

# Arghavan (Aria) Alisoltani, PhD

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## 1- Professional Summary

Senior bioinformatician and data scientist with 9+ years postdoctoral experience in computational biology, multi omics, microbiome data analysis, biomarker and target discovery. Led development of ML-powered web tools ViralVar and MetaProt, enabling rapid viral variant analysis and protein functional analysis. Proven track record of high impact publications (h index 19, >3000 citations), successful CDC contract acquisition, official mentoring and management experience. I am seeking to apply my expertise in quantitative analysis, problem-solving, collaboration, and adaptability to support research and development translate data into actionable insights.

## 2- Professional Experience

### Senior researcher and Bioinformatician

USA

*Joint in Oklahoma State University and University of Alberta*

2025 – ~

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

### Senior researcher and Bioinformatician

USA

*Northwestern University*

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

USA

*University of California, Riverside*

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

South Africa

*University of Cape Town*

2018 – 2019

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

### Postdoctoral Research Associate

South Africa

*Vaal University of Technology*

2017 – 2018

- Metagenomics studies to identify human disease-associated taxa

### Adjunct Lecturer

Iran

*Shahrekord University*

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 21<sup>st</sup> Century. *Archives of Microbiology*

## 5- Technical skills

### Bioinformatics and Data Science Skills

- Languages & Scripting: R, Python, Linux/Unix, shell, Git, UI design, HTML, Shiny, SQL
- Data Science & AI: Prompt engineering, Supervised/unsupervised ML (SVM, Random Forest, regression), deep learning, statistical analysis
- Big data analysis: pipeline development (Nextflow), HPC, SLURM, cloud computing, google cloud, 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)