

Shila Ghazanfar

Senior Lecturer

shila.ghazanfar@sydney.edu.au

sydney.edu.au/science/people/shila.ghazanfar.php

Curriculum Vitae

The University of Sydney

The University of Sydney, Camperdown, Australia

+61 (02) 8627 6698

Employment and Academic Positions

1/2025 – Present Senior Lecturer. The University of Sydney, School of Mathematics and Statistics.

2/2022 – Present ARC Discovery Early Career Researcher (DECRA). The University of Sydney, School of Mathematics and Statistics. *Statistical approaches for spatial genomics at single cell resolution.*

2/2023 – 12/2024 Lecturer. The University of Sydney, School of Mathematics and Statistics.

2/2019 – 1/2022 Royal Society-Newton International Fellow. *Leveraging spatially resolved single cell gene expression and single cell RNA-sequencing to understand cellular heterogeneity.* UK Co-applicant: Dr John Marioni (University of Cambridge/EMBL-EBI).

2/2019 – 4/2022 Research Associate, Cancer Research UK Cambridge Institute, University of Cambridge.

9/2017 – 1/2019 Research Associate, Judith and David Coffey Life Lab, Charles Perkins Centre; School of Mathematics and Statistics, The University of Sydney.

5/2017 – 8/2017 Research Associate, School of Life and Environmental Science (SOLES), The University of Sydney.

3/2017 – 7/2017 Casual tutor, School of Mathematics and Statistics, The University of Sydney.

3/2013 – 11/2016 Postgraduate Teaching Fellow, School of Mathematics and Statistics, The University of Sydney.

3/2012 – 11/2012 Casual tutor, School of Mathematics and Statistics, The University of Sydney.

Fellowships and Awards

2022 Australian Research Council Discovery Early Career Research Award (DECRA). *Statistical approaches for spatial genomics at single cell resolution.*

2019 Royal Society Newton International Fellowship. *Leveraging spatially resolved single cell gene expression and single cell RNA-sequencing to understand cellular heterogeneity.*

2013 CSIRO Office of the Chief Executive (OCE) Ph.D. Scholarship.

2013 Australian Postgraduate Award (Ph.D.).

2012 CSIRO Mathematics, Informatics, and Statistics (CMIS) Honours Scholarship.

Academic Record and Qualifications

Ph.D. Mathematical Statistics, University of Sydney, Australia, 2018. *Statistical approaches to harness high throughput sequencing data in diverse biological systems.* <http://hdl.handle.net/2123/17268>

B.Sc (Adv. Mathematics) Majors in Statistics and Pure Mathematics, with First Class Honours, University of Sydney, Australia, 2012. *Statistical issues of integrative gene set approaches for biomedical data.*

Prizes, Honours and Awards

Despite having gained my PhD five years ago, I have attracted over \$AUD 1 Million in total funding through competitive awards and scholarships as a sole investigator:

2023; \$1,360,000 The Charles Perkins Centre Jennie Mackenzie Research Fund to Prof Jean Yang, Prof David James, Dr Shila Ghazanfar and Dr Ellis Patrick. With \$189,000 co-contribution from Faculty of Science School of Mathematics and Statistics.

2023; Outstanding Early Career Researcher Award. Australian Bioinformatics and Computational Biology Society.

2023; £GBP 4,800 Royal Society Newton International Fellows Alumni Follow-on Funding to Dr Shila Ghazanfar. *Data integration for single cell and molecule-resolved spatial genomics.*

