

# Fatemeh Vafaei

## Curriculum Vitae

School of Biotechnology and Biomolecular Sciences  
University of New South Wales, Sydney NSW 2006

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### Research Interests

Computational biology and bioinformatics, artificial intelligence, machine learning, deep learning, biomarker discovery, cancer informatics, drug discovery.

### Current Appointments

- 10/2022– **Associate Professor**, *School of Biotechnology & Biomolecular Sciences (BASB)*, UNSW, Sydney.
- 3/2021– **Deputy Director**, *UNSW Data Science Hub (uDASH)*, University of New South Wales, Sydney.
- 11/2022– **Program Lead**, *AI-enabled Medical Technologies NGGP (Med-Tech.AI)*, CSIRO/Data61 Next-Generation Graduate Program (NGGP).
- 5/2020– **Health Data Science Lead**, *UNSW Data Science Hub*, UNSW, Sydney.
- 2/2022– **Founding CEO**, *OmniOmics.AI Pty Ltd.*, Sydney, Australia.

### Former Academic Positions

- 5/2017– **Senior Lecturer**, *School of Biotechnology and Biomolecular Sciences*, UNSW, Sydney, Australia.
- 10/2022 Research: Computational biomedicine, systems biology, bioinformatics, precision medicine
- 3/2013– **Research Fellow**, *Charles Perkins Centre*, University of Sydney, Australia.
- 5/2017 Research: Computational biomedicine, systems biology, bioinformatics
- 8/2011– **Postdoctoral Associate**, *University Health Network, Ontario Cancer Institute, Department of Computer Science*, University of Toronto, Canada.
- 9/2012 Research: Computational biology, cancer informatics

### Education

- 5/2011 **Ph.D.**, *Computer Science, Artificial Intelligence*, University of Illinois at Chicago, USA.  
Thesis Topic: Controlling Genetic Operator Rates in Evolutionary Algorithms
- 8/2006 **B.Sc.**, *Computer Engineering*, Sharif University of Technology, Tehran, Iran.  
Thesis Topic: Design and implementation of Multi-Media Value Added Service Provider

### Honours and Recognition

- 2023 Winner of Women in AI Asia-Pacific **Award in Health**
- 2023 Runner-up of Women in AI Asia-Pacific **Innovator of the Year**
- 2020 Georgina Sweet Award for Women in Quantitative Biomedical Science (Finalist)
- 2019 UNSW Science Visiting Research Fellowship
- 2009 Grace Hopper Celebration of Women in Computing Award, Anita Borg Inst

### Media Interviews and Invitations

- APC Network:** Featured Expert in [AI enhancing personalised medicine and precision therapy](#)
- Digital Nation:** [The Women in AI creating change through the power of AI](#)
- ABC News:** Invitation to Interview: Bias in Artificial Intelligence
- UNSW Newsroom:** Featured for [WAI Award](#) and [MRFF Success](#)

## Research Income

**Last 5 Years Metrics:** Net value of **\$13.5M** (unapportioned, Chief Investigator) in research & industry funding.

- 2023 – 2026 Funding body: *Industry Research Contract*, Title: AI-enabled drug discovery. Lead Investigator: **\$1.2M Vafaee F, Industry Partner:** Living Cell Technologies Limited (\$0.9M) and CSIRO/Data61 NGGP (\$0.3M).
- 2023 – 2027 Funding body: *Next-Generation Graduate Program (NGGP), CSIRO/Data61*, Title: AI-integrated Medical Technologies: From Diagnostics to Therapeutics. Chief Investigators: **Vafaee F** (Lead CI), Wilkins M, Rokny H, Berkovsky S, Saberim, Beydoun G, **Industry Partners:** GenieUs Genomics, 23Strands, Trajan Scientific & Medical, Metasense, Surround Australia, Evidentli.
- 2022 – 2024 Funding body: *ARC Discovery Project (DP220101938)*, Title: Decoding regulatory RNA function in bacteria. Chief Investigators: Tree J, **Vafaee F** (CIB) **\$550K**
- 2021 – 2025 Funding body: *Medical Research Future Fund, EPCDRI - Improving Diagnosis in Cancers with Low Survival Rates (APP2008996)*, Title: Microbial based biomarkers powered by artificial intelligence for early detection of liver cancer in Australia. The Australian Liver Cancer Microbiome Consortium. Chief Investigators: Zekry A, El-Omar E, **Vafaee F** (CIC, Artificial Intelligence (AI) Lead), Sowmya A, McCaughan G, Nicholson J, Holmes E, Roberts S, Fung K, Behary J. **\$4M**
- 2021 – 2025 Funding body: *NHMRC Development Grant (APP2014538)*, Title: Development of a novel blood test that accurately predicts response to checkpoint therapy in cancer patients. Chief Investigators: Fazekas B, Clark G Tsonis C, McGuire H, **Vafaee F** Boyer M, Kao S, Lee J Rankin N **\$600K**
- 2021 – 2025 Funding body: *Medical Research Future Fund, Australian Government*, Title: An Australian-specific Multicentre Double-Blinded Randomised Controlled Trial of Genotype-guided versus Standard Psychotropic Therapy in Moderately-to-Severely Depressed Patients Initiating Pharmacotherapy. Chief Investigators: Wu K, Fitzgerald, Grieve, Harris, Hood, Rogeers, Schofield, Shrestha, Usherwood, **Vafaee F** (Chief Investigator, AI Lead) **\$2.95M**
- 2019 – 2021 Funding body: *Mark Hughes Foundation Brain Cancer Innovation Project Grant*, Title: Combining artificial intelligence and genomics to non-invasively monitor glioblastoma patients and predict tumour recurrence. Chief Investigators: **Vafaee F** (CIA), Howell V, Jurisica I. **\$150K**
- 2019 – 2021 Funding body: *Cooperative Research Centres Project (CRC-P), Australian Government*, Title: Smart Sensor & Deep Learning Behavioural Engine for Personalised Health Monitoring. Chief Investigators: Mehta H, Varnes P, Liu G, **Vafaee F** (Chief Investigator, AI Lead), Salvado O, Wentworth J, Hoek A, Shaw J, Crowder R, Wiebenga R, McGuinness R. **\$2.15M**
- 2020 – 2021 Funding body: *Cellular Genomics Future Institute, UNSW*, Title: Fast and scalable denoising and integration of large-scale single-cell sequencing data. Chief Investigators: **Vafaee F** (CIA), Lovell N, Arcot S. **\$100K**
- 2021 – 2022 Funding body: *Digital Grid Future Institute, UNSW*, Title: EV adoption in Smart Cities: with AI-enabled mental map configuration to enhance the individuals, decision-making. Chief Investigators: Waller T, Rashidi T, **Vafaee F**, Najmi A. **\$60K**
- 2021 – 2022 Funding body: *Industry Network Seed Funding, UNSW*, Title: Data-driven repositioning of small molecules for a novel insecticide discovery against small hive beetle. Chief Investigators: Scott Sisson, **Vafaee F**, Partner Organisation: Wanderer Honey. **\$20K**
- 2021 – 2022 Funding body: *Social Good Seed Funding, UNSW*, Title: An AI-enhanced Multi-analyte Blood Test: The Next Generation of Breast Cancer Diagnostics. Chief Investigators: **Vafaee F**, Omid Faridani, Mehdi Rafei, Partner Organisation: BreastScreen NSW. **\$20K**
- 2021 – 2021 Funding body: *Industry Network Seed Funding, UNSW*, Title: Deep learning-based integration of different modalities of data – multi-omics and beyond. Chief Investigator: **Vafaee F**, Partner Organisation: BCAL Diagnostics. **\$18K**

