

# Curriculum Vitae of Dharmesh Dinesh Bhuva

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## Personal Information

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## Brief biography

Dharmesh Bhuva is a computational biology research officer in the Davis laboratory at the Walter and Eliza Hall Institute. He recently submitted his PhD thesis to the department of Mathematics and Statistics at the University of Melbourne. His research has been focused on developing novel systems biology approaches to study cancer systems using data generated from single-cell and spatial 'omics technologies.

During his undergraduate studies in computer science at the University of Southampton, Dharmesh acquired skills in the disciplines of computational biology, machine learning and computer vision, and developed a novel feature extraction algorithm for 3D volumetric images for his research project. He later completed a M.Sc. in Bioinformatics at the University of Melbourne, during which he was awarded a merit-based University of Melbourne bursary to undertake the research component of his studies.

Dharmesh has published 5 (co-)first authored and 2 collaborative papers. He has also developed/co-developed 7 open-source R/Bioconductor software packages that have had more than 42,500 downloads. He has tutored in computational genomics, and algorithms for functional genomics at the University of Melbourne and has run workshops for the Masters in Bioinformatics course at the University of Melbourne. He has co-supervised 2 MSc Bioinformatics students and mentors four PhD students.

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## Qualifications, Prizes and Professional Memberships

### Qualifications

- PhD (Mathematics and Statistics) The University of Melbourne, 2020
- MSc (Bioinformatics) The University of Melbourne, 2015
- BSc (Computer science) University of Southampton, 2013

### Awards

- Victorian Cancer Bioinformatics Symposium – best written lay summary award, 2021
- The University of Melbourne's Melbourne Research Scholarship, 2016
- The University of Melbourne M.Sc. (Bioinformatics) merit-based bursaries, 2014

### Professional Memberships

- Student member of the Australian Bioinformatics and Computational Biology Society (ABACBS) (2017 - present)

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## Career Profile

**2020 – present**      **Research officer, Bioinformatics Division, The Walter and Eliza Hall Institute of medical research (WEHI)**

- Analysis of spatial and single-cell transcriptomics to identify mechanisms of drug-induced phenotypic plasticity in cancer.

- Data analysis for commercial research collaboration between the CRC for Cancer Therapeutics and Pfizer Inc.
- Analysis of generic and drug specific regulatory mechanisms in biological systems using data integration approaches.
- Analysis of multi-omics data associated with drug response across a diverse set of biological models including cell lines and patients.
- Partial supervision of post graduate student

**2016 – 2020      PhD Student, School of Mathematics and Statistics, The University of Melbourne (Co-supervised by Prof. Edmund Crampin and Assoc. Prof. Melissa J. Davis)**

- Analysis of context-specificity in network models, focusing on cancer subtype-specific gene regulatory networks.
- Development of methods to quantify molecular phenotypes across a diverse set of cancer types.
- Analysis of large transcriptomic datasets and experiment specific datasets from patients, cell lines and xenograft data.
- Development of several R packages.
- Partial supervision of post-graduate student.

**2019 – 2022      Workshop coordinator (BINF90002 – Elements of bioinformatics), The University of Melbourne**

- Prepare and deliver a workshop on the singscore software I developed during my PhD and network analysis in bioinformatics.

**2019              Tutor (COMP90016 – Computational genomics), The University of Melbourne**

- Supervision of tutorials, preparation and revision of tutorial material, preparation of assignments, preparation of marking sheets and marking, consultations with students, revision of exam, deploying and managing the IT infrastructure for the course.

**2018              Tutor (COMP90014 – Algorithms for functional genomics), The University of Melbourne**

- Supervision of tutorials, preparation and revision of tutorial material, preparation of assignments, preparation of marking sheets and marking, consultations with students.

## **All Refereed Publications and Preprints**

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### **\* co-first author**

1. Berthelet J\*, Foroutan M\*, **Bhuva DD\***, Whitfield HJ, El-Saafin F, Cursons J, Serrano A, Merdas M, Lim E, Charafe-Jauffret E, Ginestier C. Computational Screening of Anti-Cancer Drugs Identifies a New BRCA Independent Gene Expression Signature to Predict Breast Cancer Sensitivity to Cisplatin. *Cancers*. 2022 May 13;14(10):2404.
2. Kulasinghe A, Tan CW, dos Santos Miggiolaro AF, Monkman J, SadeghiRad H, **Bhuva DD**, Junior JD, de Paula CB, Nagashima S, Baena CP, Souza-Fonseca-Guimaraes P. Profiling of lung SARS-CoV-2 and influenza virus infection dissects virus-specific host responses and gene signatures. *European Respiratory Journal*. 2021 Jan 1.
3. Genovesi LA, Millar A, Tolson E, Singleton M, Hassall E, Kojic M, Brighi C, Girard E, Andradas C, Kuchibhotla M, **Bhuva DD**, Endersby R, Gottardo NG, Bernard A, Adolphe C, Olson JM, Davis MJ, Wainwright BJ. Systems pharmacogenomics identifies novel targets and clinically actionable therapeutics for medulloblastoma. *Genome Medicine*. 2021 Dec;13(1):1-5.
4. **Bhuva DD**, Cursons J, Davis MJ. Stable gene expression for normalisation and single-sample scoring. *Nucleic acids research*. 2020 Nov 4;48(19):e113-.

5. **Bhuva DD**, Cursons J, Smyth GK, Davis MJ. Differential co-expression based detection of conditional relationships in transcriptional data: comparative analysis and application to breast cancer. *Genome biology*. 2019 Dec;20(1):1-21.
6. **Bhuva DD**, Foroutan M, Xie Y, Lyu R, Cursons J, Davis MJ. Using singscore to predict mutations in acute myeloid leukemia from transcriptomic signatures. *F1000Research*. 2019 Jun 3;8.
7. Foroutan M\*, **Bhuva DD\***, Lyu R, Horan K, Cursons J, Davis MJ. Single sample scoring of molecular phenotypes. *BMC bioinformatics*. 2018 Dec;19(1):404.

