

CURRICULUM VITAE

HENDRIK J. VAN HEERDEN, PH.D

6 June 2019

CONTACT DETAILS:

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PERSONAL DETAILS:

Surname: Van Heerden
Full Name: Hendrik Jacobus
Name: Pat
Title: Dr
Gender: Male
Marital Status: Married
Date of birth: 17 September 1980
Citizenship: South African
Driver License: Yes. Code B (SA)
Home Language: Afrikaans
Other Languages: English (Speak, read and write)
Health : Good
Hobbies and Interests : Applied Science and Engineering, Literature, History, Art and Antiquities, Health and Exercise

EDUCATION AND QUALIFICATIONS:

TERTIARY QUALIFICATIONS AND DETAILS:

Institution: University of the Free State (2002 - 2014, 2016 - Present)

Qualification: Baccalaureus Scientiae: EnSci - BSc Majoring in Engineering Subjects. (2016 - Present)

Qualification: Philosophiae Doctor: Thesis (2008 - 2014)
Thesis Title: A search for pulsed high-energy non-thermal emission from the nova-like variable system AE Aquarii.

Qualification: Magister Scientiae: Dissertation (2006 - 2007)
Dissertation Title: The Development of an IRAF-Based Scientific Photometric Package for the UFS-Boyden 1.5m Telescope.

Qualification: Baccalaureus Scientiae Honores: Physics (2005)

Qualification: Baccalaureus Scientiae (2002 - 2004)

Institution: University of South Africa (UNISA) (2002 - 2004)
Courses: Baccalaureus Scientiae: Astronomy
Qualification: Non-degree purposes. The course material is presented in collaboration with the University of the Free State.

Institution: Central University of Technology, Free State (2000 - 2001)
Courses: B Tech: Engineering: Civil
Extramural Activities: Tokrevueries: University Revue (2000 - 2001)

Other:

Certificate in One Day Fire Programme. Presented by Disaster and Rescue Training (Pty) Ltd (June 2011). Refresher training August 2017.

Certificate in First Aid Level 1. Presented by ER24 EMS (Pty) Ltd (June 2011). Refresher training June 2019.

Certificate for Health and Safety Representative training. Presented by Nature and Business Alliance Africa (Pty) Ltd, Safety and Health Consultants (July 2009). Refresher training attended (July 2017), presented by UFS Health and Safety.

Certificate in Laboratory Safety and Chemical Grades. Presented by MERK (May 2008).

Certificate in Basic Laser Safety. Presented by the National Laser Centre (March 2007, August 2017).

SECONDARY SCHOOL QUALIFICATIONS AND DETAILS:

Secondary School: Technical High School Louis Botha
Bloemfontein
(1995 - 1999)

Highest qualification: Senior Certificate, Gr. 12

Prizes and Awards: Diploma for exceptional achievement in GR12 in Engineering Drawing HG and Woodworking SG. Receive the Oosthuysen-Cup for best achievement in Woodworking (1999).

Full Colours for achievement in Expo for young scientist (1999).

Expo for young scientist 1999 (Regional) - Gold diploma in Architecture, housing and accommodation (open) division.

Expo for young scientist 1999 (Nationals) - Certificate of participation.

Extramural Activities: Drama (1998) and Revue (1999).

SKILLS:

General: Problem solving, critical thinking, technical proficiency, diplomacy, leadership, logistics.

Management: Project planning, coordinating and implementing. Human resource management. Events management (Conference/Symposium)

Leadership: Academic supervision, Project-supervision and Team Lead.

Communication: Technical, Educational and Public outreach. Marketing (Web-based and Physical).

Finance: Asset management and procurement. Financial planning and implementation.

Research: Astrophysics - Experimental - Multi-wavelength.

Research: General science and technology.

Instrumentation: Development, maintenance and computer interfacing.

Writing: User manuals, study guides and research articles.

Information Communication Technology: Microsoft Windows and Linux OS, software and hardware management, audiovisual.

Software Programming: C++, C, C#, Java, Visual Basic, Fortran, Matlab, LaTeX, Python.