- 2019 – 2020 Funding body: *CINSW Sydney Vital Translational Cancer Research - Research Seed Funding Award*, Title: Understanding of the involvement of inflammation in cancer progression and the development of resistance to treatments - Bioinformatician Funding Source. Chief Investigators: Howell V, **Vafaee F**
- 2020 – 2021 Funding body: *Research Infrastructure Scheme, UNSW*, Title: Nanopore-based long read sequencer and Viaflo sample prep station for the Ramaciotti Centre for Genomics. Chief Investigators: Wilkins M, Cavicchioli R, Edwards R, Janitz M, Hazel M, Lan R, Murray V, Oates E, Tree J, **Vafaee F**, Waters P, White P, Zhang Li (co-CIs alphabetically sorted)
- 2019 – 2021 Funding body: *Vertex Innovation Funds*, Title: Exosomal Biomarkers for Early Prediction of Cystic Fibrosis Related Diabetes. Chief Investigators: Waters S, Kicic A, Jaffe A, **Vafaee F**, Verge C, Widger J, Yvnone B et al.
- 2019 – 2020 Funding body: *UNSW Scientia Education Investment Fund*, Title: Micro-credentials in bioinformatics/systems biology, genetics/genomics and protein structural biology. Chief Investigators: Whitaker N, **Vafaee F**, Oates E, Marquis C, Gaela A, et al.
- 2019 – 2019 Funding body: *UNSW Research Technology Services*, Title: AI-empowered Brain Genomics (Machine learning and Cloud Computing Schemes) . Chief Investigator: **Vafaee F**
- 2019 – 2019 Funding body: *UNSW Faculty Research Grants Program*, Title: Cell-identity mapping from massive single-cell data using deep learning. Chief Investigator: **Vafaee F**
- 2015 – 2016 Funding body: *SPARC Implementation Fund*, Title: The Sydney 1000 Cancer Project–Stage 1 Gastrointestinal Cancers Immunophenotyping Study. Chief Investigators: Charles K, Clarke S, Diakos C, Pavlakis N, Engel A, Gill A, Smith A, Byrne S, McGuire H, **Vafaee F**, King M.
- 2014 – 2015 Funding body: *Ramsay Research and Teaching Fund*, Title: Routine application of next generation sequencing for identifying Actionable Mutations in patients with non-small cell lung cancer. Chief Investigators: Pavlakis N, Howell V, Colvin E, **Vafaee F**.
- 2014 – 2015 Funding body: *Judith & David Coffey*, Title: Characterizing the temporal cellular response to a loss of redox homeostasis using systems biology approaches. Chief Investigators: **Vafaee F**, Fisher-Wellman K, Fazakerley D, Krycer J, James D, Kuncic Z.

Associate Investigator on NHMRC Ideas grant (*APP2012848*, **1.1M**, 2022 - 2025). Title: Revolutionising immunotherapy response prediction in lung cancer via single-cell proteomic analysis of CTC and immune cells.

## Research Funding Under-Review

- 2024 – 2027 Funding body: *NHMRC Ideas (APP2029435)*, Title: Multi-analyte blood test powered by artificial Intelligence: a game-changer in early detection of breast cancer; Chief Investigators: **Vafaee F** et. al. (Lead CI)
- 2024 – 2026 Funding body: *NHMRC Ideas (APP2029104)*, Title: Machine Learning for Precision Medicine in Melanoma Diagnosis using Ex Vivo Microscopy: Baker M, **Vafaee F** et. al. (CIB), Song Y
- 2024 – 2027 Funding body: *Australian Research Council, Discovery Project (DP240103177)*, Title: Radically expanding Australia’s chemical toolbox for life science research, Chief Investigators: Lock J, De Weck A, **Vafaee F** (CIC) et al.
- 2024 – Funding body: *Australian Research Council, Linkage Infrastructure, Equipment and Facilities (LE240100058)*, Title: Single Cell Proteomics Platform for NSW, Chief Investigators: Larance M et al. and **Vafaee F** (UNSW Lead CI).

