

Arghavan (Aria) Alisoltani, PhD

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1- Professional Summary

- Senior researcher with 9+ years of postdoctoral experience in computational biology, multi-omics, data science and structural bioinformatics.
- Strong record of publication (h-index 19; >3000 citations) and write a successful CDC contract proposal
- Development ML-powered webtools ViralVar & MetaProt, visualization tools Coronavirus3D, FGTDB
- Experienced project lead, independently manages complex projects, official supervising experience

2- Professional Experience

Senior researcher and Bioinformatician

Joint in Oklahoma State University and University of Alberta

USA

2025 – ~

- Studying complex, giga-scale eukaryotic genomes and GWAS analysis
- Mentoring junior scientists; providing technical direction on pipeline design

Senior researcher and Bioinformatician

Northwestern University

USA

2022 – 2025

- Developed ML-enabled webtool and pipelines for rapid analysis of viral genomic variants (ViralVar).
- GWAS to identify associated markers with virulence, cytotoxicity, antimicrobial resistance.

Postdoctoral Research Associate

University of California, Riverside

USA

2019 – 2022

- Studied microbial evolution in the context of protein 3D structure and function.
- Chronic diseases multi-omics analysis and smoking effect on cancer immune microenvironment

Postdoctoral Research Associate

University of Cape Town

South Africa

2018 – 2019

- Large-scale metaproteomics analysis to link microbial function and genital inflammation
- Provided technical guidance and mentorship to junior scientists

Postdoctoral Research Associate

Vaal University of Technology

South Africa

2017 – 2018

- Metagenomics studies to identify human disease-associated taxa

Adjunct Lecturer

Shahrekord University

Iran

2012 – 2014

Grants: CDC contract, BAA 75D301-23-R-72545 (SP0081422) | 2023 | 1 year

ML-based analysis and multilevel visualization webserver to study viral protein mutations

Awards:

- Fellowship award & Ranked 3 in National Universities entrance for master's programs in science, 2007
- The International Claude Leon Foundation Postdoctoral Fellowship award, 2018

Mentorship experience: I have officially co-supervised two MSc and two PhD students.

1- Tayebeh Rahimi, MSc, Shahrekord University, 2016-2018; 2- Andrea Abraham, MSc, University of Cape Town, 2018-2020

3- Shima Karami, PhD, Shahrekord University, 2018-2023; 4- Bahiah Meyer, PhD, University of Cape Town, 2018-2025

3- Education: PhD: molecular genetics-bioinformatics | Shahrekord University | 2011- 2015

