Curriculum Vitae

Hannes Breytenbach

email: hannes@saao.ac.za
Cell: +27 82 726 9311

Personal Information

Names:	Johannes Benjamin Breytenbach
Date of Birth:	26 June 1987
Place of Birth:	Santiago, Chile
Citizenship:	South African
Languages:	English, Afrikaans (Expert); German (Intermediate)
Current Occupation:	PhD. Student at the South African Astronomical Observatory (SAAO) and University of Cape Town, (UCT)
Work Address:	Room 431, RW James Building, 9 University Avenue, Upper Campus, UCT, Woolsack Drive, Rondebosch, South Africa

Education

2011 - present: UCT - *Philosophiæ Doctor* (Astrophysics)
- Thesis title: *"Rapid Variability in magnetic Cataclysmic Variable Stars"*
- Supervisors: Dr. David Buckley, A. Prof Patrick Woudt
- Modules: Cataclysmic Variable Stars, Stellar Structures, Advanced General Relativity, Hot Topics in Cosmology, High Energy Astrophysics

2010: UCT - *Baccalaureus Scientiæ Honores* (Astrophysics and Space Science)
- Project title: *"The Sferic Count Rate from SANAE-IV, Antarctica"*
- Supervisors: Dr. Andrew Collier
- Modules: General Astrophysics, Electrodynamics, General Relativity, Computational Astrophysics, Galaxies and Large Scale Structure, Observational Techniques, Radio Astronomy

2006 - 2009: University of Pretoria (UP)- *Baccalaureus Scientiæ* (Physics and Astronomy)
- Project title: *"Rutherford Backscattering Spectroscopy and X-ray Diffraction Spectroscopy of Aluminium 100"*
- Supervisors: Prof. Chris Theron
- Modules: Quantum Mechanics, Solid State Physics, Statistical Mechanics, Differential Calculus, Vector Calculus, Partial Differential Equations, Abstract Algebra, Mathematical Modelling

Awards and Scholarships

- 2013 - present: NRF, Postgraduate Development Programme (PDP) Doctoral Scholarship
- 2010 - 2012: South African Square Kilometre Array (SKA) Postgraduate Scholarship
- 2008 - 2009: SKA Undergraduate Bursary Award

Special Skills

Computing

- Public code repository: `https://github.com/apodemus`
- Languages:
  - Python (Expert)
  - IRAF, MATLAB (Octave) (Highly proficient)
  - IDL, R, C, Mathematica, Maple, LabView (Intermediate)
  - SQL (Novice)
- Algorithm Development:
  - Machine learning algorithms for classification of EEG data (epileptic seizure prediction)
  - Time series analysis & Spectral estimation techniques (Ph.D. Thesis)
  - (Unofficial) Data reduction pipeline for Sutherland High Speed Optical Camera (SHOC)
  - Computational modelling of Dwarf Novae in Outburst (M.Sc. Thesis)

Observing

- 77 nights on 1.9m telescope at SAAO, Sutherland
  - Rapid photometry of CVs
- 14 nights on 1.0m telescope at SAAO, Sutherland
  - Multi-colour(UBVRI) photometry of interacting galaxies
  - High speed photometry of CVs
- 7 nights on 1.9m telescope at SAAO, Sutherland
  - Spectroscopy of Dwarf Stars (SkyMapper follow-up)
- 7 nights on 1.9m telescope at SAAO, Sutherland
  - Polarimetry of magnetic CVs (Assisting)
- 7 nights on 1.4m Infra-red Survey Facility telescope (IRSF) at SAAO, Sutherland
  - Photometry of interacting galaxies (during ISYA)

Professional Development

Conference Attendance

- 2015 September: The Golden Age of Cataclysmic Variables and Related Objects - III
  - Presentation: “Quasi-Periodic Oscillations in magnetic CVs”
- 2015 June: SALT Science Conference 2015, STIAS, Stellenbosch
  - Poster: “Probing accretion in magnetic CVs through rapid photometry with SALTICAM”
- 2014 July: South African Institute of Physics Conference (SAIP2014)
  - Presentation: “Rapid Variability of magnetic Cataclysmic Variable Stars”
- 2013 September: The Golden Age of Cataclysmic Variables and Related Objects - II
  - Presentation: “Modelling Quasi-Periodic Variability in Cataclysmic Variable Stars”
- 2013 July: SKA Joint Radio Transients Conference
- 2012 December: SKA Postgraduate Bursary Conference
  - Presentation: “Modelling Quasi-Periodic Variability in Cataclysmic Variable Stars”
- 2012 August: IAU XXVIII General Assembly
  - Poster: “Modelling Quasi-Periodic Variability in Cataclysmic Variable Stars”
- 2011 December: SKA Postgraduate Bursary Conference
  - Poster: “A study of DNOs and QPOs in Cataclysmic Variable Stars”

