# AFSHIN **KHAN, Ph.D.**

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## Scientist/Entrepreneur

*Highly motivated and innovative biotechnology, astrobiology, and molecular medicine scientist.*

Experienced researcher with a history of success in the biotechnology industry. Skilled in data analysis, scientific communication, grant writing, team building, and cross-functional collaboration. Strong scientific research professional with a Ph.D. in Environmental Science and Natural Resources and postdoctoral research experience in NASA's Jet Propulsion Laboratory and Cleveland Clinic. Passion for innovation with demonstrated entrepreneurship as co-founder of a biotech startup. Affiliate of U.S.-based non-profit organization, Blue Marble Space Institute of Science.

## PROFESSIONAL EXPERIENCE

**Postdoctoral Fellow, Cleveland Clinic** (1/2021 – Present) Cleveland, OH

*Technical Scope: Cell and Tissue Culture, Human organoids culture, qRT-PCR, SDS-PAGE, Western Blot, siRNA and shRNA knockdowns, Immunofluorescence Confocal Imaging, Animal and Invertebrate Histology, Biomolecular Isolation of Mitochondria, Genomic Isolation, RNA-Seq data analysis, Flow Cytometry, and Protein assays.*

Working in the Department of Inflammation and Immunity at Lerner Research Institute. Studying the proteins that maintain DNA organization and their pathways to understand better how cells respond to various stresses, ensure the normal development of tissues, and uncover novel pathways that could be exploited to prevent disease progression. Focused on IBD and colon cancer.

***Key Achievements:***

- Trained in experimental techniques in drosophila, mice, mammalian cell lines, and human primary cells
- Trained in organoids culture from patient samples
- Mentored medical students, undergraduate, and high school trainees in the laboratory

**Entrepreneur, National Security Innovation Network (4/2022 – 11/2022)** Arlington, VA

*Technical Scope: Entrepreneurship, stakeholder discovery, market analysis, technical due diligence, market strategy, business development, marketing, and communication.*

The NSIN Foundry, powered by FedTech, matches cutting-edge Department of Defense (DoD) technologies with teams of entrepreneurs during intensive, six-month cohorts. Entrepreneurs work closely with lab inventors, mentors, coaches, subject matter experts, and DoD end-users to assess the market viability and commercialization potential of the technologies. Successful teams form new companies, license the technologies, and develop solutions that impact the DoD and the private sector.

***Key Achievements:***

- Performed due diligence on urea oxidation technology commercialization pathway for U.S. Army Labs, with key stakeholder discovery in the U.S. DoD, NASA, Blue Origin, and Florida state government.
- Worked on due diligence of semiconductor architecture technology for quantum computing applications for Lawrence Berkeley Labs, with a complete commercialization pathway analysis for the spinoff Superchips Inc. and key stakeholder discovery in the U.S. Dod, Cybersecurity, IBM, and Fintech customers.

**Postdoctoral Scholar, Jet Propulsion Laboratory** (1/2020 – 12/2020) NASA, Pasadena, CA

*Technical Scope: Mass Spectrometry with MALDI-TOF, Gene Sequencing, Cell Culture, Protein Extraction, Taxonomic Data Analysis using Excel Scripts, UNIX, Python, R*

Researching microbiomes in the Biotechnology and Planetary Protection Division. Acquiring experience in diverse research techniques and technologies. Refining data analysis skills using bioinformatics. Mentored and assisted undergraduate interns accomplish research goals.

***Key Achievements:***

- Rapidly learned the lab's genomic and proteomic pipeline; generated publishable results within two months from start date. Produced two co-authored publications, currently writing first author manuscript.
- Designated as a global problem solver by NASA SpaceApps COVID-19 Challenge; Currently a judge for international hackathon entries.
- Bioscience mentor for team motorCortex.ai which won MIT AI Collaborative System Competition in May 2020

**Co-founder | Operations Lead, Chimeric Designs, Inc** (5/2017– 12/2019). Pullman, WA

Founded a protein engineering startup to introduce multi-functional antibody-drug conjugates to cancer therapeutics market. Developed and executed business strategy and operations budget. Managed research and development and business development activities. Formed strategic academic-industry partnerships; represented the company at industry-focused conferences.

***Key Achievements:***

- Achieved technical milestones within 80% of total budget.
- Secured seed funding through highly competitive grants from the Washington Research Foundation and Washington State University GAP Fund, enabling prototype development of engineered monoclonal antibodies and a carrier system synthesis strategy.
- Completed regional NSF funded Innovation-Corps program and won business plan competition. Led our team to qualify for national NSF I-Corps Program.

**Instructor| Consultant, Washington State University** (08/2015 – 12/2019) Pullman, WA

Promoted from Graduate Teaching Assistant to Adjunct Professor. Taught geology laboratory courses and earth and planetary science courses to classrooms of 150-250 undergraduate students and online to up to 100 students. Developed and executed innovative instructional techniques.

***Key Achievements:***

- Created online interactive teaching and testing platform on TopHat, which enabled effective distanced learning during Covid19.
- Consulted with technology start-ups in aerospace, health care and agriculture.
- Science payload specialist for CougSat-1. Responsible for the project development of a plant germination chamber in a cube satellite by engineering students' team at Washington State University.

**Visiting Scientist, NASA Ames Research Center** (06/2015 - 08/2015) Mountain View, CA

Investigated suspended animation and hypo-metabolic state in various organisms; wrote grants, planned and managed projects, developed strategic executive proposals for Industry-NASA collaboration.