MEMBERSHIPS AND ASSOCIATIONS:

Society	Year	Details
Astronomical Society of Southern Africa	2003 - 2013	Member
Astronomical Society of Southern Africa Bloemfontein Branch	2003 - 2005	Member
	2005 - 2007	Committee Member
	2007 - 2013	Treasurer
South African Institute of Physics	2006 - 2018	Student Member
	2018 -	Ordinary Member

WORKING EXPERIENCE:

- 2009 - Senior Officer: Professional services (Contract: March - June 2009, Permanent: June 2009, Promotion to Senior Officer: 2015). Responsibilities include: Responsible for undergraduate practical. Development of new undergraduate experiments. ICT maintenance: including troubleshooting, networks, access control, websites(content) and FTP and archive servers. Management of interface between research equipment and control computers. Procurement of required laboratory equipment, instrumentation and peripherals. Responsible for laboratory safety. Research. Participation in the community service activities of the Department. General office administration. Lecturer for predefined courses.
- 2012 - ... Technical officer: Naval Hill Planetarium. Assisted during design and implementation as well as installation of digital components (audiovisual, computers, cabling, sound). Responsibilities include: Maintenance of digital systems and peripherals. Production, editing and maintaining of Digital Planetarium Shows for the Naval Hill Planetarium. Team lead and project coordinator during installation of Historical Lamont-Hussey telescope exhibit in front of Planetarium (January 2019).
- 2008 - System administrator for UFS / Boyden telescopes. Responsibilities include: Upgrade and development of data acquisition and system control software and hardware for the telescopes. Maintenance of the telescopes and peripherals. Recent major projects were re-alluminizing of the 60-inch and Watcher robotic telescopes' primary optics (2018).
- 2009 - Safety representative for the Department of Physics and Boyden Observatory.
- 2014 - Radiation protection officer for the Department of Physics and Boyden Observatory.
- 2012 - Member of NAS Faculty ICT committee.
- 2013 - Member of NAS Faculty Web and Marketing committees.
- 2019 - Member of UFS Official Graphic Design Work Group.
- 2017 - 2018 Member of local organizing committee of the 63rd Annual conference of the South African Institute of Physics to be held at UFS, Bloemfontein, June-July 2018.
- 2014 Member of the local organizing committee of the 2nd High Energy Astrophysics in South Africa Conference help at UFS-Boyden Observatory 24 - 25 April 2014.
- 2012 Member of the local organizing committee of the 4th International Conference on Nanoscience and Nanotechnology held at University of the Free State 1 - 4 April 2012.
- 2008 Participate in the pilot programme for the community service learning module (NEC 302).

- 2008 Presented a workshop (practical and theoretical) on telescopes to the Department of Education of the Northern Cape in May 2008.
- 2008 Presenter at the RIEP (Research Institute for Education Planning) Workshop on Science held in January 2008. Title: Electromagnetic Spectrum.
- 2006 Member of Organizing Committee of 7th ASSA Astronomical Symposium held at Boyden Observatory 28th - 30th September 2006.
- 2005 - 2014 Presenter/Assistant at Boyden Science Center, University of the Free State. (Ad-hoc) Responsibilities include: Acting as main presenter or as assistant during Educational or Public Outreach programs of the Boyden Science Center.
- 2005 - 2009 Laboratory Assistant at Department of Physics, University of the Free State. (Contract) Responsibilities include: Demi for pre-graduate classes (first, second year), Assisting senior staff and lecturers with technical as well as non-technical work.
- 2004, 2006 Judge at Expo for Young Scientist (Regional). Astronomy
- 2009 and Space Sciences & Energy Sections.

ENGINEERING AND APPLIED SCIENCE RELATED EXPERIENCE:

SITE VISITS AS STUDENT:

1999 - Expansion of Loch Logan Waterfront South Side Open Market Section. Single visit.

2000 - Expansion of the Engineering Faculty at CUT. Various visits during final stages of completion.

2001 - Mohale Rock-fill Dam Site (during surfacing stages of inner concrete lining) as well as Tour of Katse Dam and Lesotho Highlands Water Project. Single visit.

SITE VISITS AS REPRESENTATIVE OF OWNER OR OBSERVER:

2002-2016 - Expansion and Upgrading of various aspects of the Boyden Observatory - Various visits during building and completion.

2011-2013 - Building of the Naval Hill Digital Planetarium - Various visits during building and completion.