## Publications

**Summary of Metrics:** 60 peer-reviewed articles plus 7 articles in-prep/under-review, 60% corresponding author, 95% Q1 journals. Field-Weighted Citation Impact: 3.08 (SciVal, 2017–2019). Produced over 20 software/analysis-pipelines accessible via the VafaeeLab GitHub or as cloud-based software.

[Journal Papers](#) (Corresponding authorship is marked by \*)

- 2023 Zandavi M, Liu D, Chung V, Anaissi, **Vafaee F\***, Fotomics: Fourier transform-based omics imagification for deep learning-based cell-identity mapping using single-cell omics profiles. *Artificial Intelligence Review*, doi: 10.1007/s10462-022-10357-4 (IF: 12.50)
- 2023 Safari F, Kehelpannala C, Safarchi A, Batarseh AM, **Vafaee F\***, Biomarker Reproducibility Challenge: A Review of Non-Nucleotide Biomarker Discovery Protocols from Body Fluids in Breast Cancer Diagnosis. *Cancers* doi: 10.3390/cancers15102780 (IF:5.2)
- 2023 Gunawan I, Vafaee F, Meijering E, Lock JG, An introduction to representation learning for single-cell data analysis', *Cell Reports Methods*, doi:10.1016/j.crmeth.2023.100547
- 2023 Subramanian S et al., Genome-wide Transcription Factor binding maps reveal cell-specific changes in the regulatory architecture of human HSPC', *Blood*, doi: 10.1182/blood.2023021120 (IF: 20.3)
- 2023 Choi WWY, Sánchez C, Li JJ, Dinarvand M, Adomat H, Ghaffari M, Khoja L, **Vafaee F**, Joshua AM, Chi KN, Guns EST, Hosseini-Beheshti E, Extracellular vesicles from biological fluids as potential markers in castration-resistant prostate cancer, *Journal of Cancer Research and Clinical Oncology*, doi:10.1007/s00432-022-04391-6
- 2023 Ahmadzada T, Vijayan A, **Vafaee F**, Azimi A, Reid G, Clarke S, Kao S, Grau GE, Hosseini-Beheshti E, Small and Large Extracellular Vesicles Derived from Pleural Mesothelioma Cell Lines Offer Biomarker Potential, *Cancers*, doi: 10.3390/cancers15082364 (IF:5.2)
- 2023 Batarseh AM, **Vafaee F** et al., Investigation of Plasma-Derived Lipidome Profiles in Experimental Cerebral Malaria in a Mouse Model Study, *International Journal of Molecular Sciences*, doi: 10.3390/ijms24010501
- 2023 Mandal A, Priyam S, Chan HH, Gouveia BM, Guitera P, Song Y, Baker MAB, **Vafaee F\***, Computer-Aided Diagnosis of Melanoma Subtypes Using Reflectance Confocal Images. *Cancers*, doi: 10.3390/cancers15051428 (IF: 6.639)
- 2023 Khazaal A, Zandavi M, Smolnikov A, Fatima S, **Vafaee F\***, Pan-cancer analysis reveals functional similarity of three lncRNAs across multiple tumors. *International Journal of Molecular Sciences*, doi: 10.3390/ijms24054796 (IF: 6.208)
- 2023 Gano C et. al, **Vafaee F** and Scott K, Anti-cancer potential of synergistic phytochemical combinations is influenced by the genetic profiles of prostate cancer cell lines. *International Journal of Molecular Sciences*, doi: 10.3389/ijms24054796 (IF: 6.208)
- 2022 Zandavi M, Koch F, Vijayan A, Val Zanini F, Mora F, Gallego-Ortega D, **Vafaee F\***, Disentangling single-cell omics representation with a power spectral density-based feature extraction. *Nucleic Acids Research*, doi: 10.1093/nar/gkac436 (**Impact Factor IF: 19.16**)
- 2022 Vijayan, Fatima, Swomya, **Vafaee F\***, Blood-based transcriptomic signature panel identification for cancer diagnosis: Benchmarking of feature extraction methods, *Briefings in Bioinformatics* (IF: **13.99**), invited submission to ncRNA Special Issue, doi:10.1101/2022.03.13.483368
- 2022 Zandavi M, D Liu, Chung V, Anaissi A, **Vafaee F\***, Fotomics: Fourier transform-based omics imagification for deep learning-based cell-identity mapping using single-cell omics profiles, *Artificial Intelligence Review*, In Press (IF: **9.588**), doi:10.1101/2022.07.08.499309
- 2022 Qayyum A, Benzinou A, Razzak I, Mazher M, Nguyen TT, Puig D, **Vafaee F**, 3D-IncNet: Head and Neck Primary Tumors Segmentation and Survival Prediction, *IEEE Journal of Biomedical and Health Informatics*, (IF: **7.02**), pp. 1 - 9, doi:10.1109/jbhi.2022.3219445
- 2022 Choi WWY, Sánchez C, Li JJ, Dinarvand M, Adomat H, Ghaffari M, Khoja L, **Vafaee F**, Joshua AM, Chi KN, Guns EST, Hosseini-Beheshti E, 3Extracellular vesicles from biological fluids as potential markers in castration resistant prostate cancer, *Journal of Cancer Research and Clinical Oncology*, doi:10.1007/s00432-022-04391-6
- 2022 Fatima S, Ma Y, Safrachi A, Haider S, Spring KJ, **Vafaee F**, Scott KF, Roberts T, Becker T, de Souza P, Harnessing liquid biopsies to guide immune checkpoint inhibitor therapy. *Cancers*, 14(7), doi: 10.3390/cancers14071669. (**IF: 6.56**)
- 2022 Dinarvand et al, **Vafaee F\***, dSeqSb: A systems biology approach to decipher dynamics of host-pathogen interactions using temporal dual RNA-seq data, *Microbial Genomics*, In Press, doi: 10.1101/2022.02.28.482417 (IF: 5.24)

