Hugh Murrell
Resume

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Personal Details

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Birth Date 17 December 1954.

Birth Place Kasama, Zambia.

Citizenship dual, British and South African

Education

1971: Matric, Hyde Park, Johannesburg.

1975: B.Sc., Natal University, Pietermaritzburg.

1981: B.Sc. Hons, Rhodes University, Grahamstown.

1982: M.Sc., Rhodes University, Grahamstown.

1995: PhD., Natal University, Durban.

Experience

1977-1978: Natal Provincial Administration in Pietermaritzburg, Programmer.

1979-1984: Rhodes University, Computing Services, Programmer.

1985-1986: Department of Mathematics, Rhodes University, Lecturer.

1987-2003: Department of Computer Science, Natal University,
Senior Lecturer and Associate Professor (Durban campus).

2004-2014: School of Computer Science, University of KwaZulu-Natal, Professor (Pietermaritzburg campus)

- Head of School (2005-2007)
- PI for Bioinformatics NBN grant (2006-2009)

2015-2018: Contract Lecturing and Postgrad supervision, University of KwaZulu-Natal.

2019-2019: Postgrad supervision, University of KwaZulu-Natal.

2020-2020: Developed Covid-19 dashboard.

2021-2023: Developed PorpidPostproc pipeline for h705 trials.

Postgrad Supervision

Hilton Goldstein, MSc thesis, 1990,
Computer Enhanced Skull Surgery

Hilton Goldstein, PhD thesis, 1994,
Space Frequency decomposition of arbitrary signals

Cuan Brown, MSc thesis, 2000,
A Real Time, Secure, Internet Based, Auctioning System

Mark Lewis, MSc thesis, 2001,
Spectral Techniques for Roughness Estimation

Keagan Moodley, MSc thesis, 2002,
Pseudo-Colouring of grayscale images

Kieran O'Neill, MSc thesis, 2007,
Relieving the Cognitive Load of Constructing Molecular Biological Ontology Based Queries by means of Visual Aids

Rafael Jimenez, MSc thesis, 2007,
Vector Graphics to improve Blast Graphic Representations

John McGuiness, MSc thesis, 2009,
Investigation of techniques for automatic polyphonic music transcription using wavelets,

Anisa Ragalo, MSc thesis, 2011,
An analysis of algorithms to estimate the characteristics of the underlying population in Massively Parallel Pyrosequencing data

Devin Pelser, Msc thesis, 2019,
Deep and dense sarcasm detection

Selected Publications

1996: *Computer Aided Tomography*, The Mathematica Journal, Vol 6, No. 2, pp.60-65

2001: *On Measuring Roughness*, South African Computer Journal, Number 27, pp 49-56, Co-Authors: Mark Lewis, Colin Jermy and Tally Palmer.

2004: *A colour-map plugin for the open source, Java based, image processing package, ImageJ*, Computers & Geosciences, vol 30, pp 609-618. Co-Author: Keagan Moodley.

2008: *Gene Spotting with Support Vector Machines*, Proceedings of IMS2008, Maastricht.

2011: *Fisher Discrimination with Kernels*, The Mathematica Journal, Vol 13, July 26, Co-Authors: Kazuo Hashimoto and Daichi Takatori.

2014: *R^2-equitability is satisfiable*, Proc Natl Acad Sci USA , early edition, Co-Authors: Ben Murrell and Daniel Murrell.

2016: *Discovering General Multidimensional Associations*, PLoS ONE 11(3): e0151551. doi:10.1371/journal.pone.0151551 Co-Authors: Ben Murrell , Daniel Murrell.

2019: *Deep and dense sarcasm detection*, `https://arxiv.org/abs/1911.07474`, November 2019, Co-Author: Devin Pelser.

2019: *Deep Learning Notes, with Julia and Flux*, Edition 1, `https://HughMurrell.github.io/DeepLearningNotes` Co-Author: Nando de Freitas.

2023: *Optimized SMRT-UMI protocol produces highly accurate sequence datasets from diverse populations - application to HIV-1 quasispecies*, `https://www.biorxiv.org/content/10.1101/2023.02.23.529831v1` Co-Authors: Dylan H. Westfall, Wenjie Deng, Alec Pankow, Lennie Chen, Hong Zhao, Carolyn Williamson, Morgane Rolland, Ben Murrell, James I. Mullins.

Coding Projects

CRAN package During my 2012 sabbatical I wrote an R data mining package for discovering non-linear associations between variables in a dataset. Read `https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0151551` for further details.

Deep Learning with Julia During 2018 I developed a textbook that teaches Deep Learning using the Julia computing ecosystem. The current version of the text is available online `https://hughmurrell.github.io/DeepLearningNotes/index.html`.

Covid-19 tracking During 2020, I constructed a Julia script to compute Rt estimates at scale from global data sets. This script updates nightly and allows users to compare Covid outbreaks from region to region. Results can be viewed here; `https://reproduction.live/world`

PacBio Pipeline In July 2021, I started supporting a high throughput PacBio pipeline that performs demultiplexing, filtering and UMI analysis to obtain sequence populations from HIV patients. The pipeline is composed of Julia scripts running under `SnakeMake`. Initially the client was Carolyn Williamson from the HIV Diversity and Pathogenesis Group at UCT. Later, James Mullins from the University of Washington, Seattle and Morgane Rolland from the viral genomics section of US military HIV research programme (MHRP) in Washington joined my customer base. For further details please consult the repository at: `https://github.com/MurrellGroup/PORPIDpipeline`

Referees

`carolyn.williamson@uct.ac.za`

Prof. Carolyn Williamson,

Division of Medical Virology,

Department of Pathology,

University of Cape Town.

(current-employer)

`gwetum@ukzn.ac.za`

Dr. Mandlenkosi Gwetu,

Academic Leader,

Computer Science

University of KwaZulu-Natal.

(ex-colleague)