

ITIKA ARORA, PHD

CURRENT POSITION

Assistant Professor of Bioinformatics
College of Medicine
Al Faisal University, Kingdom of Saudi Arabia
itiarora@alfaisal.edu

WEBSITES

LinkedIn <https://www.linkedin.com/in/itika-arora/> | [Google Scholar](#)

BIOGRAPHY

Dr. Itika Arora's primary research interest is applying bioinformatics, genomics, and computational biology to study bacterial and viral evolution, host-pathogen interactions, metabolic disorders, and resistance mechanisms. She earned her Ph.D. in Epigenetics of Cancer from the University of Alabama at Birmingham (UAB) in 2022 under the mentorship of Dr. Trygve Tollefsbol. Her doctoral research investigated the combinatorial effects of dietary botanicals on mammary tumor prevention, integrating transcriptomics, methylomics, and multi-omics approaches. This work resulted in multiple high-impact publications and established her expertise in epigenomics and systems-level data integration.

Dr. Arora holds an appointment as an adjunct assistant professor at Alfaisal University, Riyadh, Kingdom of Saudi Arabia. Her work focuses on early diagnosis, risk prediction, and biomarker discovery by integrating transcriptomic, methylomic, proteomic, metabolomic, and clinical datasets. She develops advanced computational pipelines, performs pathway and enrichment analyses, and stratifies patients using sophisticated bioinformatics and statistical frameworks. In addition to her research leadership, she mentors graduate and undergraduate students, promoting interdisciplinary learning and translational research capacity building.

Across her academic career including postdoctoral training at UAB, the University of Kentucky, and the University of Miami Dr. Arora has expanded her expertise in next-generation sequencing (NGS) technologies, including bulk RNA-seq, single-cell ATAC-seq (scATAC-seq), metagenomics, and targeted sequencing. Her research further extends to proteomics, metabolomics, and microbiome analysis, where she applies integrative computational methods to address key questions in host-pathogen biology, neurodegenerative disorders, and metabolic disease.

Dr. Arora is proficient in high-performance computing (HPC) and cloud-based platforms (AWS, GCP), employing workflow automation tools such as Nextflow, Snakemake, and Docker for large-scale reproducible omics analyses. Her technical skills include R, Python, Perl, and MySQL, supporting the development of customized, automated pipelines for integrative data analysis. She has contributed to over 25 peer-reviewed publications spanning microbial genomics, cancer epigenetics, neurodegenerative research, and metabolic disorders.

Through her cross-institutional roles, Dr. Arora's work advances computational innovation and translational research, bridging academia, clinical science, and public health. Her long-term goal is to leverage multi-omics integration, data-driven discovery, and precision medicine approaches to improve disease stratification, risk prediction, and therapeutic targeting in complex diseases.

PROFESSIONAL WORK HISTORY

Al Faisal University

Assistant Professor

Adjunct Assistant Professor

Kingdom of Saudi Arabia

July 2026 – Present

August 2025 – June 2026

Duties: *Lead integrative multi-omics research in glioblastoma (GBM) focused on identifying molecular drivers, prognostic biomarkers, and therapeutic targets. Design and implement computational pipelines for the integration of transcriptomic, methylomic, proteomic, and genomic datasets to unravel tumor heterogeneity and treatment response. Perform pathway enrichment, survival-linked feature discovery, and patient stratification using advanced bioinformatics and statistical approaches. Collaborate with translational and clinical teams to correlate molecular signatures with clinical outcomes, resistance mechanisms, and disease progression.*

SKILLS: Multi-omics data integration; bulk and single-cell RNA-seq analysis; DNA methylation and proteomics data processing; differential expression and network biology; pathway and TF enrichment; mutation and copy-number integration; survival and prognosis modeling; workflow automation (Nextflow, Snakemake, Docker); high-performance and cloud computing

Khalifa University

Research Scientist

Abu Dhabi, UAE

June 2025 – April 2025

Duties: *Lead multi-omics integration research in Type 2 Diabetes with a focus on early diagnosis, risk prediction, and biomarker discovery. Develop and implement computational pipelines for integrative analysis of transcriptomics, methylomics, proteomics, and clinical data. Perform enrichment analyses, factor-feature associations, and patient stratification using advanced statistical and bioinformatics methods. Collaborate with clinical teams to correlate molecular findings with patient outcomes.*

SKILLS: Multi-omics data integration; NGS analysis (bulk RNA-seq, scATAC-seq, metagenomics); pathway enrichment; statistical modeling; workflow automation (Nextflow, Snakemake, Docker); HPC and cloud computing (AWS); clinical-bioinformatics correlation studies; advanced R and Python programming; graduate student mentorship.