- 2022 Batarseh AM, **Vafaee F**, Hosseini-Beheshti E, Safarchi A, Chen A, Cohen A, Juillard A, Hunt NH, Mariani M, Mitchell T and Grau G.E.R. Investigation of Plasma-Derived Lipidome Profiles in Experimental Cerebral Malaria in a Mouse Model Study. *International Journal of Molecular Sciences*, 24(1), p.501., doi: 10.3390/ijms24010501
- 2021 Zandavi, SM, Rashidi T, **Vafaee F\***, Forecasting the Spread of COVID-19 Under Control Scenarios Using LSTM and Dynamic Behavioral Models. Under review by *IEEE Transactions on Cybernetics*, doi: 10.1109/TCYB.2021.3120967. (IF: 19.11)
- 2021 Koch F, Sutton G, Voinugea I, **Vafaee F\***, Supervised Application of Internal Validation Measures to Benchmark Dimensionality Reduction Methods in scRNA-seq Data. *Briefings in Bioinformatics*, doi: 10.1093/bib/bbab304 (IF: 13.99)
- 2021 AKM Azad, Fatima S, Capraro A, Waters S, **Vafaee F\***, An integrative resource for network-based investigation of COVID-19 combinatorial drug repositioning and mechanism of action. *Patterns*, Cell Press, doi:10.1016/j.patter.2021.100325.
- 2021 Safarchi A, Fatima S, Ayati Z, **Vafaee F\***, Update on Novel Approaches for Diagnosis and Treatment of SARS-CoV-2 Infection. *Cell & Bioscience*, (IF: 9.6), doi: 10.1186/s13578-021-00674-6.
- 2021 Rashidi TH, Shahriari S, Azad AK, **Vafaee F\***, COVIDSpread: real-time prediction of COVID-19 spread based on time-series modelling *F1000 Research* (under review), doi:10.12688/f1000research.73969.1.
- 2021 Scott K, et al., Human Group IIA Phospholipase A2—Three Decades on from Its Discovery *Molecules*, vol. 26, pp. 7267 - 7267, doi:10.3390/molecules26237267
- 2020 Azad AKM, Dinarvand M, Nematollahi A, Swift J, Lutze-Mann L, **Vafaee F\***, A comprehensive integrated drug similarity resource for in-silico drug repositioning and beyond, *Briefings in Bioinformatics*, (Impact Factor: 13.99) bbaa126, doi:10.1093/bib/bbaa126.
- 2020 Colvin EK, Howell VM, Mock S, Samimi G, **Vafaee F\***, Expression of long noncoding RNAs in cancer-associated fibroblasts linked to patient survival in ovarian cancer, *Cancer Science*, doi:10.1111/cas.14350. (IF: 6.5)
- 2020 Walsh K, Voineagu M, **Vafaee F\***, Voineagu I\*, TDAview: an online visualization tool for topological data analysis, *Bioinformatics*, btaa600, doi:10.1093/bioinformatics/btaa600 (IF: 6.9)
- 2020 Bayati M, Rabiee H, Mehrbod M, **Vafaee F**, Ebrahimi D, Forrrest A, Alinejad-Rokny H. CANCER-SIGN: a user-friendly and robust tool for identification and classification of mutational signatures and patterns in cancer genomes, *Scientific Reports*, vol. 10, doi:10.1038/s41598-020-58107-2
- 2020 Dinarvand M, Spain MP, **Vafaee F\***, Pharmacodynamic Functions of Synthetic Derivatives for Treatment of Methicillin-Resistant Staphylococcus aureus (MRSA) and Mycobacterium tuberculosis, *Frontiers in Microbiology*, bbaa126, doi:10.3389/fmicb.2020.551189.
- 2020 Ebrahimkhani S, Beadnall HN, Barnett MH, Suter CM, Buckland ME, **Vafaee F\***. Serum exosome microRNAs predict multiple sclerosis disease activity after fingolimod treatment, *Molecular Neurobiology*, doi:10.1007/s12035-019-01792-6
- 2019 Su Z, Burchfield J, Yang P, Humphrey S, Yang G, Francis D, Yasmin S, Shin SY, Norris D, Fisher-Wellman K, Wang QP, Parker B, Neely G, **Vafaee F**, Chiu J, Yeo R, Hogg P, Fazakerley D, Nguyen L, Kuyucak S, James D. Global redox proteome and phosphoproteome analysis reveals novel mode of Akt regulation, *Nature Communications*, vol. 10, pp. 5486, doi:10.1038/s41467-019-13114-4.
- 2019 Wong M, Braidly N, Pickford R, **Vafaee F**, Crawford J, Muenchhoff J, Schofield P, Attia J, Brodaty H, Sachdev P, Poljak A. Plasma lipidome variation during the second half of the human lifespan is associated with age and sex but minimally with BMI. *PLOS ONE*, vol 14, doi.org/10.1371/journal.pone.0214141
- 2018 Ebrahimkhani S, **Vafaee F**, Hallal S, Wei H, Lee M, Young P, Satgunaseelan L, Shivalingam B, Suter C, Buckland M, Kaufman K. Deep sequencing of circulating exosomal microRNA allows non-invasive glioblastoma diagnosis. *NPJ precision oncology, Nature*, 2(28), doi:10.1038/s41698-018-0071-0