2023; \$USD 200,000	Chan Zuckerberg Initiative (CZI) Single-Cell Biology Data Insights Grant to Dr Shila Ghazanfar and A/Prof Stephanie Hicks (Johns Hopkins University). <i>Multi-sample clustering for large atlas-scale spatial data.</i>
2023; \$50,000	BGI STOmics Grant to Dr Shila Ghazanfar, Professor Richard Harvey, Dr Vaibhao Janbandhu, and A/Prof Emily Wong. <i>Spatial Transcriptomics to Discover Novel Targets in Cardiac Fibrosis.</i>
2023; \$21,000	USyd-Cornell Partnership Collaboration Awards (PCA) to Dr Shila Ghazanfar and A/Prof David Lin. <i>Defining spatiotemporal mechanisms that promote peripheral nerve regeneration.</i>
2022; \$USD 200,000	Chan Zuckerberg Initiative (CZI) Single-Cell Biology Data Insights Grant. <i>Multiscale Data Integration for Single-Cell Spatial Genomics.</i>
2022; \$443,869	Australian Research Council Discovery Early Career Research Award. DE220100964. <i>Statistical approaches for spatial genomics at single cell resolution.</i>
2019; £100,566	Royal Society Newton International Fellowship. NIF\R1\181950. <i>Leveraging spatially resolved single cell gene expression and single cell RNA-sequencing to understand cellular heterogeneity.</i>
2018; \$200	Australian Bioinformatics and Computational Biology Society Travel Grant to attend ABACBS 2018 Conference.
2018; (expenses)	Funded award to attend the MAGIC Mentoring and Guidance in Careers program for Women in Mathematical Sciences in Canberra, Australia.
2018; \$250	Oz Single Cells Data Analysis Challenge: “Utilising ambient RNA and damaged cell profiles for appropriate cell selection in droplet-based single cell transcriptomics”.
2016; \$100	2nd Oral Prize at AB3ACBS Conference.
2016; \$750	SSAI NSW Branch Travel Grant to attend the Australian Statistical Conference.
2015; \$75	2nd Poster Prize at COMBINE Symposium.
2015; \$500	SSAI NSW Branch Travel Grant to attend Young Statisticians Conference.
2014; \$100	University of Sydney Faculty of Science grant to attend EMBL Australia PhD Symposium.
2013; (expenses)	Successful application to attend the EMBL Australia PhD Course.
2013; \$750	AMSI Travel Scholarship for BioInfoSummer.
2013; \$51,000	CSIRO OCE PhD Scholarship (Stipend \$7,000 p.a. with \$10,000 p.a. operating expenses for three years).
2013; \$950	University of Sydney School of Mathematics and Statistics PRSS Funding.
2013; \$86,000	Australian Postgraduate Award (approx. \$28,715 p.a. for three years and six months).
2012; \$3,000	CSIRO Mathematics, Informatics, and Statistics (CMIS) Honours Scholarship.

Research mentorship and supervision

2023	Pratibha Panwar; Postdoctoral Research Associate; Supervisor.
2023	Farhan Ameen; PhD student; Co-supervisor, joint with Dr Ellis Patrick.
2023	Guan Gui; Honours Student; Supervisor.
2023	Mengqian Qu; Honours Student; Supervisor.
2023	Max Woppard; Honours Student; Supervisor, joint with Dr Linh Nghiem.
2023	Alicia Werlen; Dalyell Scholar, Supervisor.
2023	Barbara Zita Peters Couto; Research Visitorship; Supervisor, joint with Dr Ellis Patrick.
2023	Lachlan Gee; Denison Summer Research Scholarship; Supervisor.
2022	Jessica Han; Charles Perkins Centre Summer Student & Dalyell Scholar; Supervisor joint with A/Prof Alexandra Sharland.
2022	Yue Cao; PhD Student; Supervisor.

2021 – 2022 Elyas Heidari; Masters thesis student (ETH Zurich); Supervisor.

2019 – 2021 Tim Lohoff; PhD student; Collaborator and mentoring throughout first lead author publication.

2018 Andrew Lee; Summer Research Scholarship student; Supervisor under guidance by Prof Jean Yang and Prof Germaine Wong.

2017 Elise Bickley; BINF3101 Bioinformatics Project Unit of Study; Supervisor joint with Prof Jean Yang.

2017 Yingxin Lin; Honours student; Mentor.

Selected Presentations

I have given over 45 conference, seminar, and workshop presentations, including invitations to 19 international conferences, workshops and departmental seminars, 15 invitations of which were fully funded.