2011-2012 - Expansion of basement laboratories of Physics Department at UFS. Various visits during building and completion.

2014-2016 - Expansion of Main Physics Building of Physics Department at UFS. Various visits during building and completion.

ENGINEERING, APPLIED SCIENCE OR INDUSTRY SITE VISITS AS PART OF TOUR OR SCIENCE RELATED EXERCISE:

2005-2015 - CSIR, Denel, MinTek, SAAO, HartRAO, iThemba LABS, Koeberg power station, NECSA.

2015 - Lehsatsi Solar Power Station.

2017 - Gariiep Dam wall and Eskom Hydro-electric power station.

NOTABLE LEADERSHIP AND SUPERVISORY ROLES:

ACADEMIC

Co-supervisor to MSc student Q. Kaplan (2018-...)

Co-supervisor to MSc student S. Madzime (2018-...)

OTHER

Team coach to Team UFS. Winners at the 9th International Natural Sciences Tournament. Tallinn, Estonia. February 2019.

RESEARCH OUTPUT, CONFERENCES AND WORKSHOPS:

ARTICLES AND PROCEEDINGS:

H.J. van Heerden, P.J. Meintjes. *Exploring the nature of AE Aquarii at higher energies using Suzaku and Fermi-LAT*. 3rd Annual Conference on High Energy Astrophysics in Southern Africa - HEASA2015. University of Johannesburg, South Africa. 18-20 June 2015. PoS(HEASA2015)005 (<http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=241>)

P.J. Meintjes, A. Odendaal and **H. van Heerden**. *AE Aquarii: A Short Review*. Acta Polytechnica CTU Proceedings **2**(1): 86-89, 2015; doi: 10.14311/APP.2015.02.0086. ■

H.J. van Heerden and P.J. Meintjes. *Fermi-LAT analysis and upper-limit calculations for AE Aquarii*. Mem. S.A.It. **86** (2015) 111.

M. Topinka, L. Hanlon, S. Meehan, P. Tisdall, M. Jelínek, P. Kubánek, **H. van Heerden**, P. Meintjes. *Gamma-Ray burst afterglows with the Watcher robotic telescope*. III Workshop on Robotic Autonomous Observatories, Revista Mexicana de Astronomia y Astrofisica Conference Series, **45** (2014) 65

M. Topinka, S. Meehan, L. Hanlon, P. Tisdall, **H. van Heerden**, P. Meintjes, M. Hoffman, M. Jelínek, P. Kubánek. *Status update of the Watcher Robotic Telescope*. EAS Publications Series, **61** (2013) 487

P. Kubánek, A.J. Castro-Tirado, A. de Ugarte Postigo, R. Cunniffe, M. Prouza, J. Štrobl, **H.J. van Heerden**, J. Gorosabel, R. Hudec, P. Yock, W.H. Allen, I. Bond, G. Christie, S. Guziy, L. Hanlon, M. Jelínek, S. Meehan, C. Polášek, V. Reglero, P. Vitale. *Operating a global network of autonomous observatories*. Proc. SPIE, Vol. 7740, 77400U (2010); doi:10.1117/12.857222.

Young, L., B. Sicardy, T. Widemann, M. J. Brucker, M. W. Buie, B. Fraser, **H. Van Heerden**, R. R. Howell, K. Lonergan, C. B. Olkin, H. J. Reitsema, A. Richter, T. Sepersky, L. H. Wasserman, E. F. Young. *Results from the 2010 Feb 14 and July 4 Pluto Occultations*. Bulletin of the American Astronomical Society 42 (2010) 982.

L. A. Young, M. W. Buie, L. W. Wasserman, J. Regester, E. F. Young, J. R. Spencer, C. B. Olkin, K. Shoemaker, **H. J. Van Heerden**, P. M. Tamblyn, A. A. S. Gulbis. *Results from the 2009 April 21 Pluto Occultation*. Bulletin of the American Astronomical Society 41 (2009).

H.J. van Heerden. *Refereed Article: Boyden Observatory, then and now*. MNRAS vol 67 nos 7&8 (2008) p:116-134.