- 2018 **Vafae F**, Diakos C, Kirschner MB, Reid G, Michael MZ, Horvath LG, Alinejad-Rokny H, Cheng ZJ, Kuncic Z, Clarke S . A data-driven, knowledge-based approach to biomarker discovery: application to circulating microRNA markers of colorectal cancer prognosis. *NPJ systems biology and applications, Nature*, 4(1), 20, doi:10.1038/s41540-018-0056-1
- 2018 Chaudhuri R, Krycer JR, Fazakerley DJ, Fisher-Wellman KH, Su Z, Hoehn KL, Yang JYH, Kuncic Z, **Vafae F\*** & James DE. The transcriptional response to oxidative stress is part of, but not sufficient for, insulin resistance in adipocytes *Scientific Reports*, 8, doi:10.1038/s41598-018-20104-x.
- 2018 Contaldi C, **Vafae F\***, Nelson PC. Bayesian network hybrid learning using an elite-guided genetic algorithm. *Artificial Intelligence Review Journal* 1-28, doi:10.1007/s10462-018-9615-5.
- 2018 **Vafae F\***, Dashti H, Alinejad-Rokney H. Transcriptomic Data Normalization. *Encyclopedia Of Bioinformatics and Computational Biology, Reference Module in Life Sciences*, Elsevier, doi: 10.1016/B978-0-12-809633-8.20209-4.
- 2017 **Vafae F\***, Colvin EK, Mok SC, Birrer MJ, Howell VM, & Samimi G. Functional prediction of long non-coding RNAs in ovarian cancer-associated fibroblasts indicate a role in metastasis. *Scientific Reports* 4;7(1):10374. doi: 10.1038/s41598-017-10869-y.
- 2017 Ebrahimkhani S, **Vafae F**, Young PE, Hur S, Hawke S, Devenney E, Beadnall H, Barnett MH, Suter C, & Buckland M. Exosomal microRNA signatures in multiple sclerosis reflect disease status. *Scientific Reports*, 7. doi:10.1038/s41598-017-14301-3
- 2016 **Vafae F\***, Krycer J, Ma Xiuquan, Burykin T, James D, Kuncic Z. ORTI: an open-access repository of transcriptional interactions for interrogating mammalian gene expression data, *PLOS ONE*. 11(10), 1-21.
- 2016 **Vafae F\***. Using Multi-objective Optimization to Identify Dynamical Network Biomarkers as Early-warning Signals of Complex Diseases, *Nature-Scientific Reports*, 24;6:22023. doi: 10.1038/srep22023.
- 2016 Parker N R, Hudson A L, Khong P, Parkinson J F, Ikin R, Zhu Y, Cheng Z J, **Vafae F**, Chen J, Wheeler H R, Howell V.) Intratumoral heterogeneity of DNA repair pathways in glioblastoma, *Nature-Scientific Reports*, 4;6:22477. doi: 10.1038/srep22477.
- 2016 Domanova W, Krycer J, Chaudhuri R, Yang P, **Vafae F**, Fazakerley D, Humphrey S, James D, Kuncic Z. (2016) Identifying kinase substrate relationships using temporal data from large-scale phosphoproteomics studies, *PLOS ONE*. 11(6), 1-14.
- 2015 Rollo J , Banhashemi N, **Vafae F**, Crawford J, Kuncic Z, Holsinger D. Unravelling the mechanistic complexity of Alzheimer's disease with systems biology, *Alzheimer's & Dementia*, doi:10.1016/j.jalz.2015.10.010.
- 2014 Kotlyar M, Pastrello C, Pivetta, F, Lo Sardo A, Cumbaa, C, Li, H, Naranian, T, Niu Y, Ding Z, **Vafae F**, Broackes-Carter F, Petschnigg, J, Mills, G.B, Jurisicova, A, Stagljar, I, Maestro, R, & Jurisica, I. In silico prediction of physical protein interactions and characterization of interactome orphans, *Nature Methods*, 12(1):79-84.
- 2013 **Vafae F\***, Rosu D, Broackes-Carter F, and Jurisica I. Novel semantic similarity measure improves an integrative approach to predicting gene functional associations. *BMC Systems Biology*, 7:22.
- [Refereed Full-paper Proceedings](#)
- 2020 Alizadeh F, Jazayeriy H, Jazayeri O, Vafae F 'SMIA: a simple way for inference of admixed population ancestors'. *IEEE International Conference on Computer and Knowledge Engineering, ICCKE 2020*, 540 - 543
- 2017 Contaldi C, **Vafae F\***, Nelson PC. The Role of Crossover Operator in Bayesian Network Structure Learning Performance: a Comprehensive Comparative Study. *ACM, Genetic & Evolutionary Computation*, 769-776.
- 2014 **Vafae F\***. Learning the structure of large-scale Bayesian networks using genetic algorithm, *ACM, Genetic and Evolutionary Computation*, 855-862.
- 2014 **Vafae F**, Turan G, Nelson PC & Berger-Wolf TY. Balancing the exploration and exploitation in an adaptive diversity guided genetic algorithm, *IEEE, Evolutionary Computation*, 2570-2577.

- 2014 **Vafaee F**, Turan G, & Nelson PC. Among-site rate variation: adaptation of genetic algorithm mutation rates at each site, *ACM, Genetic & Evolutionary Computation*, 863-870.
- 2010 **Vafaee F**, Turan G, & Nelson PC. Optimizing Operator Rates Using a Markov Chain Model of Genetic Algorithms, *ACM, Genetic & Evolutionary Computation*, 721-728.
- 2010 **Vafaee F** & Nelson PC. An explorative and exploitative mutation scheme, *IEEE, Evolutionary Computation*, 1-8.
- 2009 Xu B, **Vafaee F** & Wolfson O. In-network query processing in mobile p2p databases, *ACM, Advances in Geographic Information Systems*, 207-216.
- 2009 **Vafaee F** & Nelson PC. A genetic algorithm that incorporates an adaptive mutation based on an evolutionary model, *IEEE, Machine Learning and Applications*, 101-107.
- 2008 **Vafaee F**, Xiao W, Nelson PC, & and Zhou C. Adaptively evolving probabilities of genetic operators, *IEEE, Machine Learning and Applications*, 292-299.