***Key Achievements:***

- Developed strategic partnership between NASA Ames and Mayo Clinic and GoogleX Labs to explore hypometabolism in astronauts for long term space missions.
- Mentored undergraduate and high school interns in the lab to develop Lunar payload concepts.

**Visiting Research Scholar, German Aerospace Center** (06/2011 – 07/2011) Berlin, Germany

Monitored photosynthetic activity of lichens from dry valleys in Antarctica and Atacama Desert as a Mars simulation experiment.

**Visiting Scientist, European Molecular Biology Laboratory** (6/2010 –5/2011) Heidelberg, Germany

*Technical Scope: Cryo-Electron Microscopy, Mammalian Cell Culture, siRNA Gene Knockout, Bioinformatics*

Key contributor to multiple units including the Computational Biology Unit and the Cell Biology Microscopy Core Unit. Collaborated with scientists spanning diverse disciplines on research projects. Hired by multiple labs within the organization for being a quick thinker and fast learner; given opportunities to learn novel research techniques.

**Key Achievements:**

- Developed and optimized the bioinformatics pipeline for proteomic data analysis with open-source tools in collaboration with scientists in the Computational Biology Unit.
- Worked in partnership with Dr. Martin Beck of the Cell Biology and Microscopy Core Unit with to study nucleoporin protein structure using Cryo-Electron Microscopy.
- Accomplished research goals within 3 months instead of the allocated 6 months leading to opportunities to work on larger tasks.

## EDUCATION AND TRAINING

**Doctor of Philosophy in Environmental Science and Natural Resources**, Concentration in Geomicrobiology
Washington State University, Pullman, WA - 2017
*Thesis: "Characterization of geomicrobiology of a natural asphalt lake and its relevance in search for life in the Solar System"*

**Global Solutions Program** in utilizing exponential technologies to solve global problems
Singularity University (in partnership with NASA, Google, Autodesk, Genentech, and The Kauffman Foundation) – Mountain View, CA Jun 2013 – Aug 2013

*Project: Developed optical/electrical sensor technology for monitoring beehives, mitigating colony collapse disorder of bees, and positively impacting the agriculture industry.*

**Master of Science in Applied Biomolecular Technology**
University of Nottingham, Nottingham, United Kingdom – 2010
*Thesis: "Optimization of mathematical analysis tools, for proteomic mass spectrometry data for drug discovery"*

**Bachelor of Science in Biotechnology**, Minors in Genetics and Biochemistry
Bangalore University, Bengaluru, India - 2008

## SPEAKER PRESENTATIONS

- "Characterization of residual biosignatures in Mars analog environments towards determination of extremophilic microbial life in a plausible sample return mission", Astrobiology Science Conference | Phoenix, AZ| May 2017 (https://www.hou.usra.edu/meetings/abscicon2017/pdf/3675.pdf)

- "Asphalt volcanism as a model to understand the geochemical nature of Pitch Lake, a planetary analog for Titan and the implications towards methane flux into Earth's atmosphere", American Geophysical Union |

San Francisco, CA | Dec 2016 (https://ui.adsabs.harvard.edu/abs/2016AGUFM.P33D2188K/abstract)

- "A case for space agriculture for sustainable space exploration", International Space Development Conference | Los Angeles CA | May 2014

- "Case for farming on Mars", TEDx Washington State University | Pullman WA | April 2014 (https://youtu.be/Q3qkWXkuFhc)
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- "Bio-solar cells: a sustainable source of energy for deep space missions", International Alternative and Sustainable Energy Conference | NASA Goddard, MD | Dec 2012

- "Adaptation of Antarctic lichen under simulated Mars conditions", NASA Astrobiology Graduate Conference | Pasadena, CA | August 2012

## HONORS AND AWARDS

- **Innovation Corps Program**
  2017-2018 | Honor issuer: National Science Foundation
- **Astrosat & Huntsville Prize and Overall International Prize of Space Exploration Masters**
  Nov 2017 | Honor issuer: European Space Agency and Industry partners
- **NASA and NSF Fellowship for Exoplanet System Science Workshop at Biosphere 2, Arizona**
  Feb 2016 |Honor issuer: NASA, NSF
- **Outer Planets Assessment Group Meeting Fellowship**
  Feb 2015 | Honor issuer: NASA
- **H. Walter and Jeanete Praetorius Graduate Fellowship**
  April 2015 | Honor issuer: Washington State University
- **James W. Crosby Memorial Scholarship**
  April 2015 | Honor issuer: Washington State University
- **Leadership Development Fall 2014 Cohort**
  August 2014 | Honor Issuer: Washington State University
- **2014 Global Case Competition Winner**
  April 2014 | Honor Issuer: Washington State University
- **Graduate Student/Leader Scholarship for Global Solutions Program**
  May 2013 | Honor Issuer: Singularity University, Google, Washington State University
- **Astrobiology Graduate Conference Research Focus Group Winner**
  August 2012 | Honor Issuer: NASA Astrobiology Institute
- **Graduate Student Grants**
  August, Dec 2012 | Honor Issuer: NASA
- **Developing Solutions Scholarship for Master's Program in Applied Biomolecular Technology**
  Oct 2009 | Honor Issuer: University of Nottingham, UK

## RESEARCH AND PUBLICATIONS

https://www.researchgate.net/profile/Afshin_Khan