

# Himal Shrestha

PHD, BIOINFORMATICS

La Trobe University

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*As a PhD graduate in Bioinformatics with expertise in computational and mathematical modelling, I am passionate about using data to predict, prevent, and eliminate infectious diseases. Currently, I work as a bioinformatician in the Peter Doherty Institute for Infection and Immunity, University of Melbourne. My research at La Trobe University involved studying the transmission of parasitic disease, called river blindness, by integrating genomic, environmental, and epidemiological data with a variety of modelling and analytical approaches.*

## Education

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### PhD in Bioinformatics

Melbourne, Australia

LA TROBE UNIVERSITY

2019-2023

- Thesis: New tools for onchocerciasis elimination in Africa: the role of spatially explicit models in informing decisions.

### Master of Biotechnology and Bioinformatics

Melbourne, Australia

LA TROBE UNIVERSITY

2017-2019

- Thesis: Analysis of ivermectin action on adult female *Onchocerca volvulus* from embryogram data: evidence for reproductive periodicity and the basis for the embryostatic phenotype.

### Bachelor of Science in Human Biology

Dhulikhel, Nepal

KATHMANDU UNIVERSITY

2012-2016

- Thesis: Assessment of C-Reactive Protein/Albumin ratio for predicting outcome in critically ill patients with various underlying diseases.

## Skills

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#### COMPUTATIONAL SKILLS

- Programming languages: R, Python, MATLAB, Unix/Linux shells, Julia, javascript, C and C++
- GIS softwares: Earth Engine, QGIS
- Markup and version control: LaTeX, Markdown, CSV, JSON, YAML, Git, VSCode
- Bioinformatics databases: NCBI, UniProt, EMBL-EBI, DDBJ, Wormbase and Vectorbase
- Miscellaneous: High Performance Computing Clusters, Cloud computing (AWS, Oracle-Cloud, GCP), RShiny, Docker

#### WET LAB SKILLS

- Samples: Clinical (blood, sputum, urine), microbiological (bacteria, fungus) and molecular samples (protein, RNA, plasmid and DNA)
- Molecular techniques: DNA and plasmid extraction, Gel Electrophoresis, SDS PAGE, ELISA, Cloning with restriction endonuclease, Primer Design for PCR, Protein separation with IMAC
- Instruments: Spectrophotometer, Centrifuge, PCR thermal cycler, water bath, incubators and autoclaves

#### ORGANIZATIONAL SKILLS

- Initiated a contract research organisation called, **Anka Analytica** with a group of post-docs in Australia
- Active committee member: PAM-HDR (2020), **COMBINE-AU** (2020-2022)
- Initiated undergraduate student club, One Class One Community (OCOC) with approximately 200 members
- Experience of working as a team with diverse group of people

#### COMMUNICATION SKILLS

- Verbal: presentations in seminar, conferences, teaching and co-host of a podcast, **Science ka Kura**
- Written: journal articles, thesis, newsletters at student societies (PAM-HDR, COMBINE) and report writing

## Employment

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### Bioinformatician

Melbourne, Australia

THE PETER DOHERTY INSTITUTE FOR INFECTION AND IMMUNITY

Oct, 2023-Ongoing

- Developing and applying computational tools to analyse genomic data of bacterial pathogens

### Post-doctoral researcher (Bioinformatics/infectious disease modelling)

Melbourne, Australia

LA TROBE UNIVERSITY

Apr, 2023-Oct, 2023

- Formulating empirical and/or mechanistic transmission models utilising genomic, environmental and epidemiological data and supervise students working on related research.