#### [Abstracts peer-reviewed](#)

- 2020 Batarseh A, Beheshti E, **Vafaee F**, Chen A, Cohen A, Julliard A, Mariani M, Grau G, Lipidomics profiles of plasma microvesicles differ in experimental cerebral malaria, compared to malaria without neurological complications, *Australasian Extracellular Vesicles Conference*
- 2019 Koch F and **Vafaee F\***, Effect of dimensionality reduction on clustering single cell RNA-sequencing, *ISMB/ECCB 2019, Intelligent Systems for Molecular Biology*, July 2019, Switzerland.
- 2019 Bataresh A, **Vafaee F et al.**, Plasma microvesicles lipidomics of Cerebral malaria in mice model, *World inflammation Conference*, September 2019, Sydney Australia.
- 2017 Ebrahimkhani S, Barnett Michael, **Vafaee F**, Suter C, & Buckland M. An optimized protocol used to extract and profile EV small RNA from limiting amounts of human and mouse serum, *ISEV workshop on Diet, Environment and Extracellular Vesicles*, January 2017, Melbourne, Australia.
- 2016 Ebrahimkhani S, **Vafaee F**, Barnett Michael, Cropley J, Jayasooriah N, Suter C, & Buckland M. Small Non-coding RNAs from Serum Derived Extracellular Vesicles are Potential Biomarkers in Multiple Sclerosis, *ASMR NSW Annual Scientific Meeting*, May 2016, Sydney, Australia.
- 2015 **Vafaee F**, Colvin EK, Mok SC, Birrer MJ, Howell VM, & Samimi G. Analysis of long non-coding RNAs expression profiles in ovarian cancer-associated fibroblasts, *Intl. Conference on Health Informatics and Technology*, July 2015, Valencia, Spain.
- 2015 Parker NR, Hudson AL, Khong P, Parkinson JF, Ikin R, Chen ZJ, **Vafaee F**, Helen R. & Wheeler HR, Howell VM. Intratumoral heterogeneity of DNA repair pathways in glioblastoma, *Advances in Brain Cancer Research, American Association for Cancer Research Annual Meeting*, May 2015, Washington D.C., USA.
- 2015 Colvin EK, **Vafaee F**, Mok SC, Birrer MJ, Howell VM, & Samimi G. Differential expression of long non-coding RNAs in ovarian cancer-associated fibroblasts versus normal ovarian fibroblasts, *Advances in Ovarian Cancer Research, American Association for Cancer Research Annual Meeting*, April 2015, Philadelphia, USA.
- 2015 **Vafaee F**, Krycer J, James D, & Kuncic Z. Unravelling dynamic transcriptional responses to oxidative stress, *Intl. Conf. on Systems Biology (ICSB 15)*, Nov. 2015 Singapore.
- 2015 Cheng ZJ, Krycer J, Su T, Fazakerley D, Kuncic Z, & **Vafaee F**. Elucidating the cellular response to oxidative stress by a holistic and integrative multi-omics analysis, *Intl. Conf. on Systems Biology (ICSB 15)*, Nov. 2015 Singapore.
- 2014 **Vafaee F**, Holsinger D, & Conrad M. Temporal dynamics of oxidative stress-related gene transcription in the human prefrontal cortex during neurodegeneration, *Society of Free Radical Research International (17th SFRR)*, March 2014 Kyoto, Japan.
- 2014 **Vafaee F** & Holsinger D Modelling the transcription of oxidative stress and neurodegeneration related genes in the mouse hippocampus during aging. *Intl. Conf. on Systems Biology (ICSB 14)*, Sep. 2014 Melbourne, Australia.

- 2014 Wong M, Norris D, Burchfield J, Krycer J, **Vafaee F**, Domanova W, Kuncic Z, & James D. (2014) Dynamic systems model of insulin signalling pathway for identifying causes of insulin resistance, *Intl. Conf. on Systems Biology* (ICSB 14), Sep. 2014 Melbourne, Australia.
- 2014 Domanova W, Wong M, Parker B, Burchfield J, **Vafaee F**, Kuncic Z, & James D. Dynamic *in silico* reconstruction of the insulin signalling network, *Intl. Conf. on Systems Biology* (ICSB 14), Sep. 2014 Melbourne, Australia.
- 2014 Domanova W, Krycer J, **Vafaee F**, James D, & Kuncic Z. Modelling the insulin signalling network: unravelling the molecular mechanisms of insulin resistance, *Intl. Conf. on Bioinformatics* (InCoB2014), Aug. 2014 Sydney, Australia.
- 2013 Wong M, Domanova W, **Vafaee F**, Krycer J, Burchfield J, James D, & Kuncic Z. Network reconstruction and simulation of insulin resistance in adipocytes, *Computational Models for Life Science*, (CMLS 13), Nov. 2013 Sydney, Australia.

## Editorship and Peer Review

- 2017 – Editor of Journal of Artificial Intelligence Review (SNIP 3.623, IF: 12.50, Percentile: 99%)
- 2021 – Editorial Board of Journal of Cancers (SNIP 1.567, IF 6.126, Percentile: 92% Oncology)
- 2021 – Advisory Board of Journal of Patterns, *Cell Press* (SNIP TBA, Percentile: X% Multidisciplinary)

### Journal Peer-Review

- 2013 – Reviewer of journals of *Briefing in Bioinformatics* (SNIP 2.126, Percentile: 97%), *Bioinformatics* (SNIP 1.813, Percentile: 91%), *Cancers* (SNIP 1.567, Percentile: 92%), *Therapeutic Advances in Medical Oncology* (SNIP 1.783, Percentile: 83%), *Artificial Intelligence Review* (SNIP 3.623, Percentile: 99%), *Scientific Reports* (SNIP 1.365, Percentile: 93%)