PAPERS, POSTERS AND TELEGRAMS:

P.J. Meintjes, Q. Kaplan, S. Madzime, **H.J. van Heerden**, A. Odendaal, B. van Soelen and R. Britto. *White Dwarf pulsars as possible gamma-ray sources*. 6th Annual Conference on High Energy Astrophysics in Southern Africa - HEASA2018. Stonehenge in Africa (Lodge), South Africa. 1-3 August 2018.

Q. Kaplan, **H.J. van Heerden**, P.J. Meintjes, A. Odendaal and R. Britto. *Search for Gamma-ray emission in the White Dwarf pulsar of AR Scorpii*. 63rd Annual conference of the South African Institute of Physics. Bloemfontein (2018).

S.T. Madzime, **H.J. van Heerden**, P.J. Meintjes, A. Odendaal and R. Britto. *The search for pulsed γ -ray emission from AE Aquarii, Fermi-LAT Pass 8 Data pipeline 2008-2018*. 63rd Annual conference of the South African Institute of Physics. Bloemfontein (2018).

A. Martin-Carrillo (UCD), D. Murphy (UCD), L. Hanlon (UCD), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *GCN CIRCULAR NUMBER: 21123. GRB 170519A: Watcher optical observations*. DATE: 17/05/20 18:31:58 GMT.

A. Martin-Carrillo (UCD), D. Murphy (UCD), L. Hanlon (UCD), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *GCN CIRCULAR NUMBER: 20305. GRB 161219B: Watcher optical observations*. DATE: 16/12/20 14:15:30 GMT.

H.J. van Heerden, P.J. Meintjes. *A comparative timing analysis of Suzaku X-ray data of the nova-like variable system AE Aquarii*. 61st Annual conference of the South African Institute of Physics. Cape Town (2016).

A. Martin-Carrillo (University College Dublin, UCD), D. Murphy (UCD), L. Hanlon (UCD), M. Topinka (CTU), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *Significant colour change of ASASSN-15ni observed with the UCD Watcher telescope*. ATel #7875. DATE: 5 Aug 2015; 23:07 UT.

A. Martin-Carrillo (University College Dublin, UCD), D. Murphy (UCD), L. Hanlon (UCD), M. Topinka (CTU), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *Optical observations of ASASSN-15ni with the University College Dublin Watcher telescope*. ATel #7855. DATE: 29 Jul 2015; 15:47 UT.

A. Martin-Carrillo (University College Dublin, UCD), D. Murphy (UCD), L. Hanlon (UCD), M. Topinka (CTU), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *Significant decrease in the average optical emission from V404 Cyg*. ATel #7729. DATE: 29 Jun 2015; 16:00 UT.

A. Martin-Carrillo (University College Dublin, UCD), D. Murphy (UCD), L. Hanlon (UCD), M. Topinka (CTU), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *Optical monitoring campaign of V404 Cyg with the Watcher Robotic Telescope*. ATel #7718. DATE: 26 Jun 2015; 20:25 UT.

A. Martin-Carrillo (UCD), D. Murphy (UCD), L. Hanlon (UCD), M. Topinka (CTU), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *GCN CIRCULAR NUMBER: 18085. GRB 150727A: Watcher optical upper limit*. DATE: 15/07/28 10:39:46 GMT.

D. Murphy (UCD), A. Martin-Carrillo (UCD), M. Topinka (CTU), L. Hanlon (UCD), **H. J. van Heerden** (UFS), B. van Soelen (UFS) and P. J. Meintjes (UFS). *GCN CIRCULAR NUMBER: 17947. GRB 150616A: Watcher optical upper limit*. DATE: 15/06/18 16:07:20 GMT.

H.J. van Heerden, P.J. Meintjes. *Optimering van tydreeks analise metodes vir veranderlike astrofisiese bronne: AE Aquarii*. Studentesimposium in die Natuurwetenskappe 2012. Universiteit van Potchefstroom. 25-26 November 2012.

H.J. van Heerden, M.J.H. Hoffman, ASSA Bloemfontain. *ASSA's contribution to Bloemfontein's Two Observatories' Project*. 10th ASSA Astronomical Symposium. SAAO, Cape Town. 12-14 October 2012.