(v) indicates a virtual presentation. * indicates fully or partially funded.

International conferences:

Invited Panellist* *Computational challenges for data integration.* Chan Zuckerberg Initiative Single Cell Biology Annual Meeting, San Jose, USA. November 2022.

Invited Speaker* *Multiscale data integration for single cell spatial genomics.* Chan Zuckerberg Initiative Single Cell Biology Annual Meeting, San Jose, USA. November 2022.

Invited Speaker *Integrative analyses for spatial genomics data.* Sanger Institute Special Seminar. October 2022.

Invited Speaker (v) *StabMap: Mosaic single cell data integration using non-overlapping features.* Harvard Center for Computational Biomedicine Seminar. October 2022.

Invited Keynote Speaker* EuroBioC Conference, Heidelberg, Germany. September 2022.

Invited Speaker (v) *Data integration for molecule-resolved spatial gene expression of mouse organogenesis.* Seattle Cell Science Symposium. January 2022.

Invited Speaker (v) *Molecule-resolved spatial reference maps for mouse organogenesis.* Oz Single Cell Brisbane. October 2021.

Invited Speaker (v) *Integrating molecule-resolved spatial gene expression and single cell RNA-sequencing data.* Single Cell Genomics Day. March 2021.

Invited Speaker (v) *Molecule-resolved spatial reference maps for mouse organogenesis.* ISSCR digital Computational Stem Cell Biology - Reference maps for stem cell biology. March 2021.

Selected Speaker (v) *Interrogating highly multiplexed spatially resolved gene expression of mouse embryogenesis.* Cold Spring Harbor Laboratory Biology of Genomes. May 2020.

Invited Speaker* EuroBioC in Brussels, Belgium in December 2019 [declined due to schedule conflict].

Invited Speaker* *Investigating second order interactions in single cell data.* Joint Statistical Meeting special session on Single Cell Genomics in Denver, USA, in July 2019.

National conferences:

Invited Speaker* Multiomics 2022 Conference, Brisbane, Australia December 2022.

Invited Speaker* BiolInfoSummer, Melbourne, Australia November 2022.

Invited Speaker Statistical Society of Australia NSW Branch, August 2022.

Invited Speaker WEHI Bioinformatics Seminar Series, August 2022.

Keynote Speaker* Sydney Bioinformatics Research Symposium, Sydney Australia June 2022.

Keynote Speaker* *Data integration for molecule-resolved spatial gene expression of mouse organogenesis.* WEHI Spatial Technology Symposium, Melbourne Australia April 2022.

Invited Speaker* *Investigating higher order interactions in single cell data with scHOT.* BioCAsia lecture in Sydney, Australia December 2019.

Invited Speaker* *scMerge: Integration of multiple single-cell transcriptomics datasets leveraging stable expression and pseudo-replication.* BiolInfoSummer in Perth, Australia, in December 2018.

Invited Speaker *Differential correlation across ranked samples for single cell RNA-sequencing data.* ComBio meeting in Sydney, Australia, 2018.

Workshops, lectures and short courses:

Invited Workshop*	BioInfoSummer Unlocking single cell spatial omics analyses with scdney, Melbourne, Australia, November, 2022.
Invited Lecture*	EMBL Integrative analysis of multi-omics data, EMBO Practical Course. Heidelberg, Germany. September 2022.
Selected Workshop	Bioconductor EuroBioc Birds of a Feather session on Status and opportunities in interactive apps with Bioconductor, Germany. September 2022.
Invited Presenter	Keynote lecture at EMBL-EBI Introduction to multiomics data integration and visualisation course in Cambridge UK, March 2022
Invited Presenter	EMBL-EBI RNA-Seq analysis course lecture on single cell sequencing analysis in Cambridge UK, April 2020
Invited Workshop*	BioInfoSummer, Sydney, Australia, December 2019.
Invited Workshop*	BioInfoSummer, Perth, Australia, December 2018.

