

Dr. Heather Masson-Forsythe, Ph.D.

Ph.D., Biochemistry & Biophysics
Science Communicator,
2022-23 AAAS STPF
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she/her

Education

- Ph.D.** Biochemistry & Biophysics, Oregon State University 2016-2021
Committee: Elisar Barbar, Afua Nyarko, Michael Freitag, Colin Johnson, Maret Traber
- B.S.** Biology, University of Central Arkansas 2016
Minor: Honors Interdisciplinary Studies
- International Baccalaureate Diploma**, North Little Rock High School 2012

Research Experience

PhD Graduate Research, Corvallis, OR

2017-Present

Advisor: Dr. Elisar Barbar, Oregon State University

Thesis: "Proteins in Motion: Protein Dynamics of Cataracts, and Interactions Between the COVID-19 Virus and its RNA Genome"

Research interests: protein dynamics, protein structure and function relationships, intrinsically disordered proteins, nucleotide-protein binding interactions

Lab Experience: Bacterial protein expression and purification, 1D 2D & 3D nuclear magnetic resonance, cloning, plasmid prep, column chromatography, transformation, PCR, DNA extraction, ion exchange, SDS-PAGE, agarose gel electrophoresis, analytical ultracentrifugation, circular dichroism crystallography, analytical ultracentrifugation, isothermal titration calorimetry, Linux and Command line proficient, Python basics

Ph.D. Research & Development Intern, Corvallis, OR 2020
Hewlett Packard, Microfluidics Futures Lab

Graduate Rotation Project, Corvallis, OR 2017
Linus Pauling Institute, Oregon State University
"The Effects of Age and Dietary Restriction on the Brain Metabolome of the Killifish"

Graduate Rotation Project, Corvallis, OR 2016
Advisor: Dr. Dave Hendrix, Oregon State University
“Developing an Age-dependent Model of the Circadian Clock”

Undergraduate Honors Biology Research Thesis, Conway, AR 2014 - 2016
Advisor: Dr. Mindy Farris, University of Central Arkansas
“Effect of Hormone Precursor Availability on Lifespan & Stress Resistance of Long-lived *C. elegans*”

Undergraduate Research Assistant, Little Rock, AR 2014-2016
Advisor: Dr. Gulner Com, Arkansas Children’s Hospital
“Longitudinal Assessment of Fat Free Mass Index and its Impact on Clinical Outcome of Children with Cystic Fibrosis”

Undergraduate Honors Research Thesis, Conway, AR 2014-2016
Advisor: Dr. Ellen Stengel, Dept of Writing, University of Central Arkansas
“Harry Potter and the Ugly Passport Photo”
Study abroad program developed for university’s Writing, Childhood Education, Film & Biology programs following an independent study abroad in Ireland, the UK, and Portugal

Study Abroad: Science and Society in Rwanda 2014
Developed and taught science lessons for Rwandan primary schools, including a school for the deaf; Mountain Gorilla Trekking; Kanembwe village visit to learn pottery making and dance

Publications

Forsythe, H. M., Galvan, J. R., Yu, Z., Pinckney, S., Reardon, P., Cooley, R. B., ... & Barbar, E. (2021). Multivalent binding of the partially disordered SARS-CoV-2 nucleocapsid phosphoprotein dimer to RNA. *Biophysical Journal*.

Forsythe, H.M & Barbar E (2021). The Role of Dancing Duplexes in Biology and Disease. *Progress in Molecular Biology and Translational Science*.

Forsythe, H. M., Vetter, C. J., Jara, K. A., Reardon, P. N., David, L. L., Barbar, E. J., & Lampi, K. J. (2019). Altered protein dynamics and increased aggregation in human γ S-crystallin due to cataract-associated deamidations. *Biochemistry*.

Galvan, J.R., Donner, B., Veseley, C.H., Reardon, P., **Forsythe, H. M.**, Howe, J., Fujimura, G., & Barbar, E. (2021). Human Parainfluenza Virus 3 Phosphoprotein Is a Tetramer and Shares Structural and Interaction Features with Ebola Phosphoprotein VP35. *Biomolecules*.

Honors and Awards

[College of Science Inclusive Excellence Award](#) 2021

This award recognizes the outstanding work of a faculty, staff, or student in advancing inclusive excellence at Oregon State University.

“Dance Your Ph.D.” COVID-19 Category Winner 2021

The Dance Your Ph.D. contest hosted by *Science* challenges scientists to explain their research through dance. The judges select winners in the categories of physics, chemistry, biology, and social sciences. In 2020/21, they also crowned the winner of a new category, COVID-19.