M.J.H. Hoffman, **H.J. van Heerden**, P.M. Lamusse. *The Conversion of an Old Telescope Building into a Digital Planetarium - optimal diameter, seating and acoustics for the Lamont-Hussey multi-functional dome theater*. International Planet-

arium Society Conference 2012, Baton Rouge, Louisiana, USA 22-26 July 2012.

M.J.H. Hoffman, D.P. van Jaarsveldt, **H.J. van Heerden**, P.M. Lamusse. *Boyden Observatory and Science Centre: our heritage and environment*. 6th Science Centre World Congress, Cape Town, South Africa, 4-8 September 2011.

H.J. van Heerden, P.J. Meintjes, J.J. Calitz, J.J. Terblans. *'n Volledige bespreking van die Boyden fotometrie-pyplyn*. Studentesimposium in die Natuurwetenskappe 2010. Universiteit van Pretoria. 4-5 November 2010.

H.J. van Heerden, D.P. van Jaarsveldt, M.J.H. Hoffman. *Observatories Museum - An Overview*. 9th ASSA Astronomical Symposium. Council for Geosciences, Silverton, Pretoria. 7-9 October 2010.

H.J. van Heerden, P.J. Meintjes, J.J. Calitz, J.J. Terblans. *Spica: Custom data acquisition and control software for the Boyden research telescopes*. 55th Annual conference of the South African Institute of Physics. Pretoria (2010).

M. Jelinek, A. de Ugarte Postigo, R. Felletti, L. Hanlon, **H. van Heerden**, P. Kubanek. *GCN CIRCULAR NUMBER: 10150. GRB 091109B: Optical limits from Watcher*. DATE: 09/11/09 23:47:07 GMT.

P. Seitzer, M.J.H. Hoffman, P.J. Meintjes, D.P. van Jaarsveldt, **H.J. van Heerden**, A. Schoch, G.P. Penning. *The Boyden Observatory and the Boyden Science Centre in South Africa*. ATS Thematic Workshop, Cincinnati Observatory, May 2-4, 2008.

H.J. van Heerden, P.J. Meintjes. *Developing a scientific photometric pipeline for the University of the Free State / Boyden 1.5m Telescope*. 52nd Annual conference of the South African Institute of Physics. Johannesburg (2007).

H.J. van Heerden. *Introduction to CCD Operations*. 7th ASSA Astronomical Symposium. Boyden Observatory, Bloemfontain. 28-30 September 2006.

H.J. van Heerden, P.J. Meintjes. *Developing a scientific photometric pipeline for the University of the Free State / Boyden 1.5m Telescope*. 51st Annual conference of the South African Institute of Physics. Cape Town (2006).

CONFERENCE AND WORKSHOP PARTICIPATION:

An Engagement with Diversity and Inclusion workshop. University of the Free State, South Africa, 16-17 July 2018.

Sky-Skan introduction to digital planetarium workshop and training. Naval Hill Planetarium, South Africa, 25-30 October 2013.

Adaptive Optics and Astronomical Observations Summer School. SAAO at CT and Sutherland, South Africa, 2-7 December 2012.

SAASTA Space Science Workshop. SANSA SO (Hartebeeshoek), South Africa, 20-21 Oktober 2011.

Precongress Workshop. 6th Science Centre World Congress, Cape Town, South Africa, 1-3 September 2011.

Preconference Workshop - Astrophysics and Space Science. 51st Annual conference of the South African Institute of Physics. Hermanus (2006).

Chris Engelbergh Summer School on Theoretical Physics and Pre-School Workshop, UKZN and Drakensberg, South Africa. January 2006.

OTHER:

Editor and/or Compiler: PHYS1502, PHYS1512 Study Guides(2009-2017).

Editor and/or Compiler: PHYS1514&1534 Practical and PHYS1624&1644 Practical Guides (2009-2017).

Editor and/or Compiler: PHYS3752 and PHYS3762 Practical Guides (2009-2017).

Author: "Observing Procedures and Celestron Telescope Manual" for the Boyden Celestron 14" telescope (2010).

Co-author: "Observing Procedures and 1.52m Telescope Manual" for the Boyden 1.52m telescope (2009).

Author: Photometric cookbook for Boyden Astrophysics CCD-photometric data analysis system (2008).

Compiled in-house user manuals for Fedora Linux and IRAF (Image Reduction and Analysis Facility) (2006).

REFERENCES:

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