- 2011 March: Middle-East and African Regional IAU Meeting II (MEARIM-II)
- 2010 - 2008 November: SKA Postgraduate Bursary Conference

Workshop Attendance

- 2015 April: GPGPU programming workshop, UCT
- 2014 November: GADGET Simulations workshop, UCT
- 2014 October: 2^{nd} Machine learning JEDI Workshop, Cape Town
- 2012 February: IAU International School of Young Astronomers (ISYA), UCT & SAAO, Cape Town
- 2011 October: Workshop on Space Science and Astrophysics, Centre for High Performance Computing (CHPC), CSIR, Pretoria
- 2010 December: Workshop on Convection in stars, University of the Witwatersrand (WITS), Johannesburg
- 2010 January: National Astrophysics and Space Science Program (NASSP) Summer School, UCT & SAAO, Cape Town

Publications

Peer-reviewed

[1] D. L. Coppejans, P. A. Woudt, B. Warner, E. Körding, S. A. Macfarlane, M. P. Schurch, M. M. Kotze, **H. Breytenbach**, A. A. Gulbis, and R. Coppejans. High-speed photometry of faint cataclysmic variables–VIII. targets from the Catalina Real-Time Transient Survey. *MNRAS*, 437(1):510–523, 2014.

[2] A. N. Semena, M. G. Revnivtsev, D. A. Buckley, M. M. Kotze, I. I. Khabibullin, **H. Breytenbach**, A. A. Gulbis, R. Coppejans, and S. B. Potter. On the area of accretion curtains from fast aperiodic time variability of the intermediate polar EX Hya. *MNRAS*, 442(2):1123–1132, 2014.

Conference Proceedings

[1] D. Buckley, S. Potter, E. Kotze, M. Kotze, and **Breytenbach, H**. New observations of accretion phenomena in magnetic cataclysmic variables. In *EPJ Web of Conferences*. Vol. 64. EDP Sciences, 2014, p. 07005.

Short publications

[1] D. Buckley, **H. Breytenbach**, A. Kniazev, M. Kotze, M. Motsoaledi, S. Potter, J. Thorstensen, E. Gorbovskoy, V. Lipunov, and P. Woudt. Classification of master ot j061451. 70-272535.5 as an eclipsing polar. *The astronomer's telegram*, 7169:1, 2015.

[2] D. Buckley, **H. Breytenbach**, A. Kniazev, M. Kotze, S. Potter, E. Gorbovskoy, and V. Lipunov. Salt spectroscopy of the flaring blazar j141922. 55-083832.0. *The astronomer's telegram*, 7167:1, 2015.

Work and Teaching Experience

- 2013: Tutor: Stellar Structures (AST3002F), UCT
- 2012: Tutor: Introductory Astronomy (AST2002S), UCT

- 2012: Tutor: Introductory Astronomy (private)
- 2011: Tutor: Electrodynamics Honours, NASSP, UCT
- 2009: Tutor: Biological Physics (PHY103), 1^{st} year course, UP
- 2007 Dec - Jan: Student Data Processor, Hartebeest Hoek Radio Astronomy Observatory (HartRAO)

Research interests

- Astrophysical Accretion on all scales
- Compact binary stars
- Machine Learning
- Computational Modelling

Leadership & Extracurricular Involvements

Academic

- 2014-2015: Postgraduate Student Representative for Astronomy Dept., UCT
- 2014: Chairperson: UCT Mountain and Ski Club
- 2011 - present: Committee member: UCT Mountain and Ski Club
- 2011: Siyavula Education Program
  - Tasks: Proof reading and Translation into Afrikaans of open source High School science textbooks

Sport

- 2012: UCT Sports Merit Award
  - UIAA Youth expedition to summit the highest mountain in Europe, Mt Elbrus at 5 642m
- 2011: UCT Sports Performance of the Year Award
  - UCT Mountain and Ski Club (MSC) mountaineering expedition to summit the 6 264m Himalayan peak, CB13-A

References

- Emeritus Distinguished Professor Brian Warner
  Astronomy Department
  University of Cape Town
  Phone: +27 21 650 2391
  email: brian.warner@uct.ac.za
- Professor Chris Theron
  Head of Department Physics
  University of Pretoria
  Phone +27 12 420 2455
  email: chris.theron@up.ac.za