## Casual academic

LA TROBE UNIVERSITY

- BIO5INF (Bioinformatics)
- BIO1MGC (Molecules, Genes and Cells)
- BIO1EEB (Ecology, Evolution and Biodiversity)

Melbourne, Australia

Feb, 2020-Oct, 2022

## La Trobe Outreach Demonstrator

LA TROBE UNIVERSITY

- Bytesize Bioinformatics

Melbourne, Australia

Jan, 2020

## Research assistant

LA TROBE UNIVERSITY

- Performed analysis of embryogram and skin snip data of female *Onchocerca volvulus* parasite
- Assisted in analysis of genomic data generated in the lab

Melbourne, Australia

Jul-Aug, 2019

## Lecturer

PURBANCHAL UNIVERSITY

- Anatomy and Physiology
- Pharmacology and Toxicology

Bhaktapur, Nepal

Jan-Jun, 2017

## Awards

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### Best poster prize

ASIA PACIFIC CONSORTIUM OF MATHEMATICS FOR INDUSTRY

Melbourne, Australia

2022

### ASTMH Young Investigator Award (First-tier Mention)

AMERICAN SOCIETY OF TROPICAL MEDICINE & HYGIENE

Seattle, Washington, United States

2022

### ASTMH annual meeting travel award

AMERICAN SOCIETY OF TROPICAL MEDICINE & HYGIENE

Seattle, Washington, United States

2022

### SABE HDR student research support award

LA TROBE UNIVERSITY

Melbourne, Australia

2022

### The Jenny Graves Prize for best student short presentation

GENETICS SOCIETY OF AUSTRALASIA

ComBio22, Melbourne, Australia

2022

### LTU Full Fee Research Scholarship (LTUFFRS) Award

LA TROBE UNIVERSITY

Melbourne, Australia

2019-2023

### LTU Postgraduate Research Scholarship (LTUPRS) Award

LA TROBE UNIVERSITY

Melbourne, Australia

2019-2023

### Australian Society of Parasitologists (ASP) student travel grant

AUSTRALIAN SOCIETY OF PARASITOLOGY

Adelaide, Australia

2019

### Pro Vice Chancellor's Commendation 2018

LA TROBE UNIVERSITY

Melbourne, Australia

2019

### Research Poster Excellence Award

MASTER'S POSTER SESSION (LA TROBE UNIVERSITY)

Melbourne, Australia

2019

### La Trobe College Excellence Scholarship

LA TROBE UNIVERSITY

Melbourne, Australia

2017-2019

### Merit based Scholarship

KATHMANDU UNIVERSITY

Dhulikhel, Nepal

2013-2016

## Research grants

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### Co-investigator/Sub-awardee

UNICEF/UNDP/WORLD BANK/WHO SPECIAL PROGRAMME FOR RESEARCH AND TRAINING IN TROPICAL DISEASES (TDR/WHO)

(US\$108,000)

2021-2022

- Population genetic tools for onchocerciasis control programmes to determine transmission zones.

## JOURNAL PUBLICATIONS

- **Shrestha H**, McCulloch K, Hedtke SM, Grant WN. Geospatial modeling of pre-intervention nodule prevalence of *Onchocerca volvulus* in Ethiopia as an aid to onchocerciasis elimination. Cotton J, editor. PLoS Negl Trop Dis. 2022 Jul 18;16(7):e0010620.
- Gyawali P, Tamrakar D, Shrestha A, **Shrestha H**, Karmacharya S, Bhattarai S, et al. Consumer acceptance and preference for brown rice-A mixed-method qualitative study from Nepal. Food Sci Nutr. 2022 Mar 4;fsn3.2803.
- Gyawali P, **Shrestha H**, Pant V, Risal P, Gautam S. C-reactive Protein to Albumin Ratio among Patients Admitted to Intensive Care Unit of a Tertiary Care Hospital: A Descriptive Cross-sectional Study. J Nepal Med Assoc. 2021 Dec 11;59(244):1247-51.
- R Shrestha, DP Subedi, S Adhikari, A Maharjan, **H Shrestha**, GR Pandey (2017). Experimental Study of Atmospheric Pressure Argon Plasma Jet-Induced Strand Breakage in Large DNA Molecules, Plasma Medicine, vol. 7, no. 1. doi:10.1615/PlasmaMed.2017019986
- J Shrestha Manandhar, R Shrestha, N Basnet, P Silwal, **H Shrestha**, A Risal, D Kunwar (2017). Study of Adherence Pattern of Antidepressants in Patients with Depression, Kathmandu University Medical Journal (KUMJ), vol. 15, no. 57, pp: 3-9. PMID: 29446354
- JTM Shrestha, **H Shrestha**, M Prajapati, A Karkee, A Maharjan (2017). Adverse Effects of Oral Hypoglycemic Agents and Adherence to them among Patients with Type 2 Diabetes Mellitus in Nepal, Journal of Lumbini Medical College, vol. 5, no. 1, pp. 34-40. doi:10.22502/jlmc.v5i1.126