Anniversary Award Winner – The Protein Society 2021

Award to attend and present my research at the 35th Annual Symposium

HP InternSteller Customer Impact Award, runner-up 2020

Award given to the HP intern across all of Hewlett Packard’s international campuses whose project is expected to have a positive impact for HP customers

Finn Wold Travel Award – The Protein Society 2019

Travel Award of up to attend and present my research at the 33rd Annual Symposium

KEVIN'S CHOICE AWARD 2019 “NMR is GOOD” Contest 2019

NMR spectra-turned-art submitted to be showcased at the 2019 Experimental Nuclear Magnetic Resonance Conference. Submission: “WT human gS crystallin”

BB GSA Travel Award

2019

Travel Award from the dept of Biochemistry & Biophysics at Oregon State University, organized by the BB graduate student association

Science Communication & Community Engagement

TikTok [@heycurlytop](#)

2019-Present

I use TikTok trends including songs, memes, and dances to communicate science & scientist culture on TikTok social media app. I have created many videos with tens of thousands-1M views, and accumulated >50K followers

ASBMB Today Contributor

2021-Present

Contributing writer for the American Society for Biochemistry and Molecular Biology’s magazine

[Published articles](#)

[#LGBTQinBMB](#): LGBTQ+ STEM community Twitter Chat 2022

Keynote Speaker 2022

[Girls of Promise Conference](#), is a free opportunity for 8th-grade girls across Arkansas to be introduced to opportunities, careers, and mentors in the fields of Science, Technology, Engineering, Arts, and Math (STEAM), [Women's Foundation of Arkansas](#)

ComSciCon National Flagship Workshop 2021

[ComSciCon](#) provides graduate student attendees with a one-of-a-kind opportunity to meet early career leaders in Science Communication, learn from and interact with a remarkable group of invited experts, and produce an original work communicating complex technical concepts from science and engineering to a new audience.

STEM FOR ALL VIDEO SHOWCASE 2021

COVID-19, Equity, & Social Justice

Submission: "[Dancing in STEM: Social Media Trends to Bring STEM to All](#)"

[#ASBMBSciArt](#): Science & Art Twitter Chat 2021

88.7 KBVR-FM Corvallis, "Inspiration Dissemination" Cohost 2018-2020
Live Radio Show, Podcast, and Blog

Blog posts:

- o "[Monkeying around in the lab to find a good egg](#)"
- o "[The bacteria living inside us and what they have to say about autism](#)"
- o "[This time, it actually is rocket science: computational tools for modeling combustion](#)"
- o "[3D modeling rock shape: archeological research of the earliest North Americans](#)"
- o "[Kayaks and Computers: the gray whale research essentials](#)"
- o "[Treating the cancer treatment: an investigation into a chemotherapy drug's toxic product](#)"
- o "[Finding cancer with sound: the development of nanoparticles to deliver light-to-sound converting agents](#)"

Podcast Episodes

- o [Grad Inspire 2020](#)
- o [Proteins run the show \(except when they unfold and cause cataracts\)](#)
- o [Robots! A Story of Engineering and Biology](#)
- o [A Blade of Seagrass is a Powerful Thing](#)
- o [Finding a place in policy: where do the scientists fit in?](#)
- o [Working with Dungeness crab fishermen to get a 'sense' of low-oxygen conditions off the Oregon coast](#)
- o [Swimming with Salmon\(ids\)](#)
- o [Monkeying around in the lab to find a good egg](#)
- o [The bacteria living inside us and what they have to say about autism](#)
- o [Repair, Don't Replace: Developing a New Treatment for Lower Back Pain](#)
- o [3D Modeling Rock Shape: Archeological Research of the Earliest North Americans](#)
- o [Tsunami Surfing and the Giant Snot](#)
- o [If a Fault Moves at the Bottom of the Ocean, Can Anyone Hear It?](#)

- [Kayaks and Computers: The Gray Whale Research Essentials](#)
- [Treating the Cancer Treatment: An Investigation into a Chemotherapy Drug's Toxic Product](#)
- [Finding Cancer with Sound: The Development of Nanoparticles to Deliver Light-to-Sound Converting Agents](#)

GRAD Inspire: Ideas in Action 2019-2021

2021: MC of event

2020: Nominated graduate students to give a short talk in the style of TEDx talks and coached selected students to formulate a unique, short, and impactful story. Attending GRAD Inspire (formally GRADx) planning meetings with the graduate school, coordinating event space, nominations, coaching selected students through developing their talks, and MC of event.