2021-2026

1. **Alisoltani, A.**, Manhanzva MT, Matthys G, Potgieter, Christina Balle, et al (2021). Microbial function and genital inflammation in young South African women at high risk of HIV infection. *Microbiome*
2. (Co-first authored) Jaroszewski, L, Mallika I, **Alisoltani A.**, Sedova M and Adam Godzik. (2021) The interplay of SARS-CoV-2 evolution and constraints imposed by the structure and functionality of its proteins. *PLOS Computational Biology*
3. DeGrace, M. M, Ghedin, E, Frieman, M. B, Krammer, F, Grifoni, A, **Alisoltani, A.**, ... & Suthar, M. S. (2022) Defining the risk of SARS-CoV-2 variants on immune protection. *Nature*
4. (Co-Senior Author) **Alisoltani A.**, Jaroszewski L, Godzik A, Iranzadeh A, Simons M, Dean T, Lorenzo-Redondo R, Hultquist J, and Ozer E (2022) ViralVar: a web tool for multilevel visualization of SARS-CoV-2 genomes. *Viruses*
5. Tegally H, Wilkinson E, Giovanetti M, Iranzadeh A, Fonseca V, Giandhari G, Doolabh D, Pillay S, James San E, Msomi N, Mlisana K, Gottberg A, Walaza S, Allam M, Ismail A, Mohale T, Glass A, Engelbrecht S, Van Zyl G, Preiser W, Petruccione F, Sigal A, Hardie D, Marais G, Hsiao M, Korsman S, Davies M, Tyers L, Mudau I, York D, Maslo C, Goedhals D, Abrahams S, Laguda-Akingba O, **Alisoltani A.**, ... Williamson C, de Oliveira T (2021). Emergence of a SARS-CoV-2 variant of concern with mutations in spike glycoprotein. *Nature*.
6. **Alisoltani, A.**, Lukasz Jaroszewski, Mallika Iyer, Arash Iranzadeh, and Adam Godzik. (2022) Increased frequency of indels in hypervariable regions of SARS-CoV-2 proteins—a possible signature of adaptive selection. *Frontiers in Genetics*.
7. Delgado-Diaz, D.J, Jesaveluk, B, Hayward, JA, Tyssen, D, **Alisoltani, A.**, Potgieter, M, ... & Tachedjian, G. (2022). Lactic acid from vaginal microbiota enhances cervicovaginal epithelial barrier integrity by promoting tight junction protein expression. *Microbiome*, 10(1), 1-16. *Microbiome*
8. Cheung B., **Alisoltani A.**, Kochan T. J., Lebrun-Corbin M., Nozick S., Axline C. M., ... & Hauser A. R. (2023). Genome-wide screens reveal shared and strain-specific genes that facilitate enteric colonization by Klebsiella pneumoniae. *Mbio*
9. Fink, E. A., ..., **Alisoltani,A.**, Lacy M. Simons, Ramon Lorenzo-Redondo, Egon A. Ozer, Judd F. Hultquist, Anthony J. O'Donoghue, Yurii S. Moroz, (2023). Large library docking for novel SARS-CoV-2 main protease non-covalent and covalent inhibitors. *Protein Science*
10. Lane G., ... & **Alisoltani A.**, Ysselstein D., Awatramani R, Murphy R, Theron G, Zelano C (2023). Quantity of SARS-CoV-2 RNA copies exhaled per minute during natural breathing over the course of COVID-19 infection. *eLife*
11. Atassi, G., Medernach, R., Scheetz, M., Nozick, S., Rhodes, N.J., Murphy-Belcaster, M., Murphy, K.R., **Alisoltani, A.**, Ozer, E.A. and Hauser, A.R., (2023). Genomics of aminoglycoside resistance in pseudomonas aeruginosa bloodstream infections at a United States Academic Hospital. *Microbiology Spectrum*
12. Turner S, **Alisoltani A.**, et al. (2023). US National Institutes of Health Prioritization of SARS-CoV-2 Variants. *Emerging Infectious Diseases*
13. Gupta, P.M., Balle C., Tharp G.K, Nelson S.A., Gasper M.A., Brown B., **Alisoltani A.**, ... & Bosinger S.E. (2023) Systems analysis reveals differential expression of endocervical genes in African women randomized to DMPA-IM, LNG implant or cu-IUD. *Clinical Immunology*
14. **Alisoltani, A.**, Simons, L. M., ...& Ozer, E. A. (2023). Resurgence of SARS-CoV-2 Delta after Omicron variant superinfection in an immunocompromised pediatric patient. *Virology Journal*
15. (Co-Senior Author) **Alisoltani A.**, Qiu X, Jaroszewski L, Sedova M, Iyer M, and Godzik A (2023) Gender differences in smoking-induced changes in the tumor immune microenvironment. *Archives of Biochemistry and Biophysics*
16. Ling-Hu, T., Simons, L, Dean, T. J., Rios-Guzman, E., Caputo, M. T., **Alisoltani, A.** et al. (2024). Integration of individualized and population-level molecular epidemiology data to model COVID-19 outcomes. *Cell Reports Medicine*
17. Rios-Guzman, E., Simons, L. M., Dean, T, Agnes, F., Pawlowski, A., **Alisoltani, A.**, et al (2024). Deviations in RSV epidemiological patterns and population structures in the United States following the COVID-19 pandemic. *Nature communications*
18. Ling-Hu, T., Simons, L. M., Rios-Guzman, E., Carvalho, A. M., Agnes, M. F., **Alisoltani, A.**, Lorenzo, R., Hultquist, J. F. (2025). The Impact of Remdesivir on SARS-CoV-2 Evolution in vivo. *Journal of Clinical Investigation (JCI)*.
19. Gangiah, T. K., **Alisoltani, A.**, Potgieter, M., Bell,... & Masson, L. (2025). Exploring the female genital tract mycobiome in young South African women using metaproteomics. *Microbiome*, 13(1), 1-22.

20. Bolig, T. C., S. H. Nozick, C. M. R. Axline, I. T. Niki, T. L. Turner, A. Valdes, A. Alisoltani, E. Ozer, and A. R. Hauser (2025). Cytotoxicity and Virulence Attributes of Pseudomonas Aeruginosa Isolates From Patients With Necrotizing Pneumonia. *American Journal of Respiratory and Critical Care Medicine*.
21. Iranzadeh, A., Alisoltani, A., Kiran, A. , ... & Mulder, N. (2025). Comparative pangenomics of Streptococcus pneumoniae from Malawi:uncovering genetic variability and pathogenicity. *Microbial genomics*.