## PREPRINT

- **Shrestha H**, McCulloch K, Chisholm RH, Armoo S, Vierigh F, Sirwani N, et al. Synthesising environmental, epidemiological, and genetic data to assist decision making for onchocerciasis elimination. Epidemiology; 2023 Feb. doi:10.1101/2023.02.14.23285937

## CONFERENCE PRESENTATIONS AND POSTERS

- **H Shrestha**, S Hedtke, K McCulloch, W Grant, R Chisholm (2023). Understanding persistent transmission of river blindness in northwestern Ethiopia using spatially structured mathematical models. Poster presentation at Forum "Math-for-Industry" 2023-MfI2.0, Fukuoka, Japan, 29 Aug-1 Sep, 2023.
- **H Shrestha**, S Hedtke, K McCulloch, W Grant, R Chisholm (2023). Understanding persisting onchocerciasis hotspots in Africa using mathematical models. Oral presentation at International Congress for Applied Mathematics (ICIAM), Tokyo, Japan, 20-25 Aug, 2023.
- **H Shrestha**, C Wilding, R Post, S Feleke, R Chisholm, W Grant, S Hedtke (2023). Landscape genetics reveals vector migration in a cross-border onchocerciasis transmission zone shared by Ethiopia and Sudan progressing towards elimination. Poster presentation at International Congress of Genetics (ICG), Melbourne, Australia, 16-21 Jul, 2023.
- **H Shrestha**, S Hedtke, K McCulloch, S Feleke, W Grant (2022). Parameterising vector movement in an onchocerciasis transmission model with population genetic data. Asia Pacific Consortium of Mathematics for Industry (APCMfI), 21-22 Nov, 2022.
- **H Shrestha**, K McCulloch, SM Hedtke, WN Grant (2022). Geospatial modeling of the baseline *Onchocerca volvulus* nodule prevalence in Ethiopia as an aid to elimination. Poster presentation at ASTMH 2022 Annual Meeting, Seattle Convention Center, United States, 30 Oct - 3 Nov, 2022.
- **H Shrestha**, SM Hedtke, RH Chisholm, WN Grant (2022). Landscape genetics and persistence of Onchocerciasis transmission in Ghana. Lightning talk at ComBio22, Melbourne Convention and Exhibition Centre (MCEC), 27-30 Sep, 2022.
- **H Shrestha**, SM Hedtke, K McCulloch, WN Grant (2021). Landscape genetics to determine factors for ongoing transmission of onchocerciasis in the transition region of Ghana. Oral presentation (15 mins) at COMBINE Student Symposium (Virtual), Nov 22, 2021.
- **H Shrestha**, K McCulloch, SM Hedtke, SM Feleke, WN Grant (2021). Geospatial analysis of pre-intervention prevalence of onchocerciasis in Ethiopia. Australian Society of Parasitology Online Conference (Virtual). Jun 23-25, 2021.
- **H Shrestha**, K McCulloch, SM Hedtke, WN Grant (2021). Geospatial mapping of onchocerciasis prevalence in Ethiopia. Spatial and Temporal Statistics Symposium (STSS), University of Wollongong (Virtual), February 17-19, 2021.
- **H Shrestha**, SM Hedtke, K McCulloch, WN Grant (2020). Identifying spatial patterns of onchocerciasis transmission using landscape analysis. Science bite talk at PAM Research Symposium 2020 held online on December 10 and 11, 2020.
- WN Grant, SM Hedtke, K McCulloch, S Wanji, **H Shrestha** (2020). Elucidating ivermectin's action on reproduction of adult female *Onchocerca volvulus* from embryogram data: the basis for the embryostatic phenotype and sub-optimal response. Anthelmintics: Discovery to Resistance IV, Los Angeles, California, February 3-7, 2020
- **H Shrestha** (2019). Elucidating ivermectin's action on reproduction of adult female *Onchocerca volvulus* from embryogram data: the basis for the embryostatic phenotype. PRISM2 Annual Conference, Woodward Conference Centre, Carlton, Victoria, November 12-13, 2019.
- W Grant, S Hedtke, S Wanji, **H Shrestha** (2019). Ivermectin and fertility in nematodes. The second Australian *C. elegans* Symposium (ACES, 2019), Queensland Brain Institute, The University of Queensland, Brisbane, Queensland, October 23-25, 2019.
- **H Shrestha**, SM Hedtke, K McCulloch, S Wanji, WN Grant (2019). Effect of ivermectin treatment on adult female *Onchocerca volvulus* from embryogram data: evidence for periodicity of reproduction and the basis for the embryostatic phenotype. Oral presentation (15 mins) at annual meeting of Australian Society for Parasitology, Adelaide Convention Centre, South Australia, July 8-11, 2019.
- S Gautam, P Gyawali, J Singh, **H Shrestha** (2016). Assessment of C-Reactive Protein/Albumin Ratio in Critically Ill Patients with Various Underlying Diseases. Poster presentation at Second Annual Scientific Meeting (NACC-CON 2016) at Dhulikhel Hospital Kathmandu University Hospital, Nepal, August 20-21, 2016.
- A Maharjan, **H Shrestha**, S Shrestha (2016). Prevalence of Rheumatic Symptoms in Urban Population of Kathmandu Valley. Poster presentation at 7th National Conference on Science and Technology, Kathmandu, Nepal, March 29-31, 2016.
- **H Shrestha**, A Maharjan, S Shrestha (2016). Attitudes Towards Menstruation of Pre-menstruating Adolescent School Girls. Poster presentation at 7th National Conference on Science and Technology, Kathmandu, Nepal, March 29-31, 2016.