Emory University

Assistant Bioinformatics Scientist

Atlanta, GA, USA

January 2024- April 2025

Duties: *Conduct bacterial and viral genomic analysis, focusing on large-scale sequencing datasets from COVID-19 patient samples, influenza, dengue, Powassan virus, and wastewater surveillance. Develop and optimize bioinformatics pipelines for analyzing viral intrahost variation and recombination using tools such as Viralrecon, CDC's IRMA, Kraken, MIRA CDC, and StrainGE on AWS. Design and implement computational workflows to ensure efficient data processing and analysis. Collaborate with multi-institutional teams to streamline data analysis and manage large-scale genomic datasets. Perform variant calling, strain identification, and phylogenetic analysis to support infectious disease research and pathogen surveillance. Troubleshoot computational workflows, manage AWS-based cloud computing resources, and optimize high-throughput data processing pipelines.*

SKILLS: Bioinformatics pipeline development; bacterial and viral genomics; pathogen surveillance; genomic data analysis; viral intrahost variation and recombination; multi-omics analysis; variant calling; strain identification; high-performance computing (HPC); AWS cloud computing; workflow automation using Nextflow, Snakemake, and Docker; computational workflows; and expertise with bioinformatics tools such as Viralrecon, IRMA, Kraken, MIRA, and StrainGE.

University of Miami

Miami, FL, USA

Postdoctoral Researcher

August 2023–December 2023 *Duties:*

Duties: Conducted research on diabetes and metabolic disorders using mouse models to study disease mechanisms and therapeutic interventions. Performed animal surgeries and conducted downstream wet-lab experiments, including RNA/DNA extraction, protein estimation, western blotting, and flow cytometry. Collaborated with research teams to design experimental protocols, computational workflows, and multi-omics analysis approaches. Provided technical support for troubleshooting wet-lab and computational workflows. Coordinated with crossfunctional teams to facilitate data sharing, analysis, and interpretation of results. Mentored graduate and undergraduate students on experimental procedures, bioinformatics workflows, and data analysis strategies.

SKILLS: Animal models; assay development; ELISA; wet-lab techniques including animal surgeries, RNA/DNA extraction, western blotting, next-generation sequencing (NGS) analysis; transcriptomics; bulk RNA-seq analysis; multi-omics data integration; and computational workflow development.

University of Kentucky

Lexington, KY, USA

Postdoctoral Researcher

February 2023–July 2023

Duties: Conducted research on Alzheimer's Disease (AD) using single-cell ATAC-seq (scATACseq) and bulk RNA-seq analysis to investigate epigenomic and transcriptomic changes associated with neurodegenerative disease. Performed computational analysis of multi-omics datasets to identify regulatory elements and gene expression patterns linked to Alzheimer's Disease. Developed and optimized computational workflows for analyzing single cell and bulk RNA-seq data.

SKILLS: Single-cell ATAC-seq (scATAC-seq); bulk RNA-seq analysis; transcriptomics; largescale data analysis; and collaborative research coordination.

University of Alabama

Birmingham, AL, USA

Postdoctoral Researcher

May 2022 – February 2023

Duties: Conducted next-generation sequencing (NGS) studies and computational analysis for various research projects. Performed RNA/DNA extraction, protein estimation, western blotting, lung lysate-related experiments, and flow cytometry. Mentored graduate and undergraduate students on computational and wet-lab methods.

SKILLS: Next-generation sequencing (NGS) analysis; RNA/DNA extraction; protein estimation; western blotting; lung lysate analysis; flow cytometry; computational workflow development; large-scale data analysis; multi-omics data integration; transcriptomics; methylomics, proteomics; and computational troubleshooting.

Biometrix Inc.