### Grant Peer-Review

- 2022 – Reviewer of ARC Discovery, ARC DECRA, ARC Industry Fellowship, NHMRC Development, National Critical Research Infrastructure

## Executive and Professional Leadership

- 2023 – 2023 Grant Assessment Committee Member of **National Critical Research Infrastructure**, NCRI
- 2019 – 2022 Member of **National Computational Merit Allocation Committee**, NCMAC
- 2018 – 2021 Member of **Women in Research Network** Executive Committee, UNSW Sydney
- 2018 – 2020 Member of School's **Executive Team** (UNSW Sydney - School of BABS)
- 2018 – 2021 **Bioinformatics Coordinator** (UNSW Sydney - School of BABS)
- 2014 – 2017 Member of **Ramaciotti Facility Informatics** Advisory Committee, University of Sydney

## Conference and Seminar Organisation

- 2023 Co-Organiser of [Sydney Bioinformatics Research Symposium](#) (Sept – 2023)
- 2023 Scientific Committee Member of Australasian Leadership Computing Symposium (Jun 2023)
- 2023 Program Chair of IEEE Big Data International Conference (Dec 2023, Italy)
- 2022 Lead Co-Organiser of BABS Research Symposium (May – 2022)
- 2021 Organising Committee Member of AMSI BioInfoSummer National Symposium (Dec – 2021)
- 2019 Lead Organiser of [AI in Biomedicine Symposium](#) (UNSW - Sydney)
- 2018 Lead Organiser of [UNSW Bioinformatics Connect](#) (UNSW - Sydney)
- 2021 Program Committee Member of 28th IEEE **International Conference on High Performance Computing Data and Analytics** (Dec – 2021), <https://hipc.org>
- 2019 Program Committee Member of 30th **International Conference on Genome Informatics**
- 2019 Program Committee Member of the **Australian Bioinformatics And Computational Biology Society**, ABACBS
- 2015 Local Organising Committee Member of *AMSI BioInfoSummer* hosted by the Australian Mathematical Sciences Institute



- 2014 Organiser of the University of Sydney *Visiting Scholar Seminars* for Prof Tanya Berger-Wolf from University of Illinois at Chicago, USA
- 2013 Organiser of the University of Sydney *Visiting Scholar Seminars* for Prof Tilman Grune from German Institute of Human Nutrition, Germany

## Supervision and Mentorship

**Last 5 Years Metrics:** (Co-)supervised 8 ECRs/RAs, 3 HDR students to completion, 5 ongoing PhD students as Primary/Joint Supervisor and 4 PhD/MSc as Secondary Supervisor, and 7 Honours students.

- 2/2023– **PhD Student, Primary Supervisor**, *Mona Abedini*, School of BABS, UNSW Sydney.  
Research: Genomics analyses of neurodevelopmental disorders
- 2/2022– **PhD Student, Primary Supervisor**, *Abir Khazaal*, School of BABS, UNSW Sydney.  
Research: Pan-cancer analysis of lncRNAs
- 2/2022– **PhD Student, Primary Supervisor**, *Daniel Al-Mouiee*, School of BABS, UNSW Sydney.  
Research: Deep federated learning in medical applications
- 5/2023– **PhD Student, Primary Supervisor**, *Fatemeh Safari*, School of BABS, UNSW Sydney.  
Research: Blood-based liquid biopsy
- 2/2022– **PhD Student, Joint Supervisor**, *Ladan Aminzadeh*, School of CS, UTS.  
Research: Deep transfer learning
- 2/2021– **PhD Student, Secondary Supervisor**, *Jack Clarke*, School of BABS, UNSW Sydney.  
Research: Discovery of new regulatory targets for heart tissue regeneration
- 2/2022– **PhD Student, Secondary Supervisor**, *Zheng Su*, School of BABS, UNSW Sydney.  
Research: Rare disease mutation identification
- 2/2023– **PhD Student, Secondary Supervisor**, *Yara Elahi*, School of BABS, UNSW Sydney.  
Research: Detection of bacterial protein using CRISPR/Cas9
- 2/2023– **MSc Student, Secondary supervisor**, *Prag Gandhi*, School of Medical Sciences, UNSW Sydney.  
Research: Design and development of data and analytical products to accelerate Bioinformatics research
- 8/2022– **Research Associate, ECR**, *Mohammad Karimi*, School of BABS, UNSW Sydney.  
Research: Multi-omics data integration in HCC diagnosis
- 8/2023– **Research Associate, ECR**, *Muhammad Javad Heydari*, School of BABS, UNSW Sydney.  
Research: AI integrated drug discovery
- 8/2018– **Research Associate, ECR**, *Miad Zandavi*, School of BABS, UNSW Sydney.  
Research: Bioinformatics, Multi-omics integration and Single-cell sequencing data analytics
- 11/2022– **Research Associate**, *Forrest Koch*, School of BABS, UNSW Sydney.  
Research: Single-cell multi-omics
- 9/2019– **Research Associate**, *Abhishek Vijayan*, School of BABS, UNSW Sydney.  
Present Research: Biomarker discovery, machine learning
- 2/2021– **Honours Student**, *Jason Su*, School of BABS, UNSW Sydney.  
5/2022 Research: Multi-omics Data Integration in liver cancer recurrence prediction
- 2/2021– **Honours Student**, *Tim Huang*, School of BABS, UNSW Sydney.  
5/2022 Research: Computational multiplexing in single-cell imaging

### Past

- 8/2018–2022 **Research Associate, ECR**, *Mojdeh Dinarvand*, School of BABS, UNSW Sydney.  
Research: Drug discovery
- 2/2020–2022 **Research Associate, ECR**, *Shadma Fatima*, School of BABS, UNSW Sydney.  
Research: Cancer biomarker discovery
- 8/2018– **Research Associate, ECR**, *AKM Azad*, School of BABS, UNSW Sydney.  
9/2020 Research: Bioinformatics, Deep learning
- 9/2020– **Research Associate, ECR**, *Azadeh Safarchi*, School of BABS, UNSW Sydney.  
12/2021 Research: Metagenomics and bioinformatics