[PODCAST](#) & [TRANSCRIPT](#)

GRADx: Ideas in Action 2018-2019

As co-coordinator, nominated graduate students to give a short talk in the style of TEDx talks and coached selected students to formulate a unique, short, and impactful story.

[PODCAST](#)

OSU Biochemistry & Biophysics Graduate Student Association 2017-2020

Vice President, 2019-2020

Social Media/Publicity Coordinator, 2017-2020

Elisar Barbar Lab 2017-2020

[Twitter](#) Page and [Website](#) Co-coordinator

Science Music Video Director, "[Protein Prep for NMR](#)". 2018

ResearchHers Code Contributor 2019

Hosted on [ResearchHers](#) Code's [Twitter](#) account

Biochemistry & Biophysics Summer Camp Volunteer 2017, 2018, 2019

Week-long day camp led, organized, and planned by graduate students in Biochemistry and Biophysics. 8th graders learn about lab safety, DNA structure, transcription and translation, protein structure and function, microscopes, evolution, model organisms, etc, through hands-on activities, including lab experiments, outdoor activities, and crafts. Additionally, campers participate in activities designed to highlight the diverse backgrounds of scientists.

"Discovering the Scientist within" Volunteer 2017, 2018, 2019

A free Saturday workshop at Oregon State University designed to introduce middle school girls to careers in science, technology and engineering.

Diversity, Equity, & Inclusion BB Dept co-organizer 2019-2020

With faculty and other graduate students created a department workgroup with the intent of continually working to make our department welcoming and inclusive. Organized a speaker visit for Dr. Sharona Gordon, led department in DEI activities at department retreat.

“Girls of Power” Volunteer 2014, 2015, 2016

A free Saturday workshop at University of Central Arkansas designed to introduce middle school girls to careers in science, technology and engineering.

Independent Study Abroad: Ireland, UK, and Portugal 2015

Solo backpacking trip to develop a study abroad program for University of Central Arkansas’s Writing, Childhood Education, Film & Biology programs based on the Harry Potter series.

Study Abroad: Science and Society in Rwanda 2014

Developed and taught science lessons for Rwandan primary schools, including a school for the deaf; Mountain Gorilla Trekking; Kanembwe village visit to learn pottery making and dance

I.D.E.A.L. Leadership Team 2012-2016

The goal of the ideal Freshmen Leadership Team is to mold a group of high-potential incoming freshmen into the future leaders of the University of Central Arkansas, teaching them the skills they will need to be successful, ethical leaders and integrating them into the University’s leadership structure. University of Central Arkansas. Member 2012, Mentor 2013-2016.

Conference Presentations

International Conferences:

Science Pub, “Investigating How COVID-19 Proteins Stick to Viral RNA & Taking Research from the Lab to the Dance Floor.”

Virtual, March 14 2022

Talk, “A Dancing Duplex: The SARS-CoV-2 Nucleocapsid Phosphoprotein’s Multivalent Binding to RNA”

The Protein Society Annual Symposium, Virtual, 7-9, 12-14 July 2021

Poster, “The SARS-CoV-2 Nucleocapsid protein Binds RNA Multivalently”

The Protein Society Annual Symposium, Virtual, 7-9, 12-14 July 2021

Invited Talk, “Multivalent binding of the partially disordered SARS-CoV-2 nucleocapsid phosphoprotein dimer to RNA”

2021 IDPSIG Virtual Symposium, Virtual, 3 June 2020

Poster, “#DancingInSTEM: TikToking Covid19 Research”

2021 Science Talk, Virtual, 24-26 March 2021

Talk, “Mulivalency and protein disorder in virus protein interactions: Common themes among Rabies virus and SARS-CoV-2”

Molecular Bases of Proteinopathies: 2020-2021 virtual meeting of talks, activities, and discussion on "protein multimerization: the bad and the good"
Virtual, 9 January 2021 [RECORDING](#)

Poster, "Crystallin in motion: Deamidation Resulting in Global Changes in Protein Dynamics"

The Protein Society Annual Symposium, Seattle WA, 30 Jun–3 July 2019

Poster, "Effects of Surface Deamidation on the Backbone Dynamics and Solvent Accessibility of Cataracts-Associated Protein, gS-crystallin"

2019 Experimental Nuclear Magnetic Resonance Conference, Pacific Grove, CA, 7-12 April 2019

Regional/National Conferences:

Lightning Talk, "Effects of Surface Deamidation on the Backbone Dynamics and Solvent Accessibility of Cataracts-Associated Protein, gS-crystallin"

Center for Genome Research and Biocomputing Fall Conference, Corvallis OR, 20 September 2019

Poster Presentations, "Altered protein dynamics in gS-crystallin due to cataract-associated deamidations Protein, gS-crystallin" and "Science Outreach through College Radio,"

2019 Diversity STEMposium, Eugene OR, 6 September 2019

Poster Presentation, "Effects of Surface Deamidation on the Backbone Dynamics and Solvent Accessibility of Cataracts-Associated Protein, gS-crystallin"

Center for Genome Research and Biocomputing Spring Conference, Corvallis OR, 19 April 2019

Poster Presentation, "Science Outreach through College Radio"

2019 Science Talk, Portland, OR, 4-5 April 2019

Poster Presentation, "Dynein Binding of Competitive Regulators Dynactin and NudE Involves Novel Interplay between Phosphorylation Site and Disordered Spliced Linkers"

2017 BioNMR Symposium, Corvallis, OR, 4 August 2017

Media Features

Interview, *Forbes*

2021

["Dance Shows How A Coronavirus Protein Interacts With Its Genetic Material"](#)

TV Interview, KGW8	2021
“OSU researcher uses dance to explain COVID-19”	
Interview, OSU News Room	2021
“Deep dive into key COVID-19 protein is a step toward new drugs, vaccines”	
Interview, Science	2021
“Watch the winners of this year’s ‘Dance Your Ph.D.’ contest”	
Feature, National Public Radio	2021
“Watch The Winners Of The ‘Dance Your Ph.D’ Contest Make Cloud Formation Catchy”	
Interview, ASBMB Today	2021
“Become the protein”	
Feature, International Business Times	2021
“Scientist’s Viral TikTok Quells COVID-19 Vaccine Fears To The Tune Of Megan Thee Stallion”	
Feature, National Science Foundation	2021
“Deep dive into key COVID-19 protein is step toward new drugs, vaccines”	
Interview, OSU News	2021
“Dancing through genres, biochemistry/biophysics student wins Science Magazine’s Dance Your Ph.D. contest”	
Interview, Arkansas Democrat-Gazette	2021
“North Little Rock grad a dancer of science”	
Feature, cnet	2021
“See coronavirus replication explained through interpretive dance”	
Feature, ars Technica	2021
“Meet this year’s winners of the Dance Your PhD contest”	
Podcast Interview, The Controversial Dive	2021
“Please Wear a Mask (Diving into COVID-19)”	
Podcast Interview, WHAT ARE YOU GOING TO DO WITH THAT?	2021
“Episode 38 - Dance your Sci-Comm (with Heather Masson-Forsythe)”	
Interview, Twist Bioscience Blog	2020
“STEM vs. STEAM, why STEM Should Welcome the Arts!”	

Podcast Interview, Chemistry Cayk online podcast 2020
[“The Versatile LC8 Protein with Heather Masson-Forsythe”](#)

1MWIS 2020
1 Million Women in STEM Exists to spotlight 1 million STEM women to provide visible role models & inspire the next generation of girls.

Blog & Podcast Interview, Inspiration Dissemination 2019
“Proteins run the show (except when they unfold and cause cataracts)”

Teaching Experience

Oregon State University, Corvallis, OR 2016 –2019
Graduate Teaching Assistant, Biochemistry & Biophysics

- Courses taught: Freshman Biology lab for non-majors, Freshman Biology lab for majors, Biochemistry for non-majors, Senior level Biochemistry Teaching Lab for Biochemistry and Bioengineering majors, Cell and Molecular Biology for Majors
- Developed quizzes; graded exams and homework; gave feedback on scientific writing, held office hours
- Coordinated grading and labs with a team of 5+ teaching assistants

Undergraduate Research Students Advised 2016-2021
Jori Casey, Sarah McKay, Seth Pinkney, Mary Hare, Hanh Thi My Hoang, Joaquin Rodriguez Galvan, Brianna Donner, Alicia Vuong, Prajna Woonnimani

Honor pedagogical Assistant, UCA Schedler Honors College 2015
● “CORE II: The Search for Community”.
Led Honors College Freshmen in a community project and through philosophy readings

Project WET (water education for teachers) Certified 2014
Project WILD Certified: education rooted in nature 2014

Professional Affiliations

Protein Society, AAAS, oSTEM