San Francisco, CA, USA

DATA Scientist (Internship)**May 2016 – August 2016**

Learning: Obtain a sound understanding of analytical methods, statistics, predictive modeling, and application of machine learning in the field of clinical research. Received hands-on training on current state of databases, data structures, B.I. tools, and other analytics technology with a focus on how these can be applied to address business challenges. Performed mining of health care data, analytics, and current uses of analytics. Gained excellent knowledge of common data structures and the ability to write efficient code in at least one language. Proficiency with relational (SQL) and non-relational databases C(Hadoop).

Emirates NBD**Dubai, UAE****Relationship Manager****May 2013 – November 2014**

Duties: Managed customer service operations inclusive of implementing short and long-term plans, managing teams with the focus on excelling business targets and service delivery metrics. Cultivated and maintained healthy business relations with clients, ensuring high customer satisfaction matrices by achieving delivery and service quality norm. Coordinated with clients for suggesting the most viable product range and build relations.

RAK Bank**Dubai, UAE****Relationship Officer****December 2012– March 2013**

Duties: Was resourceful at maintaining relationships with clients to achieve quality product and service norms by resolving service-related critical issues. Carried out effective research and intelligence into competitor products and other trends across all businesses. Conducted online campaigns and generated awareness of websites and the use of digital and social media.

EDUCATION**University of Alabama****Birmingham, AL, USA****Doctor of Philosophy****2017-2022**

Cumulative GPA: 3.5

Dissertation: *Impact of Green Tea Polyphenols (GTPs) and Broccoli Sprouts (BSp) in Prevention and Inhibition of Mammary Cancer*

Indiana University**Indianapolis, IN, USA****Master of Science in Bioinformatics****2015-2016**

Cumulative GPA: 3.6

IMT University**Dubai, UAE****Master of Business Administration****2011-2012**

Cumulative GPA: 3.4

SRM University**Chennai, TN, INDIA****Bachelor of Technology in Bioinformatics****2006-2010**Cumulative GPA: 3.9

CERTIFICATES AND TRAININGS

Animal Biocontainment Safety Level 3 Certification

2018

UAB, Birmingham, AL, USA

Mouse, C57BL/6, CD-1, A129: injections (intraperitoneal, subcutaneous, intradermal in footpad, intracranial), oral gavage, bleeds (retroorbital), inhalational anesthesia (isoflurane), euthanasia (CO₂, cervical dislocation, cardiac bleed)

Agents: chikungunya virus, West Nile virus, Venezuelan equine encephalitis virus, Eastern equine encephalitis virus Years:4

COMPUTING AND BIOINFORMATICS SKILLS

Category	Subcategory	Proficiency
		1 -----10
Operating Systems	Windows	
	Linux	
	Mac	
Bioinformatics analysis	SNP annotation	
	Reads mapping (short/long)	
	Variant calling	
	Nextflow	
	Snakemake	
	Geneious Prime	
	DNAexus	
	Taxonomic classification	
	De Novo Assembly	
	Ref based assembly	
Cloud computing Programming	Amazon web services	
	De Novo assembly	
	HPC Clusters	
Basic Computing	R	
	Bash	
Other	Adobe suite	
	Microsoft Office	
	Protein modeling	
	Swiss PDB	

RESEARCH ACTIVITIES

A. Grants

- **SNIH 2025**: From In Silico to Clinic: Unraveling Saudi Glioblastoma Through Integrative Omics and Advanced AI (*Under review*).
- **RDIA 2025**: Deciphering the Saudi Glioblastoma Genome: A Multi-Omics Approach to Personalized Therapy (*Under review*).

B. ORIGINAL RESEARCH ARTICLES

Published

Emmanuela Jules, Charlie Decker, Brianna Jeanne Bixler, Alaa Ahmed, Zijng (Carol) Zhou, **Itika Arora**, Henok Tafesse, Hannah Dakanay, Andrei Bombin, Ethan Wang, Jessica Ingersoll, Kathy

Bifulco, Jennifer K Frediani, Richard Parsons, Julie Sullivan, Morgan Greenleaf, Jesse J Waggoner, Greg S Martin, Wilbur A Lam, Anne Piantadosi (2025). Respiratory Virus Detection and Sequencing from SARS-CoV-2–Negative Rapid Antigen Tests. doi: 10.3201/eid3113.241191

Arora, I., Baer, K., Kimbro, J., Haider, A., Mott, M., Marshall, K., Wu, H.M., Fairley, J., Piantadosi, A., Myers, D.R., Waggoner, J.J. (2024). Iquitos Virus in Traveler Returning to the United States from Ecuador. *Emerging Infectious Diseases*, 30(11), 2447-2451. doi: 10.3201/eid3011.240708.