- 11/2018– **Research Associate**, *Forrest Koch*, School of BABS, UNSW Sydney.  
12/2020 Research: Cell-identity mapping from massive single-cell data
- 8/2015– **PhD Student**, *Saideh Ebrahimkhani*, Brain & Mind Research Inst, University of Sydney.  
12/2018 Research: Identification of exosomal microRNA Biomarkers in the progression of Multiple Sclerosis
- 11/2013– **PhD Student**, *Westa Domanova*, School of Physics, University of Sydney.  
7/2016 Research: Modelling molecular mechanisms of insulin resistance.
- 9/2019– **Honours Student**, *Afia Tanzim*, School of BABS, UNSW Sydney.  
9/2020 Research: Bioinformatics of Host-pathogen Interaction
- 2/2020– **Honours Student**, *Paolo Valdz*, School of BABS, UNSW Sydney.  
12/2020 Research: Computational Drug Repositioning
- 2/2021– **Honours Student**, *Michael O’Dea*, School of BABS, UNSW Sydney.  
5/2022 Research: Multi-omics Data Integration in breast cancer
- 2/2021– **Honours Student**, *Sebastian Porter Zadro*, School of BABS, UNSW Sydney.  
5/2022 Research: Combinatorial Drug Repositioning
- 2/2021– **Honours Student**, *James Tawdros*, School of BABS, UNSW Sydney.  
5/2022 Research: Microbiome biomarker discovery
- 1/2020– **MSc Student**, *Abhishek Vijayan*, Dept. of Computer Science, UNSW.  
6/2021 Research: Feature selection methods for blood-based biomarker discovery
- 1/2016– **MSc Student**, *Carlo Contaldi*, Computer Science, University of Illinois at Chicago.  
6/2017 Research: Bayesian network hybrid learning using a site-specific mutation rate genetic algorithm
- 11/2018– **SVRP Student**, *Rohan Dugdale*, School of BABS, UNSW Sydney.  
2/2019 Research: Deep learning for multi-omics integration
- 8/2018– **Research Associate**, *Cameron Stewart*, School of BABS, UNSW Sydney.  
3/2019 Research: Deep learning, autoML, machine learning
- 2/2016– **Talented Student Project**, *James Gatenby*, Biochemistry, University of Sydney.  
7/2016 Research: Genomic analysis of the link between cancer and thrombosis
- 10/2014– **Vacation Project**, *Jason Cheng*, Master of Medical Physics, University of Sydney.  
12/2014 Research: Integrative multi-omics analysis of cellular response to oxidative stress.
- 5/2014– **MPhil Project**, *Joseph Chan*, Sydney Medical School, University of Sydney.  
2/2015 Research: Identifying common inflammatory gene signatures in cancers.
- 6/2014– **Postgraduate Project**, *Jason Cheng*, Master of Medical Physics, University of Sydney.  
9/2014 Research: Biomarker identification and survival analysis in colorectal cancer.
- 5/2011– **MSc Thesis**, *Nirari Barm*, Dep. of Computer Science, University of Illinois at Chicago.  
1/2012 Research: Effects of parameter settings on the performance of multiple population genetic algorithms with different topologies.

## Teaching

- Terms 1-3 **BABS3301**, *Biomolecular Science Laboratory Project - Advanced*, School of BABS, UNSW.  
2019 - 2023 Role: Course coordinator
- Term 2 **BINF3010/9010**, *Applied Bioinformatics*, School of Computer Science, UNSW.  
2019 - 2023 Role: Lecturer, non-coding RNAs
- Term 2 **BABS3291**, *Genes, Genomes and Evolution*, School of BABS, UNSW.  
2018 - 2023 Role: Lecturer, Network Genomics module
- Term 2 **BIOC3111**, *Molecular Biology of Proteins*, School of BABS, UNSW.  
2018 - 2023 Role: Lecturer, Systems Biology module
- Term 1 **BABS3151**, *Human Genetics*, School of BABS, UNSW.  
2018 - 2023 Role: Lecturer, Systems Biology module
- Term 3 **BABS3281**, *Molecular Frontiers*, School of Computer Science, UNSW.  
2023 - 2023 Role: Lecturer, Principles of statistical analysis

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## Professional Community Membership

- 2017 – International Society of Computational Biology, [www.iscb.org](http://www.iscb.org)
- 2018 – Sydney Vital Translational Cancer Research Community, [sydneyvital.org.au](http://sydneyvital.org.au)
- 2019 – WiMLDS: Women in Machine Learning & Data Science, [wimlds.org](http://wimlds.org)
- 2020 – CONCERT:Centre for Oncology Education & Research Translation, [www.concert.org.au](http://www.concert.org.au)
- 2020 – Melanoma and Skin Cancer Trials - Artificial Intelligence Working Group, [www.masc.org.au](http://www.masc.org.au)
- 2020 – Australian Bioinformatics and Computational Biology Society (ABCBS), [www.abacbs.org](http://www.abacbs.org)

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## Community Engagement and Outreach Activities

- 8/2020 Co-organiser of WiRN event [Shadow CVs: A guide to building resilience](#), UNSW Sydney
- 5/2020 Co-organiser of [Gender-based inequality during COVID-19](#), hosted by Centre for Social Impact
- 3/2020 Co-organiser of [WiRN Science Outreach](#), UNSW Sydney
- 9/2019 Co-organiser of WiRN event [International Engagement for Women in Academia](#), UNSW Sydney
- 3/2019 Co-organiser of WiRN Learn&Lunch Series [Preparing for Mid-career](#), UNSW Sydney