# Volunteering experience

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## CO-FOUNDER AND DIRECTOR

- Aug, 2022-Ongoing: Anka Analytica

## TREASURER

- Jan, 2022-Dec, 2022: Australian Computational Biology and Bioinformatics Student Society (COMBINE-AU)

## EXECUTIVE COMMITTEE MEMBER

- Jan, 2020- Dec, 2021: Australian Computational Biology and Bioinformatics Student Society (COMBINE-AU)
- Jan-Dec, 2020: Physiology, Anatomy and Microbiology-High Degree Research (PAM-HDR) Student Society
- 2013-2014: Kathmandu University Youth Red Cross Circle (KUYRCC)

## INSTRUCTOR

- 21 May, 2023: Fundamentals of Python Programming, Anka Analytica
- 1-2 Sep, 2022,4 and 5 May, 2021: Introduction to Python, COMBINE-AU
- 15-16 Sep, 2021: A day in the life of a bioinformatician, COMBINE-AU
- 13-15 Apr, 2021: Introduction to R and Data Visualisation Workshop, COMBINE-AU

## VOLUNTEER

- Feb, 2018:International Student Host at International Student Services, La Trobe University
- Sep, 2017:Fund raising event by Olivia Newton - John Cancer Research Centre
- Nov, 2016: Fifth Conference of South Asian Association of Physiologists
- Apr, 2014: Program Coordinator in One Day Health Camp (Red Cross Circle)

# Trainings and workshops attended

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## PROGRAMMING AND MODELLING WORKSHOPS