Education Funding

2015 The University of Sydney DVC Education/Small Educational Innovation Grant - Improving Statistical Efficacy through Engaged Enquiry and Student-Driven Research in a large First Year Unit.

Teaching / Curriculum

I have a depth of experience teaching at the undergraduate level, both as a Casual and in my role as a Postgraduate Teaching Fellow, and since 2022 in my position at The University of Sydney. In the years during my PhD studies (2013-2017 inclusive), I contributed to the delivery of 13 distinct units in the School of Mathematics and Statistics at the University of Sydney, across advanced, standard and foundational levels and in junior and senior levels. Since my return as faculty at the University, I have contributed to teaching as Head tutor for DATA2902 Learning from data (Advanced) and Lecturer for Data Science Capstone (DATA3888).

Subjects lectured:

DATA3888	Data Science Capstone (S1 2023) ~430 students. Develop brand new project stream on biotechnology image analysis and lead teaching team of tutors and demonstrators.
MATH1005	Statistics (S2 2015, S2 2016, Winter School 2014, 2015) ~300 students per stream totalling ~1,200 students, ~80-100 in Winter School.
PHAR1811	Foundations of Pharmacy (S1 2014, S1 2015) ~280 students each year.
STAT2911	Probability and Statistical Models (Advanced) (S1 2015) – lectures on parametric bootstrap and conditional expectation (~40 students).

Subjects tutored:

DATA2902	Learning from Data (S2 2022);
STAT3014	Applied Statistics (S2 2013, S2 2014);
STAT3012	Applied Linear Models (S1 2016);
STAT2911	Probability and Statistical Models (Advanced) (S1 2015);
STAT2011	Statistical Models (S1 2015, S1 2017);
STAT2012	Statistical Tests (S2 2014);
PHAR2813	Therapeutic Principles (S1 2014, S1 2016);
PHAR2821	Drug Discovery and Design B (S2 2013, S2 2014, S2 2016);
MATH1905	Statistics (Advanced) (S2 2014);
PHAR1811	Foundations of Pharmacy (S1 2014);
MATH1005	Statistics (S2 2012, S2 2013, Winter School 2014, Winter School 2015, S2 2015, S2 2016);
MATH1015	Biostatistics (S1 2013, S1 2014);
MATH1011	Applications of Calculus (S1 2012, Summer School 2014, Summer School 2017, S1 2017);
MATH1111	Introduction to Calculus (S1 2013, S1 2014).

Other:

Computer demonstrations using R statistical software.

Duty tutoring: weekly consultation hour for any first-year mathematics and statistics unit (S1 2013, S2 2013, S1 2014).

Designing and marking final exams in statistics.

Designing and marking assignments in mathematics and statistics.

Marking computer lab reports in statistics.

Designing and marking quizzes in mathematics and statistics.

Designing and marking project-based assignments in statistics.

