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Dariush Aligholizadeh

Education

Aug 2020 | May 2024 **B.S. in Biochemistry/Molecular Biology and Computer Science Double Major**
University of Maryland, Baltimore County (UMBC), GPA: 3.84/4.00, Member: Honors College
Baltimore, MD; Relevant Coursework: Neurobiology, Human Physiology, Advanced Organic Synthetic Methods, Biomedicinal Chemistry, Mathematical Biology, Neuroengineering, Biochemistry 1/2, Systems Biology, Cell Biology, Molecular & General Genetics, Organic Chemistry 1/2, Linear Algebra, Discrete Mathematics, Advanced C/C++ OOP, Statistics, Foundations of Biology

Sept 2016 | May 2020 **High School Diploma**
Towson High School, GPA: 3.89/4.00, Rank: 14/326 (top 10%), SAT: 1450 (99^{th} percentile)
Towson, MD

Publications

(co-third author publication) Synthesis and Characterization of Magnetoplasmonic Air-Stable Au@FeCo, Jan 2023. Devadas, Mary; Smolyaninova, Vera; Kurshinski, Lynn; Aligholizadeh, Dariush; Langford, Kameron; Korzi, William; Miller, Cody; Kadasal, Naveen; Zhukovskyi, Maksym; Hondrogiannis, Ellen. *DOI: 10.1021/acs.langmuir.2c02965*

(pre-print) Cobalt-doping of the Au_{25} bi-icosahedron nanocluster to synthesize the novel $Au_{24}Co(PPh_3)_{10}(PET)_5Cl_2$, Feb 2023. Raufman, Benjamin; Stevens, Nathaniel; Aligholizadeh, Dariush; Devadas, Mary.

(pre-print) Biosynthesis of Undulated Gold Nanoplatelets using extracts of the Cercis Canadensis flower, Feb 2023. Aligholizadeh, Dariush; Turner, Wilson; Bechdel, Landon; Langford, Kameron; Zhukovskyi, Maksym; Devadas, Mary.

(pre-print) Portable Liquid-Phase Surface Enhanced Raman Spectroscopy Detection of DMMP and DMCP utilizing Branched Gold Nanostars, Dec 2022. Tewala, Youssef; Aligholizadeh, Dariush; Hondrogiannis, Nicole; Devadas, Mary.

(in peer-review) FeCo Nanoparticles for SERS Detection of Gunshot Residue Analytes on a Portable Raman Spectrometer, Dec 2022. Harper, Megan; Aligholizadeh, Dariush; Krushinski, Lynn; Hondrogiannis, Ellen; Devadas, Mary.

Scholarships & Grants

UMBC Merit Scholarship, Fall 2020 – Spring 2024
NIH Intramural Research Training Grant, Summer 2021
Louis-Stokes Alliance for Minority Participation Research Grant, Summer 2021

Awards & Honors

UMBC President's List, Fall 2020, Fall 2021
MHEC-CPIP Nanoscience Research Outreach Program Best Mentor Award, Jul 2022
Rice University Gulf Coast Undergraduate Research Symposium (GCURS) Travel Grant, Fall 2021
NIH Cancer Research Training Award, Summer 2021
UMBC Undergraduate Research Award – UMBC Review STEM Editor, Fall 2021-Spring 2022
Royal Microscopy Society International SEM Imaging Contest Top 8 (500+ entries), June 2021
UMBC Dean's List, Spring 2021, Spring 2022
USABO National Semifinalist (top 7% of 10,000 competitors), May 2020
Baltimore County Music Festival Highest Score Received, Cello & Piano Duet, Feb 2020

AP Scholar w/ Distinction, 2019 & 2020
Regional Chemistry Olympics 2nd place winner, Feb 2018
Regional Physics Olympics 3rd place winner, May 2019, May 2020
Colophon Literary Art Magazine Published Art (Towson High), 2018 – 2020