Bankole, T., Ma, T., **Arora, I.**, Lei, Z., Raju, M., Li, Z., Li, Y. (2024). The Effect of Broccoli Glucoraphanin Supplementation on Ameliorating High-Fat-Diet-Induced Obesity through the Gut Microbiome and Metabolome Interface. *Molecular Nutrition Food Research*. doi: 10.1002/mnfr.202300856.

Brane, A., **Arora, I.**, Tollefsbol, T.O. (2023). Epigenetic-Based Nutritional Prevention of Estrogen Receptor Negative Breast Cancer During Puberty. *MDPI Cancer*. doi: 10.3390/cancers15030674.

Chatterjee, T., Lewis, T.L., **Arora, I.**, Gryshyna, A.E., Underwood, L., Masjoan Juncos, J.X., Aggarwal, S. (2023). Sex-Based Disparities in Leukocyte Migration and Activation in Response to Inhalation Lung Injury: Role of SDF-1/CXCR4 Signaling. *Cells*. doi: 10.3390/cells12131719.

Chatterjee, T., **Arora, I.**, Underwood, L.B., Lewis, T.L., Masjoan Juncos, J.X., Heath, S.L., Goodin, B.R., Aggarwal, S. (2023). Heme-Induced Macrophage Phenotype Switching and Impaired Endogenous Opioid Homeostasis Correlate with Chronic Widespread Pain in HIV. *Cells*. doi: 10.3390/cells12121565.

Chatterjee, T., **Arora, I.**, Underwood, L., Gryshyna, A., Lewis, T.L., Masjoan Juncos, J.X., Goodin, B.R., Heath, S., Aggarwal, S. (2023). High Heme and Low Heme Oxygenase-1 Are Associated with Mast Cell Activation/Degranulation in HIV-Induced Chronic Widespread Pain. *Antioxidants*. doi: 10.3390/antiox12061213.

Staitieh, B.S., Malik, S., Auld, S.C., Wigger, G.W., Fan, X., Roth, A., Chatterjee, T., **Arora, I.**, Vamsee, R.S., Heath, S., Aggarwal, S. (2022). HIV Increases the Risk of Cigarette Smoke-Induced Emphysema via MMP-9. *Journal of Acquired Immune Deficiency Syndromes (JAIDS)*. doi: 10.1097/QAI.0000000000003125.

Arora, I., Crowley, M., Crossman, D.K., Li, Y., Tollefsbol, T.O. (2022). Genome-Wide Analysis of Transcriptomes and DNA Methylomes in Prevention of Mammary Cancer Induced by Early Combined Botanicals via Regulation of Epigenetic Mechanisms. *Cells*. doi: 10.3390/cells12010014.

Chen, M., Li, S., **Arora, I.**, Yi, N., Sharma, M., Li, Z., Tollefsbol, T.O., Li, Y. (2022). Maternal Soybean Diet on Prevention of Obesity-Related Breast Cancer Through Early-Life Gut Microbiome and Epigenetic Regulation. *Journal of Nutritional Biochemistry*. doi: 10.1016/j.jnutbio.2022.109119.

Arora, I., Sharma, M., Li, S., Crowley, M., Crossman, D.K., Tollefsbol, T.O. (2022). An Integrated Analysis of the Effects of Maternal Broccoli Sprouts Exposure on Transcriptome and Methylome in Prevention of Offspring Mammary Cancer. *PLOS One*. doi: 10.1371/journal.pone.0264858.

Chen, M., Li, S., **Arora, I.**, Yi, N., Sharma, M., Li, Z., Tollefsbol, T.O., Li, Y. (2022). Maternal Soybean Diet on Prevention of Obesity-Related Breast Cancer Through Early-Life Gut Microbiome and Epigenetic Regulation. *Journal of Nutritional Biochemistry*.

Sharma, M., **Arora, I.**, Chen, M., Wu, H., Crowley, M.R., Tollefsbol, T.O. (2021). Therapeutic Effects of Dietary Soybean Genistein on Triple-Negative Breast Cancer via Regulation of Epigenetic Mechanisms. *Nutrients*. doi: 10.3390/nu13113944.