2018-2021

22. (Co-first authored) Abia A, Alisoltani, A., Keshri, J, & Ubomba-Jaswa, E. (2018). Metagenomic analysis of the bacterial communities and their functional profiles in water and sediments of the Apies River, South Africa, as a function of land use. *Science of the Total Environment*
23. (Co-first authored) Abia A, Alisoltani, A., Ubomba-Jaswa, E, & Dippenaar, M. A. (2019). Microbial life beyond the grave: 16S rRNA gene-based metagenomic analysis of bacteria diversity and their functional profiles in cemetery environments. *Science of The Total Environment*
24. (Senior Author) Alisoltani A, Karimi, M, Ravash, R, Fallahi, H. and Shiran, B, (2019). Molecular Responses to Cold Stress in Temperate Fruit Crops with Focus on Rosaceae Family. In Genomics Assisted Breeding of Crops for Abiotic Stress Tolerance, Vol. II (pp. 105-130). Springer.
25. (Senior Author) Alisoltani A, Luther King A, Bester L (2019). Shared Microbiome in Different Ecosystems: A Meta-Omics Perspective. In Microbial Genomics in Sustainable Agroecosystems, Vol II. Springer.
26. Alegbeleye, Alisoltani A., ALK Abia, AA Awe, AT Adetunji, S RabiuInvestigation into the bacterial diversity of sediment samples obtained from Berg River, Western Cape, South Africa. (2020). *Folia Microbiologica*
27. Shobo, C. O, Alisoltani, A., Abia, A. L. K, Mtshali, P. S,... & Bester, L. A. (2020). Bacterial diversity and functional profile of microbial populations on surfaces in public hospital environments in South Africa: A high throughput metagenomic analysis. *Science of The Total Environment*
28. Sedova M, Jaroszewski L, Alisoltani A., and Godzik (2020). A. Coronavirus3D: 3D structural visualization of COVID-19 genomic divergence. *Bioinformatics*

2013-2018

29. (Senior author) Hajmansoor, S, Bihamta, M.R, and Alisoltani A. (2013). Genetic diversity among and within Iranian and non-Iranian barely (*Hordeum vulgare* L.) genotypes using SSR and storage proteins markers. *Biochemical Systematics and Ecology*
30. Alisoltani A., Fallahi, H, Ebrahimi, M, Ebrahimi, M, & Ebrahimie, E. (2014). Prediction of Potential Cancer-Risk Regions Based on Transcriptome Data: Towards a Comprehensive View. *PloS one*
31. (Co-first authored) Mousavi, S, Alisoltani A., Shiran, B, Fallahi, H, Ebrahimi, E, Imani, A, & Houshmand, S. (2014). *De Novo* Transcriptome Assembly and Comparative Analysis of Differentially Expressed Genes in *Prunus dulcis* Mill. in Response to Freezing Stress. *PloS one*
32. Alisoltani A., Shiran, B, Fallahi, H, & Ebrahimie, E. (2015). Gene regulatory network in almond (*Prunus dulcis* Mill.) in response to frost stress. *Tree Genetics & Genomes*
33. Alisoltani A., Fallahi, H, Shiran, B, Alisoltani, A, & Ebrahimie, E. (2015). RNA-Seq SSRs and small RNA-Seq SSRs: New approaches in cancer biomarker discovery. *Gene*
34. Alisoltani, A., Ebrahimi, S, Azarian, S, Hematyar, M, Shiran, B, Jahanbazi, H, Falahi, H, Mousavi- Fard, S. and Rafiei, F. (2016). Parallel consideration of SRs and differentially expresed genes under abiotic stres for targeted development of functional markers in almond and related Prunus species. *Scientia Horticulturae*
35. L Bengyella, EL Yekwa, K Nawaz, S Iftikhar, E Tambo, A Alisotani, NA Feto, P Roy (2017). Global invasive Cochliobolus species: cohort of destroyers with implications in food losses and insecurity in the 21st Century. *Archives of Microbiology*

5- Technical and Personal skills

Bioinformatics and Data Science Skills

- Languages & Scripting: R, Python, Linux/Unix, shell scripting, Git. dynamic UI design using Shiny
- Data Science & AI: Supervised/unsupervised ML (SVM, Random Forest, regression), deep learning (MLP, reinforcement learning), statistical analysis
- Big data analysis: pipeline development (Nextflow), HPC, cloud computing, gcloud, AWS S3
- Genomics & Multi-Omics: WGS/variant analysis, GWAS, pan-genome, RNA-seq/small RNA-seq, LC-MS/MS, metagenomics/metaproteomics, systems biology (WGCNA, Cytoscape). scRNA-seq
- Structural biology: Protein structure prediction/analysis and visualization (PyMOL, AlphaFold)