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**All software and data packages developed (42,500 downloads as of August 2022)**


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1. singscore (2018)	32323 downloads ( <i>top 10% globally</i> )
2. dcanr (2019)	4147 downloads
3. SingscoreAMLMutations (2019)	1025 downloads
4. emtdata (2021)	560 downloads
5. msigdb (2021)	3011 downloads
6. vissE (2021)	1291 downloads
7. standR (2022)	163 downloads

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**Conference Presentations**


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1. **Invited speaker**, Melbourne Mathematical Biology (MMB) seminar, Melbourne, Australia, May 2022.
2. **Invited speaker**, Bioinformatics workshop, AMSI Bioinfosummer Online, Australia, November 2021.
3. Victorian Cancer Bioinformatics Symposium (VCBS), Melbourne, Australia, October 2021. (Best written lay summary consumer award).
4. **Invited speaker**, Lecture and Bioinformatics workshop, WEHI Bioinformatics and Computational Biology Masterclass, Online (targeting south east Asia), August 2021.
5. Bioinformatics seminar, Walter Eliza Hall Institute, Australia, August 2021.
6. **Invited speaker**, Bioinformatics workshop, Nanjing University, China, December 2020.
7. Bioinformatics PhD completion seminar, Walter Eliza Hall Institute, Australia, May 2020.
8. COMBINE/AYRCOB Student symposium, Sydney, Australia, December 2019.
9. Bioinformatics seminar, Walter Eliza Hall Institute, Australia, November 2019.
10. COMBINE Student symposium, Melbourne, Australia, November 2018.
11. Bioinformatics seminar, Walter Eliza Hall Institute, Australia, August 2018.
12. COMBINE Student symposium, Adelaide, Australia, November 2017.

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**Research Collaborations**


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- Prof. Gabrielle Belz (The University of Queensland, Brisbane, Australia) and a team of clinicians from Hospital Marcelino Champagnat (Brazil); Characterising the molecular traits of an international cohort of ICU patients suffering from severe COVID-19 disease using novel spatial transcriptomic tools.
- Prof. Anne Voss and A/Prof. Tim Thomas (Walter and Eliza Hall Institute of medical research, Melbourne, Australia), Prof. Sarah-Jane Dawson and Prof. Mark Dawson (Walter and Eliza Hall Institute of medical research, Melbourne, Australia), and Pfizer Inc.; Investigating the mechanism of actions for a drug from Pfizer Inc. under a commercial licensing deal.

- Prof. Erik Thompson (Queensland University of Technology and St Vincent's Institute, Brisbane, Australia); Pathways implicated in the epithelial to mesenchymal transition in breast cancer.
- Dr. Laura Genovesi and Dr. Christelle Adolphe (The University of Queensland, Brisbane, Australia); Investigating dormancy induced by Palbociclib treatment in medulloblastoma and the role of hypoxia in medulloblastoma.
- Dr. Delphine Merino (ONJCRI, Melbourne, Australia); Investigating drug response prediction modelling across various cancers.
- Dr. Kate Sutherland (Walter and Eliza Hall Institute of medical research, Melbourne, Australia); Investigating regulatory mechanisms in small cell lung cancer in genomic mouse models.

## Awards and Funding

Grant	Funding Organisation	Investigators	Status	Amount
Victorian Cancer Bioinformatics Symposium Consumer Award - best written lay summary	-	-	2021	\$200
Melbourne Research Scholarship	The University of Melbourne	Dharmesh D. Bhuva	2016-2020	\$150,000 fee waiver + \$29,000 stipend p.a.
M.Sc. Bioinformatics bursary: Exploring conditional regulatory networks in breast cancer	The University of Melbourne	Dharmesh D. Bhuva	2014-2015	\$5,000

## Supervision and mentoring

- **Supervisor for research projects for M.Sc. student:** Malvika Kharbanda (Co-supervisor, awarded 2022), Ruqian Lyu (Co-supervisor, awarded 2018).
- I mentor PhD students and provide them with advice and support related to their research projects and their PhD administrative tasks.

## Teaching

WEHI Bioinformatics and Computational Biology Masterclass

- Delivered an introduction to pathway analysis lecture in computational biology.
- Prepared and delivered a pathway analysis workshop.

University of Melbourne

- Invited Demonstrator for M.Sc. Bioinformatics, BINF90002 (2022): Conducted a biological networks workshop.
- Invited Demonstrator for M.Sc. Bioinformatics, BINF90002 (2021): Conducted a biological networks workshop.
- Invited Demonstrator for M.Sc. Bioinformatics, BINF90002 (2020): Conducted a transcriptomic analysis workflow and discussed biological networks.
- Invited Demonstrator for M.Sc. Bioinformatics, BINF90002 (2019): Demonstrated a transcriptomic analysis workflow in the R programming language.
- Demonstrator for M.Sc. Bioinformatics, COMP90016 (2019, Semester 1): Taught algorithms and scripting, and demonstrated the use of knowledgebases.
- Demonstrator for M.Sc. Bioinformatics, COMP90014 (2018, Semester 2): Taught algorithms, python programming and scripting.

## Community presentations and outreach

- Volunteer head tutor to Victorian certificate of education (VCE) high school (grade 10-12) STEM students of the SKLPS Victoria Inc. community, 2015-2017. Conceived the tutoring program in

2015 and managed 5 tutors for various subjects including, mathematics, physics, chemistry and biology, for the duration of the tutoring program.