- Dec 1 2022: Symposium on Bioinformatics Entrepreneurship and Industry (SBEI2022), ABACBS, RMIT University, Melbourne
- Dec 2, 2022: Oracle - Using Oracle Cloud for Bioinformatics, Oracle for Research, ABACBS, Melbourne
- Aug 17-18, 2022: HPC201: Getting started with HPC using PBS Pro (Virtual), Intersect
- Apr 4 2022: 1-Day Introduction to AMD GPUs (AMD Instinct Architecture and ROCm) (Virtual), Pawsey Supercomputing Centre
- Oct 27-28, 2021: AWS GIS workshop for online cloud genomics (Virtual), Genome Institute of Singapore and Amazon Web Services
- Jun 28, Jul 09, 2021: Data-Driven Modelling in Mathematical Biology (Virtual), MATRIX and AMSI
- Jun 28 - Jul 02, 2021: Helminth Bioinformatics - Asia (Virtual), Welcome Connecting Science
- Nov 02-06, 2020: Hierarchical Modelling of Species Communities with the R-package Hmsc (virtual), University of Helsinki, Finland
- Sep 16, 2019: COMBINE R package development workshop, COMBINE-AU, Walter and Eliza Hall Institute, Melbourne, Australia
- Aug 08 - Sep 12, 2019: 6-Week Technical Deep Learning Workshop, Braneshop, Bluerock, Melbourne, Australia
- Feb 04-08, 2019: Mplus course on Structural Equation Modelling (SEM) and Multilevel Modelling (MLM), University of Melbourne, Melbourne, Australia
- Dec 14, 2018: G\*Power Workshop, La Trobe University, Melbourne, Australia
- Feb 25, 2017: Data analysis using Python, IT Training-Nepal, Kathmandu, Nepal

## CONFERENCES

- Dec 6, 2022: The Future of Australia's Fast-Growing Digital Health Sector: The Awakening Giant, ANDHealth, Melbourne
- Jun 07-09, 2021: Genomic Epidemiology of Malaria (Virtual), Welcome Connecting Science
- Jul 22-26, 2020: ISEC2020 International Statistical Ecology Conference (Virtual), Statistics in Ecology, Environment and Conservation, Sydney, Australia
- Jun 8-12 2020: Advancing knowledge about spatial modelling, infectious diseases, environment and health (Virtual), Fields Institute for Research in Mathematical Sciences, Toronto, Canada
- Mar 13-15, 2017: Regional workshop on Zoonotic Diseases Pandemic Preparedness for South Asia Using One Health Platform, Centre for Molecular Dynamics-Nepal, Kathmandu, Nepal

## INDUSTRY MENTORSHIP AND TRAININGS

- Sep 2022-Ongoing: IMNIS industry mentorship by Dr. Julia Hill (Head of Commercialisation at Children's Medical Research Institute)
- Apr 18 2023: STEM Careers in Industry Melbourne, IMNIS, Australian Academy of Technological Sciences and Engineering
- May 05, 2023: Project Management Professional Development Workshop, IMNIS, Australian Academy of Technological Sciences and Engineering
- Apr 26, 2023: EMCRs of LIMS -Commercialisation Workshop, La Trobe University, Melbourne
- May 4, 2023: Student and Recent Graduate Entrepreneurship Program, La Trobe University, Melbourne

## SUMMER SCHOOL

- Jan 06-31, 2020: Dynamic processes spreading on Networks, La Trobe University, Australia
- Jan 06-31, 2020: Random Fields: Mathematical theory and application in spatial statistics, La Trobe University, Australia

## MISCELLANEOUS WORKSHOPS

- Aug 01, 2017: Working with recombinant DNA, La Trobe University, Melbourne, Australia
- Mar 21, 2016: One Day Seminar on Intellectual Property Rights, Kathmandu University, Dhulikhel, Nepal

## References

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### **Prof Warwick Grant**

Head of Discipline, Genetics

Department of Environment and Genetics, La Trobe University

🏠 Bundoora, Victoria, Australia

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### **Dr Kristy Horan**

Section Leader Bioinformatics

Microbiological diagnostic unit public health laboratory, The Doherty Institute

🏠 Melbourne, Victoria, Australia

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