Research Experience

May 2019 – Present | **Undergraduate Researcher/Lab Manager**, Mentor: Dr. Mary Devadas
Towson University
Inorganic Chemistry and Nanoscience Lab.
- Co-third authored a published paper (Langmuir journal) on Au doped FeCo ferrofluids
- First authoring paper on dendritic silver nanoplate synthesis and gold nanoplates
- Second authoring paper on detection of nerve agents and Raman spectral analysis with FeCo
- Accepted to and flown out all expenses paid to Rice University to present at the Gulf Coast Undergraduate Research Symposium (GCURS)
- Presented at multiple national and regional conferences, including ACS National and Regional
- Awarded the LSAMP Undergraduate Research Grant for the Summer 2021 session
- Highly experienced with Scanning Electron Microscopy (SEM/STEM), UV-Vis Spectrophotometry, FT-IR, FT-Raman Spectrometry, Fluorescence Spectrophotometry, NMR, and Flame AAS
- Trained junior members of the lab on the above instruments
- Won international placing in the RMS 2021 competition with Electron Microscopy images

June 2021 – Aug 2021 | **Summer Research Intern**, Mentor: Dr. Alan Rein
National Institute of Health, National Cancer Institute
Retroviral Assembly Lab
- Trained in techniques for both general biological analyses, and specific viral analyses
- Awarded the Cancer Research Training Award for the Summer 2021 session (2% acceptance)
- Trained on Western Blot, Isothermal Titration Calorimetry, 2D NOESY NMR, Microscale Thermophoresis, switchSENSE

May 2020 – Present | **Bioinformatics Assistant**, Mentor: Dr. Timothy Hamerly
Remote/Online
Infectious Diseases Lab
- Independently develop software and programs for specific lab
- Solely developed database for quick Human ortholog lookup
- Created chromatography graphing program, allows quick scanning/analysis of lateral flow assay strips

Aug 2019 – Jul 2020 | **Research Assistant**, Mentor: Dr. Piotr Walczak
University of Maryland, Baltimore & Johns Hopkins School of Medicine.
Neuroradiology Lab.
- Worked on targeting of HIF1 protein and understanding its role in glioblastoma multiforme
- Worked with ImageJ and other data analysis tools
- Helped build convolutional neural network for cancer cell classification
- Trained on and worked with CryoStat, compact MRI

Oct 2020 – Feb 2021 | **Undergraduate Research Assistant**, Mentor: Dr. Govind Rao
University of Maryland, Baltimore-County
Center for Advanced Sensor Technology Lab (CAST).
- Researching ELISA technique for cheaper and more accurate antigen/biomarker detection

Scientific Presentations

* indicates that I was the presenter

American Chemistry Society (ACS) National Conference Spring 2022, In-Person, San Diego, CA, Mar 2022. Aligholizadeh, Dariush*; Devadas, Mary. "Manipulation of the Metal Crystal Lattice to Synthesize Anisotropic Nanoparticles". (lecture)

American Chemistry Society (ACS) National Conference Spring 2022, Virtual, Mar 2022. Tewala, Youssef; Aligholizadeh, Dariush; Ivanov, Hristo; Hondrogiannis, Nicole; Devadas, Mary. "Liquid phase SERS detection of DMMP and DMCP utilizing gold nanostars". (lecture)

American Chemistry Society (ACS) National Conference Spring 2022, Virtual, Mar 2022. Raufman, Benjamin; Stevens, Nathaniel; Aligholizadeh, Dariush; Devadas, Mary. "Novel cobalt-doped bi-icosahedron Au25-xCox clusters". (lecture)

Rice University Gulf Coast Undergraduate Research Symposium (GCURS), In-Person, Houston, TX, October 2021. Aligholizadeh, Dariush*; Devadas, Mary. "Shape-directed Synthesis of Anisotropic Gold & Silver Nanostructures by Manipulating the Crystal Lattice". (lecture)

NIH Summer Conference, Virtual, August 2021. Aligholizadeh, Dariush*; Rink, Constance; Datta, Siddharta; Kroupa, Tomas; Rein, Alan. "Salt-resistant binding of Gag to HIV-1 RNA Ψ-packaging signal". (poster)

LSAMP End-of-Summer Presentation, Virtual, August 2021. Aligholizadeh, Dariush*; Tewala, Youssef; Devadas, Mary. "Shape-directed Syntheses of Anisotropic Nanostructures" (poster)

ACS National Inorganic Chemistry Conference, Virtual, April 2021. Aligholizadeh, Dariush*; Krushinski, Lynn; Hondrogiannis, Nicole; Devadas, Mary. "Optimizing in-situ longevity of Silver Nanoplates" (lecture)