Professional Service and Experience

- 2024 Sydney Cytometry Academic Advisory Board member.
- 2023 Volunteer for University of Sydney Open Day August 2023.
- 2023 Invited panellist for Women and Gender Diverse in Mathematics Society event.
- 2023 Invited panellist for Women in Bioinformatics event for International Women's Day.
- 2023 Invited panellist for What is Bioinformatics event.
- 2022 Elected to executive committee for Australian Bioinformatics and Computational Biology Society since 2022.
- 2022 Invited to write perspective piece for Nature Cancer Viewpoint "The 2022 generation".
- 2022 Volunteer for University of Sydney Open Day August 2022.
- 2022 Mentor, School of Mathematics and Statistics Women in Advanced Mathematics program.
- 2022 Invited to write expert opinion for reviewed manuscript in Nature Methods.
- 2022 Careers panellist at COMBINE students in bioinformatics and computational biology symposium.
- 2022 Invited to judge student talks and posters at Sydney Bioinformatics Research Symposium.
- 2022 Member of Charles Perkins Centre Single Cell Biology Project Node.
- 2022 Organiser of International Society for Stem Cell Research (ISSCR) Digital Series on Spatial Transcriptomics in April 2022, a four-part webinar series consisting 16 expert speakers, co-organised with Dr Jan-Philipp Junker (MDC Berlin).
- 2022 Attended EMBO Project Management Course in February 2022.
- 2020 Attended EMBO Lab Leadership for Postdocs Course in February 2020.
- 2020 Member of Bioconductor Technical Advisory Board since 2020.
- 2019 Attended Royal Society Leadership Effectiveness Course in November 2019.
- 2019 Wellcome Trust Mouse Gastrulation Consortium Meetings organiser since 2019.
- 2019 Member of GIW 2019 program committee.
- 2019 Judged oral presentation at 2019 COMBINE Symposium in Sydney, Australia.
- 2018 Coordinated The University of Sydney Statistical Bioinformatics Seminar in 2018, ensuring a 50/50 balance along gender and EMCR status among seminar speakers.
- 2018 Invited to judge oral presentations at the 2018 COMBINE Symposium in Melbourne.
- 2018 Attended Mentoring and Guidance in Careers Workshop in October 2018. This was a week-long workshop with a competitive application process for mentoring of female and gender diverse early career researchers in Mathematics and Physics.
- 2018 Attended Charles Perkins Centre EMCR workshop on 'Manuscripts and Grant Reviewing' in June 2018.
- 2018 Present a talk at The University of Sydney Faculty of Science Higher Degree by Research Supervisor Forum: Supervising 21st Century Style: New Challenges and Opportunities in June 2018.
- 2018 Attended workshop on 'Effective data presentation at conferences' in March 2018.
- 2017 Volunteer for University of Sydney Open Day August 2017.
- 2017 Executive member of the COMBINE student and early-career researcher organisation in 2017, part of the COMBINE National Committee Media and Communications team.
- 2016 Member of organising committee for COMBINE Student Symposium in October 2016.

2015 – 2017 Student member of AustMS November 2015 - 2017.

2013 – 2017 Student member of the Statistical Society of Australia (SSAI) since November 2013.

2015 – 2017 Member of University of Sydney School of Mathematics and Statistics Publicity and Outreach Committee.

2015 Chaired a session at the COMBINE Symposium in October 2015.

2015 Volunteer for University of Sydney Open Day August 2015.

2015 Presented a talk at School of Mathematics and Statistics 'Thank You to Teachers' evening in August 2015.

2015 Attended 'Data Visualisation Masterclass' at Charles Perkins Centre in June 2015.

2015 Completed 'High Performance Computing Intermediate Training' at University of Sydney in March 2015.

2014 Attended 'UCSC Genome Browser' workshop in September 2014.

2014 Volunteer for University of Sydney Info Day January 2014.

2013 Participated in the inaugural EMBL Australia PhD Course, a two week intensive course on molecular biology and bioinformatics held at the University of Melbourne in June 2013.

2013 Involved in the CSIRO Vacation Scholarship Program from January to March 2013.

2012 Involved in the Charles Perkins Centre Summer Vacation Scholarship Program from December 2011 to February 2012.

2009 Volunteer for School Tutoring Program at the University of Sydney in 2009.

2007 Involved in Peer Tutoring at Macarthur Girls High School in 2007.

Peer review

Ongoing Refereeing for international journals including Nature, Nature Biotechnology, Genome Biology, Nature Methods and Bioinformatics. I have reviewed a total of 60 manuscripts thus far.
Publons: publons.com/a/1038599/

2023 ARC Discovery Projects Expert Assessor.

2023 ARC Discovery Early Career Research Award Projects Expert Assessor.

2022 ARC Discovery Projects Expert Assessor.

2019 Program Committee for Genome Informatics Workshop, Sydney, Australia.

Software

I have contributed to 8 software items, below is a selected list of software for which I have led the development:

2023 **MoleculeExperiment**: a Bioconductor package for data infrastructure for imaging based spatial transcriptomics data (Peters Couto et al, Bioinformatics, accepted).
<https://bioconductor.org/packages/release/bioc/html/MoleculeExperiment.html>

