. P., Faruck, M., and Wolynes, P. G., "Characterizing Evolutionary and Physical Energy Landscapes of Evolving, Devolving, and Random Sequences"

2020 Protein Folding Dynamics Gordon Research Conference *2020*
Galveston, TX, USA

Jaafari, H., Schafer, N. P., and Wolynes, P. G., "Pseudogene Energy Landscapes: A Frustrating Case of Neutral Evolution?"

Rice/UT Austin Biophysics Retreat *2019*
Rice University, Houston, TX, USA

Jaafari, H., Schafer, N. P., and Wolynes, P. G., "Pseudogene Energy Landscapes: A Frustrating Case of Neutral Evolution?"

Texas Christian University Student Research Symposium *2017*
Texas Christian University, Fort Worth, TX, USA

Jaafari, H., Nurekeyev, J., Doan, H., Raut, S., Castillo, M., Fudalla, R., Dzyuba, S., and Gryczynski, Z., "Characterization of Triazine-based BODIPY Rotor and Non-Rotor Trimers"

Texas Christian University Student Research Symposium *2016*
Texas Christian University, Fort Worth, TX, USA

Jaafari, H., Pendry, R., Nurekeyev, J., Doan, H., Raut, S., Dzyuba, S., and Gryczynski, Z., "Characterization of BODIPY Variants to Determine Optimal Hybridization Potential with an Azadioxatriangulenium (ADOTA) fluorophore"

CUWip Conference *2015*
University of Texas at Brownsville, Brownsville, Texas, USA

Jaafari, H., Murphy, H., Ellis M., and Dobrovolny H.,"ODE models of tumor growth: Choosing the best growth model"

SPIE Photonics West *2015*
San Francisco, California, USA

Jaafari, H., Rich, R., Raut, S., Kimball, J., Fudala, R., Gryczynski, I., Doan H., Borejdo J., Smith N., Bora, I., Laurson, B., Dzyuba, S., and Gryczynski Z., "Enhanced Molecular Rotor for Single Molecule Detection"

SIAM LS14 *2014*
Charlotte, North Carolina, USA

Jaafari, H., Murphy, H., Ellis, M., and Dobrovolny H., "Determining An Optimal Mathematical Model for Tumor Growth"

AWARDS AND GRANTS

Rice University Eric Umland Memorial Award *2022*

Rice University Harry B. Weiser Teaching Award *2022*

Rice University Women in Natural Sciences Travel Grant *2022*

Rice University Applied Physics Program Travel Grant *2022*

Rice University Chemistry Graduate Student Travel Grant *2019, 2021*

NSF Graduate Research Fellowship Program *2019*
Honorable Mention

Texas Christian University Student Research Symposium *2015, 2016, 2017*
Best Undergraduate Physics Poster Award

Texas Christian University SERC Research Grant *2016*

Texas Christian University Senior Legacy Award *2017*

Texas Christian University Pillar of University Leadership *2016*

TECHNICAL STRENGTHS

Proficient	Python, LaTeX, *nix environments
Working Knowledge	Git, Matlab, Bash, Tcl/Tk

TEACHING EXPERIENCE

Thermodynamics Course Graduate Teaching Assistant *Spring 2022*
Rice University, Houston, TX

Assisted undergraduate students enrolled in introductory thermodynamics and statistical mechanics course with understanding course material, developed and held tutorials, and graded submissions.

Physical Chemistry Course Graduate Teaching Assistant *Fall 2019, Fall 2020, Fall 2021*
Rice University, Houston, TX

Assisted undergraduate students enrolled in introductory physical chemistry course with understanding course material, developed and held tutorials, created assignment answer keys, and graded submissions.

TexPREP Summer Program Assistant *Summer 2017*
Tarrant County College, Fort Worth, TX

Assisted a group of high school students with classwork and summer engineering projects.

Undergraduate Physics Clinic Tutor *2015-2017*
Texas Christian University, Fort Worth, TX

Reviewed class material with undergraduate students and provided interactive help with assignments.

LEADERSHIP AND VOLUNTEERING

Frontiers in Science Summer Internship Mentor *2020, 2022*
Rice University, Houston, TX

Created and managed independently the completion of a summer research project involving an undergraduate student each summer from an underrepresented community in STEM. Familiarized student with theoretical concepts underlying protein folding, protein visualization programs, navigating Linux-based computer terminals, and protein energy calculations using physical coarse-grained Hamiltonians.

WikiWomen Officer *2017-2023*
Rice University, Houston, TX

Coordinated networking events between members and alumni, and organized career development workshops and social events for members. WikiWomen is an organization for women pursuing advanced studies in STEM fields.

Women in Physics Officer *2018-2023*
Rice University, Houston, TX

Organized meetings between members and department colloquium speakers, hosted social events, and established an invited lecture series hosting women physicists with significant contributions to research and physics outreach.

Women in Science and Engineering President *2013-2017*
Texas Christian University, Fort Worth, TX

Created and led an undergraduate student-led organization that fosters a supportive social and professional community for women undergraduate students pursuing studies in STEM fields.

Society of Physics Students President *2015-2017*
Texas Christian University, Fort Worth, TX

Restarted and led university chapter of organization, hosting activities to encourage undergraduate physics majors to network with physics faculty members and hold physics demonstrations at local elementary schools.