UMBC Undergraduate Research & Creative Achievement Symposium, Baltimore, MD, Jan 2021. Aligholizadeh, Dariush*; Krushinski, Lynn; Hondrogiannis, Nicole; Devadas, Mary. "Optimizing in-situ longevity of Silver Nanoplates" (lecture)

Binghamton University Undergraduate Research Conference, Virtual, Oct 2021. Raufman, Benjamin; Stevens, Nathaniel; Aligholizadeh, Dariush; Devadas, Mary; "Synthesis and characterization of the bi-icosahedral Au25-Cox nanocluster" (lecture)

Binghamton University Undergraduate Research Conference, Virtual, Oct 2021. Tewala, Youssef; Aligholizadeh, Dariush; Devadas, Mary; "Liquid Phase Surface Enhanced Raman Spectroscopy Detection of DMMP and DMCP utilizing Branched Gold Nanostars" (lecture)

Towson Undergraduate Research Conference, Towson, MD, Sept 2020. Aligholizadeh, Dariush*; Devadas, Mary. "Gold and Silver Nanoplates: Green Syntheses" (lecture)

UMBC Undergraduate Research Symposium, Baltimore, MD, Oct 2019. Aligholizadeh, Dariush*; Brown, Pierce; Langford, Kameron; Devadas, Mary. "Advances in Silver Nanoplate Synthesis: Effect of Variance of Trisodium Citrate" (poster)

Scientific Outreach

Oak Ridge Institute for Science and Education (ORISE) Joint Science and Technology Institute (JSTI) Mentor & Poster Judge, Jul & Aug 2022

- Assisted six groups of four to six children in the creation and design of professional scientific posters at the culmination of their Department of Energy funded summer internship
- Selected to judge posters that were presented as part of the JSTI summer poster presentations for STEM outreach

MHEC-CPIP Funded Nanoscience Research Outreach Program, Summer 2022, Spring 2023

- Designated as outreach group leader for underrepresented minority students from Oxon Hill and Flowers High School during a 4-week science outreach program that culminated in a scientific presentation given by the students
- Have led the MHEC funded outreach group for two years and have been commended on my dedication to teaching the junior students about a future in research sciences
- Nominated for and awarded the Best Peer Mentor award

Baltimore County Public Schools Science Outreach Group Leader, May 2021

- Was an outreach group leader for a virtual Nanoscience workshop designed for High School Students

Towson High School Science Outreach Group Leader, Jan 2020 & Jan 2021

- Conducted outreach hosting the local High School in our Towson University lab and showing them our day-to-day tasks
- Demonstrated a chemical synthesis of Gold Nanoparticles and taught about the synthesis mechanism
- Helped interested teenagers see the applications of chemistry and become interested in research

Work Experience

July 2021 – Present | **UMBC Review Lead STEM Editor/Reviewer**
University of Maryland, Baltimore-County

- Interviewed and accepted for a position as executive STEM editor for the college-wide research journal
- Communicate with Professors, Undergraduates, and review publications for inclusion in the 2022 version of the UMBC Review, published Jun 2022 in print and virtual editions

June 2021 – Present | **Research Lab Packing Coordinator**
Towson University

- Accepted as a Contingent staff member for packing and transferring Towson University research labs to the New Science Complex

◦ Worked alongside faculty and staff to ensure safe inventory and transferring of chemicals, personal materials, and glassware

June 2018 – Nov 2019 | **Head Math Instructor**
Kumon Math & Reading Center, Cockeysville, MD
◦ Led other math instructors and demonstrated excellent mathematical knowledge and communication skills
◦ Graded and tutored children ages 5 – 12 in mathematical skills ranging from basic algebra to advanced calculus II

Leadership Experience

Jan 2022 – Present | **Undergraduate Teaching Assistant – Cell Biology**
University of Maryland, Baltimore-County
◦ Volunteer position as undergraduate teaching assistant for a 300-level course in advanced cellular biology
◦ Held exam review sessions for the class of 150+ students, have led a solo recitation section with 20-35 students for the past two semesters and have helped junior Teaching Assistants better understand the role and grading requirements