2020 **Spatial Mouse Atlas**: an R/Shiny web application to interrogate spatially resolved expression of mouse organogenesis (Lohoff*, Ghazanfar*, et al, Nature Biotechnology).
<https://marionilab.cruk.cam.ac.uk/SpatialMouseAtlas/>

2020 **scHOT**: an R/Bioconductor package for single cell higher order testing (Ghazanfar et al, Nature Methods, 2020). (License: GPL-3)
<https://bioconductor.org/packages/scHOT>

2018 **DCARS**: an R package for testing differential correlation across ranked samples (Ghazanfar et al, Bioinformatics, 2018). (License: GPL-3)
<https://github.com/shazanfar/DCARS>

2018 **cellAggregator**: an R package for simulating cell-cell aggregation assays using Markov chains (Bisogni et al, eLife, 2018). (License: MIT)
<https://github.com/shazanfar/cellAggregator>

2016 **PACMEN**: an R/Shiny web application for joint analysis of cancer mutation and gene expression network analysis, published as proceedings to the Asia Pacific Bioinformatics Conference (Ghazanfar and Yang, Computational Biology and Chemistry, 2016).
<http://shiny.maths.usyd.edu.au/PACMEN/>

Publications

I have published my work in interdisciplinary and domain-specific peer reviewed journals, listed below. My work has been cited 2,022 times and I have an H-index of 18 (Google Scholar). Links to publications and further information can be found via ORCID and Google Scholar.

*indicates equal first author

+indicates senior or corresponding author

ORCID ID: 0000-0001-7861-6997

Google Scholar: <https://scholar.google.com/citations?user=D9Btwb8AAAAJ>

1. Guo, B, Ling W, ... **Ghazanfar S+**, Martinowich K, Hicks S. Integrating spatially-resolved transcriptomics data across tissues and individuals: challenges and opportunities. *Small Methods*. 2025. (Accepted)
2. **Ghazanfar S**. Single-cell expression profiling has its roots in *in situ* techniques. *Nature Reviews Genetics*. 2024.
3. Liu C, Long S, ... **Ghazanfar S** and Yang P. Multi-task benchmarking of single-cell multimodal omics integration methods. *Nature Methods Registered Report*. 2024.
4. Li T, Horsfall D, Basurto-Lozada D, Roberts K, Prete M, Lawrence JEG, He P, Tuck E, Moore J, **Ghazanfar S**, Teichmann S, Haniffa M, Bayraktar OA. WebAtlas pipeline for integrated single cell and spatial transcriptomic data. *Nature Methods*. 2024.
5. Patrick R, Janbandhu V, ... **Ghazanfar S**, ... Chong J, and Harvey R. Integration mapping of cardiac fibroblast single-cell transcriptomes elucidates cellular principles of fibrosis across diverse cardiovascular pathologies. *Science Advances*. (Accepted) 2024
6. Cao Y, Tran A, ..., **Ghazanfar S+**, Yang JYH. Thinking process templates for constructing data stories with SCD-NEY. *F1000 Research*. 2024.