Ganguly, S., **Arora, I.**, Tollefsbol, T.O. (2021). Impact of Stilbenes as Epigenetic Modulators of Breast Cancer Risk and Associated Biomarkers. *International Journal of Molecular Sciences*. doi: 10.3390/ijms221810033.

Arora, I., Li, Y., Sharma, M., Crowley, M., Crossman, D., Tollefsbol, T.O. (2021). Systematic Integrated Analysis of Methylomic and Transcriptomic Impacts of Early Combined Phytochemicals on Estrogen Receptor-Negative Mammary Cancer. *Scientific Reports*. doi: 10.1038/s41598-021-89131-5.

Arora, I., Sharma, M., Tollefsbol, T.O. (2020). The Epigenetic Link Between Aging, Gene Expression, and Polyphenols. *Frontiers in Genetics*. doi: 10.3389/fgene.2019.01329.

Sharma, M., **Arora, I.**, Stoll, M.L., Li, Y., Morrow, C.D., Barnes, S., Berryhill, T.F., Li, S., Tollefsbol, T.O. (2020). Nutritional Combinatorial Impact on the Gut Microbiota and Plasma Short-Chain Fatty Acids Levels in the Prevention of Mammary Cancer in Her2/neu Transgenic Mice. *PLOS One*. doi: 10.1371/journal.pone.0234893.

Arora, I., Tollefsbol, T.O. (2020). Computational Methods and Next-Generation Sequencing Approaches to Analyze Epigenetics Data: Profiling of Methods and Applications. *Methods*. doi: 10.1016/j.jmeth.2020.09.008.

Sharma, M., **Arora, I.**, Tollefsbol, T.O. (2020). Gut Microbiota-Derived Epigenetic Alterations During Onset of Diseases. *Book Chapter for Comprehensive Gut Microbiota, Elsevier*.

Wilson, A.C., Kumar, P.L., Lee, S., **Arora, I.**, Morrow, J.D., Rennard, S.I., Washko, G., McDonald, M.L. (2020). Heme Metabolism Genes Downregulated in COPD Cachexia. *BMC Respiratory Research*. doi: 10.1186/s12931-020-01336-w.

Arora, I., Sharma, M., Tollefsbol, T.O. (2019). Combinatorial Epigenetics Impact of Polyphenols and Phytochemicals in Cancer Prevention and Therapy. *International Journal of Molecular Sciences*. doi: 10.3390/ijms20184567.

Arora, I., Koltes, J.E., Gupta, R., Schaid, M., Kim, J., Kimple, M.E., Bhatnagar, S. (2019). A gene expression network analysis of the pancreatic islets from lean and obese mice identifies complement 1-like-3 secreted protein as a regulator of β -cell function. *Scientific Reports*, 10119(2019). doi: 10.1038/s41598-019-46219-3.

Yue, Z., **Arora, I.**, Nguyen, T.M., Feng, W., Neylon, M.T., Chen, J.Y. (2017). Repositioning Drugs by targeting network modules: A Parkinson's disease case study. *BMC Bioinformatics*, 18(Suppl 14): 532. doi: 10.1186/s12859-017-1889-0.

Yue, Z., Neylon, M.T., Nguyen, T.M., Bulsara, N., **Arora, I.**, Chen, J.Y. (2016). Towards constructing Super Gene Sets regulatory networks. *IEEE Conference on Bioinformatics and Biomedicine (BIBM)*.

C. Publications Under Review

Itika Arora, Tarek Arabi, Arshiya Akbar, Naveed Syed Abdul Kareem, Zara Ahmed, Volodymyr Mavrych, Olena Bolgova, Shamsa Hilal Saleh, Firoz Ahmed, Ahmed Abu Zaid, Mira Mousa, Mohammed Imran Khan, Ahmed Yaqinuddin (2025). Novel Epigenetic Markers and Heterogeneity in Glioma CpG Island Methylator Phenotype (G-CIMP): Prognostic Implications for Glioblastoma