Jan 2021 – Present | **Devadas Nanoscience Lab Manager**
Towson University
◦ Assist P.I. in laboratory management tasks
◦ Mentoring junior lab members and teaching them how to use lab equipment
◦ Ensure safety protocols and create standard operating procedures

Feb 2021 – Present | **Devadas Nanoscience Lead Electron Microscope Operator**
Towson University
◦ Sole operator of the Electron Microscope from March 2021 to Sep 2021, imaging undergraduate students' samples and assisting in multiple projects
◦ Mentoring graduate students and teaching them how to use the electron microscope
◦ Photography recognized in international competition (RMS 2021 Microscopy Shortlist Top 8)

Sept 2019 – May 2020 | **Biology Club President**
Towson High School
◦ Taught topics in Biology such as Immunology, Virology, and Anatomy & Physiology to members
◦ Competed in the National Biology Olympiad, 4/13 members passed the test (7% national pass rate)

Sept 2017 – May 2020 | **Programming Club President**
Towson High School
◦ Taught topics ranging from JavaScript and C++ to competitive programming to members
◦ Competed in Lockheed Martin's annual CodeQuest competition in Bethesda, MD
◦ Grew members to 4 kyu level on codewars.org (70^{th} percentile rating in competitive programming)

Sept 2018 – May 2020 | **Linguistics Club Vice-President**
Towson High School
◦ Organized and competed in linguistics competitions, furthered interest and knowledge of linguistics
◦ Competed in the North American Computational Linguistics Open Competition, two passing members

Volunteer Experience

Jul 2022 – Present | **Letters to a Prescientist**
Remote.
◦ Volunteered as a letter writer to young middle school and high school students looking to explore a future in science
◦ Been in the program for two cycles of students and have sent letters back in forth in communication with my pen-pal prescientist

Jun 2022 – Aug 2022 | **Petey Green Project Youth Services Center Tutor**
Youth Services Center, Washington D.C.
◦ Volunteered as a tutor helping incarcerated youth further their education towards a G.E.D.
◦ Independently taught groups of 3-5 students in subjects such as High School English, Math, Biology, and life skills such as filing taxes or filling out birth certificates

July 2021 – Jan 2022 | **Baltimore City Math Coach (Reach Together Program @ UMBC)**
Cherry Hill Elementary/Middle School & Arundel Elementary School, Baltimore, MD
◦ Volunteered and independent Math Coach working with 3 groups (7^{th} grade, 5^{th} grade, and 2^{nd} grade) helping underrepresented and impoverished communities enrich their Math education
◦ Worked alone on developing lesson plans and guiding students with ranging proficiencies in English in their journey through Math

◦ Specifically chosen to work with students performing 2-3 years below their appropriate education level

2016 | **Key Club**

2018 Towson High School

◦ Completed various volunteering opportunities such as gymnasium cleaning, after-school tutoring, and blood drive preparation (80+ hours)

Sept 2017 | **Dumbarton Middle School Math Help**

May 2018 Towson High School

◦ Went after-school to tutor students in Mathematics at the local Middle School (40+ hours)

May 2018 | **Greater Baltimore Medical Center Volunteer**

Aug 2018 Towson, MD

◦ Helped patients undergoing chemotherapy and cancer treatment acclimate to a hospital environment

Special Skills

Wet & Dry Lab Techniques

◦ Expert in Electron Microscopy, UV-Vis spectroscopy, advanced inorganic/organic synthesic techniques, Fluorescence imaging and spectroscopy, Raman microscopy and spectropscopy

◦ Experienced in NMR, FT-IR, ELISA, Cell culturing

Programming Languages & Software

◦ Expert in Python, JavaScript, Advanced in C++/C and Java

◦ Have utilized popular libraries like OpenCV, Tensorflow, PyTorch, and frameworks like ReactJS/Node.js

◦ Experienced with both CellProfiler and ImageJ

Lab Equipment (Trained On and Utilized)

◦ Scanning & Scanning-Transmission Electron Microscope, Plasma Cleaner, NMR, Fluorescence, UV-Vis, IR, HPLC, CryoStat, Compact MRI, Surgical Microscope, Raman Microscope

Math/Science Knowledge

◦ Expert in Calculus, Biology, Organic/Inorganic Chemistry, and Linear Algebra

Spoken Languages

◦ Native fluency in Farsi and English, Intermediate in Spanish