7. Janbandhu V, Tallapragada V, Vero Li J, Shewale B, **Ghazanfar S**, Patrick R, Cox C, and Harvey R. A Novel Mouse Model for Selective Tagging, Purification and Manipulation of Cardiac Myofibroblasts. *Circulation*. 2024. (Accepted)
8. Fu X, Lin X, Lin D, Mechtersheimer D, Wang C, Ameen F, **Ghazanfar S**, Patrick E, Kim J, Yang JYH. Biologically-informed self-supervised learning for segmentation of subcellular spatial transcriptomics data. *Nature Communications*. 2023.
9. Couto BZP, Robertson N, Patrick E, **Ghazanfar S+**. MoleculeExperiment enables consistent infrastructure for molecule-resolved spatial transcriptomics data in Bioconductor. *Bioinformatics*. 2023
10. **Ghazanfar S+**, Guibentif C, and Marioni J. Stabilised mosaic single-cell data integration using unshared features. *Nature Biotechnology*. 2023.
11. Cao Y, **Ghazanfar S**, Yang P, Yang JYH. Benchmarking of analytical combinations for COVID-19 outcome prediction using single-cell RNA sequencing data. *Briefings in Bioinformatics*. 2023.
12. Barry-Hundeyin M, Carrot-Zhang J, Dayton T, **Ghazanfar S**, et al. The 2022 generation. *Nature Cancer*. 2022.
13. Rumianek, B, Hillman, R, Jeoffreys, N, **Ghazanfar, S**, Ajwani, S, Schifter, M. Prevalence of oral HPV in the adult sample population in Sydney. *Australian Dental Journal*. 2022.
14. Lin X, Swedlund B, Ton M-LN, **Ghazanfar S** et al. Mesp1 controls the chromatin and enhancer landscapes essential for spatiotemporal patterning of early cardiovascular progenitors. *Nature Cell Biology*. 2022.
15. Righelli D, Weber LM, Crowell HL, Pardo B, **Ghazanfar S** et al. SpatialExperiment: infrastructure for spatially resolved transcriptomics data in R using Bioconductor. *Bioinformatics*. 2022.
16. Havula E, **Ghazanfar S**, Lamichane N, et al. Genetic variation of macronutrient tolerance in *Drosophila melanogaster*. *Nature Communications*. 2022.
17. Missarova A, Jain J, Butler A, **Ghazanfar S**, Stuart R, Brusko M, Wasserfall C, Nick H, Brusko T, Atkinson M, Satija R, Marioni J, et al. geneBasis: an iterative approach for unsupervised selection of targeted gene panels from scRNA-seq. *Genome Biology*. 2021.
18. Lohoff T*, **Ghazanfar S***, Missarova A, Koulena N, et al. Integration of spatial and single-cell transcriptomic data elucidates mouse organogenesis. *Nature Biotechnology*. 2021.
19. Barile M, Imaz-Rosshandler I, Inzani I, **Ghazanfar S**, Nichols J, Marioni JC, et al. Coordinated Changes in Gene Expression Kinetics Underlie both Mouse and Human Erythroid Maturation. *Genome Biology*. 2021.
20. Francis D*, **Ghazanfar S***, Havula E, Krycer JR, Strbenac D, Senior A, et al. Genome wide analysis in *Drosophila*