Abdullah Jabri, Abdulaziz Mhannayeh, Mohamed Alsharif, Bader Taftafa, Tooba Mujtaba, Arshiya Akbar, Ahmed Abu-zaid, Tanveer Ahmed Mir, Muhmmad Imran Khan, Firoz Ahmed, **Itika Arora**, Ahmed Yaqinuddin (2025). Integrative Analysis of Tissue and Circulating miRNAs as Biomarkers for Progression and Survival in Hepatocellular Carcinoma

Itika Arora, Sarah Azzam, Lena Lößlein, Dalia Barayan, Mauricio Paton, Andre Sanches Barreiros, Thanumol Abdul Khader, Tanim Chatterjee, Arshiya Akbar, Habiba Al Safar, Mira Mousa, Saurabh Aggarwal (2025). HIV Infection Drives Dysregulation of Coagulation and Complement Cascades: Proteomic Insights into Cardiopulmonary Risk

Itika Arora, Mauricio Paton, Andre Sanches Barreiros, Lena Loesslein, Tanim Chatterjee, Lily Underwood, Mira Mousa, Saurabh Aggarwal (2025). Systemic Proteomic Remodeling in HIV-Associated Chronic Pain Reveals Dysregulated Coagulation and Lipid Pathways as Potential Drivers of Neuroimmune Sensitization.

Itika Arora, Sedra Jamal Kremesh, Mira Mousa and Habiba Al Safar (2025). Beyond Blood Sugar: Harnessing Multi-Omics Integration for Precision Stratification and Risk Forecasting in Diabetes

B. SEMINARS AND CONFERENCES

- Served as a reviewer for a Handbook of Epigenetics (Third Edition) by Elsevier and Academic Press for a chapter titled: Computational Epigenetics: The CeRNA Network Analysis.
- Graduate Student presentation in Department of Biology, UAB, USA, August 2022.
- Poster presentation at Darwin's Day, UAB, USA, February 2020.
- Poster presentation at 35th Annual Diabetes research symposium, UAB, USA, June 2018.
- Poster presentation at Midsouth Computational Biology and Bioinformatics society (MCBIOS), USA, March 2017.
- Poster presentation at Midsouth computational biology and bioinformatics society (MCBIOS), USA, March 2016.
- Oral presentation at National conference on recent advances in bioengineering, INDIA, January 2010.

- National level technical symposium (ZAVEST), INDIA, October 2009.
- National seminar of biosciences, INDIA, June 2007

C. SEMINARS AND CONFERENCES

- Selected for a 5-minute oral presentation at the Counter ACT 2022 Conference and awarded a travel grant of USD 1,000 (June 2022).
- Presented at the Department of Biology Seminar during Graduate Student Presentation Day (2020).
- Recognized for outstanding performance as an Excellence Club Winner at Emirates NBD Bank, Dubai, UAE (March 2014).
- Winner of the "Dash for Double" Marathon Contest at RAK Bank, Dubai, UAE (December 2012).
- 3rd Runner-Up in the Champions League for Relationship Managers (Wealth Management) at RAK Bank, Dubai, UAE (December 2012).
- 2nd Runner-Up in the Champions League for Relationship Managers (Wealth Management) at RAK Bank, Dubai, UAE (September 2012).

TEACHING EXPERIENCE

A. TEACHING RESPONSIBILITIES AT AL FAISAL UNIVERSITY, SAR: 2025
a. Introduction of Bioinformatics, DBS 706

B. TEACHING RESPONSIBILITIES AT EMORY UNIVERSITY, USA:

a. Students/Mentees

<u>GiGi Arias</u> , Emory University Rotation student	2024
<u>Cara Chen</u> , Emory University Undergraduate work study student	2024
<u>Tyshawn Ferrel</u> , Emory University Rotation student	2024

C. TEACHING RESPONSIBILITIES AT UAB, USA:

a. Instructor

<u>Introduction to R programming</u>	2018-2021
<u>Introduction to Human Physiology</u>	2022

b. Teaching positions

<u>Guest Problem-Based Learning Facilitator Pathobiology</u>	2019
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c. Students/Mentees

<u>Tania Strilets</u> , University of Texas Medical Branch Rotation student, Biochemistry and Molecular Biology Graduate Program	2020
<u>Stephen Kunkel</u> , UAB Rotation student, MD/PhD Combined Degree Program	2022
<u>Maria Kastis</u> , Ball High School Bench Tutorials	2021