reveals diet by gene interactions and uncovers diet-responsive genes. *G3 Genes|Genomes|Genetics*. 2021.

21. Su X, Zhao L, Shi Y, Zhang R, Long Q, Bai S, ... **Ghazanfar S**, ... et al. Clonal evolution in liver cancer at single-cell and single-variant resolution. *J Hematol Oncol*. 2021.
22. Muus C, Luecken MD, Eraslan G, Sikkema L, Waghray A, Heimberg G, ..., **Ghazanfar S**, ... et al. Single-cell meta-analysis of SARS-CoV-2 entry genes across tissues and demographics. *Nature Medicine*. 2021.
23. Guibentif C, Griffiths JA, Imaz-Rosshandler I, **Ghazanfar S**, Nichols J, Wilson V, et al. Diverse Routes toward Early Somites in the Mouse Embryo. *Developmental Cell*. 2021.
24. Lau M-T, **Ghazanfar S**, Parkin A, Chou A, Rouaen JR, Littleboy JB, et al. Systematic functional identification of cancer multi-drug resistance genes. *Genome Biology*. 2020.
25. **Ghazanfar S**, Lin Y, Su X, Lin DM, Patrick E, Han ZG. Investigating higher-order interactions in single-cell data with scHOT. *Nature Methods*. 2020.
26. Su X, Long Q, Bo J, Shi Y, Zhao L-N, Lin Y, **Ghazanfar S**, et al. Mutational and transcriptomic landscapes of a rare human prostate basal cell carcinoma. *Prostate*. 2020.
27. Rood JE, Stuart T*, **Ghazanfar S***, Biancalani T*, Fisher E, Butler A, et al. Toward a Common Coordinate Framework for the Human Body. *Cell*. 2019.
28. Lin Y, **Ghazanfar S**, Wang KYX, Gagnon-Bartsch JA, Lo KK, Su X, et al. scMerge leverages factor analysis, stable expression, and pseudoreplication to merge multiple single-cell RNA-seq datasets. *Proceedings of the National Academy of Sciences USA*. 2019.
29. Lim SY, Lee JH, Gide TN, Menzies AM, Gumiński A., **Ghazanfar S**, et al. Circulating cytokines predict immune-related toxicity in melanoma patients receiving anti-PD-1-based immunotherapy. *Clinical Cancer Research*. 2019.
30. HuBMAP Consortium. The human body at cellular resolution: the NIH Human Biomolecular Atlas Program. *Nature*. 2019.
31. Lin Y, **Ghazanfar S**, Strbenac D, Wang A, Patrick E, Lin DM, et al. Evaluating stably expressed genes in single cells. *Gigascience*. 2019.
32. Bisogni AJ, **Ghazanfar S**, Williams EO, Marsh HM, Yang JY, Lin DM. Tuning of delta-protocadherin adhesion through combinatorial diversity. *Elife*. 2018.
33. Sykes EK, McDonald CE, **Ghazanfar S**, Mactier S, Thompson JF, Scolyer RA, et al. A 14-protein signature for rapid identification of poor prognosis stage III metastatic melanoma. *Proteomics Clinical Applications*. 2018.
34. **Ghazanfar S+**, Strbenac D, Ormerod JT, Yang JYH, Patrick E. DCARS: differential correlation across ranked samples. *Bioinformatics*. 2019.
35. **Ghazanfar S**, Vuocolo T, Morrison JL, Nicholas LM, McMillen IC, Yang JYH, et al. Gene expression allelic imbalance in ovine brown adipose tissue impacts energy homeostasis. *PLoS One*. 2017.
36. **Ghazanfar S**, Bisogni AJ, Ormerod JT, Lin DM, Yang JYH. Integrated single cell data analysis reveals cell specific networks and novel coactivation markers. *BMC Systems Biology*. 2016.
37. **Ghazanfar S**, Yang JYH. Characterizing mutation–expression network relationships in multiple cancers. *Computational Biology and Chemistry*. 2016.
38. Yang P, Patrick E, Humphrey SJ, **Ghazanfar S**, James DE, Jothi R, et al. KinasePA: Phosphoproteomics data annotation using hypothesis driven kinase perturbation analysis. *Proteomics*. 2016.

Preprints and submitted manuscripts:

39. Harland LTG, Lohoff T, ..., Cai L, Marioni JCM, Gottgens B, **Ghazanfar S***. A Spatiotemporal Atlas of Mouse Gastrulation and Early Organogenesis to Explore Axial Patterning and Project In Vitro Models onto In Vivo Space. *bioRxiv*. 2025.
40. Hemberg M*, Marini F*, **Ghazanfar S***, ..., Jelic I. Insights, opportunities and challenges provided by large cell atlases. *arXiv*. 2024.
41. Heidari E, Lohoff T, Tyser RCV, Marioni JC, Robinson MD, and **Ghazanfar S**. Supervised spatial inference of dissociated single-cell data with SageNet. *bioRxiv*. 2022.
42. Wang C, Chan A, ... **Ghazanfar S**, ... Yang JYH. Benchmarking the translational potential of spatial gene expression prediction from histology. *bioRxiv*. 2023.
43. Cao Y, Yu L, ... **Ghazanfar S**, Yang JYH. The current landscape and emerging challenges of benchmarking

single-cell methods. bioRxiv. 2023.

44. Ameen F, Robertson N, Lin D, **Ghazanfar S+**, Patrick E+. Kontextual: Reframing analysis of spatial omics data reveals consistent cell relationships across images. bioRxiv. 2024.

45. Hou C, **Ghazanfar S**, Marini F, Morgan M, Hicks S. HuBMAPR: an R Client for the HuBMAP Data Portal. bioRxiv. 2024.