

CURRICULUM VITAE of Heinz Erasmus Jacobs

May 2015



A. PERSONAL INFORMATION

FULL NAMES Heinz Erasmus Jacobs
DATE OF BIRTH 27 August 1970
CITIZENSHIP South African
ADDRESS Suite 9, Private Bag X34, Schonenberg Estate, Somerset West, South Africa
e-Mail hejacobs@sun.ac.za
LANGUAGES English, Afrikaans
MARITAL STATUS Married (2 dependents)

QUALIFICATIONS 2004 D.Eng.(Civil), RAU - now University of Johannesburg
1997 M.Eng.(Engineering Management) Cum Laude, RAU
1995 Certificate (C++ programming), RAU
1994 B.Eng.(Civil), RAU
1992 B.Eng.(Mechanical), RAU.

REGISTRATION Professional Engineer (Pr.Eng.), Engineering Council of South Africa (ECSA)
ECSA Reg.No. 980569, registered as professional engineer in 1998

MEMBERSHIP Member: IWA (00856832); WISA (22215)

NRF-RATING South African National Research Foundation, Rated Y2 (Last rated: 2010)
Application submitted for next rating cycle, 2015 - review in progress.

CURRENT POSITION Associate Professor, Department of Civil Engineering at Stellenbosch University (SUN).

SPECIALISATION Water services planning; water demand analysis and demand modelling; network hydraulics and master planning, water demand management

EXPERIENCE 21 Years of which: 17 years as registered professional engineer; 9 years as full time academic

ACADEMIC Moved from professional practice (1995-2006) to academic career (2007-2015).

AWARDS

Notable personal awards include:

- SUN Rector's Award for Excellent General Performance, 2015
- SUN Rector's Award for Excellent General Performance, 2011
- SUN Rector's Award for Excellent Research, 2010
- Post-doctoral fellowship, Stellenbosch University, 2006
- Various annual academic merit bursaries for under-graduate studies and post-graduate studies
- Certificate for best History mark (97%) in Randburg High School, matric, 1988.

B. RESEARCH

RESEARCH OUTPUT SUMMARY

Note: Refer to Appendix A for a comprehensive list of research outputs.

Scopus: Citations = 64; h-index = 5; 15 Cited documents (best paper 18 citations).

Google scholar: Citations = 186; h-index = 7; i10-index = 6

	Since 2009 (last 5 yrs)	Total (since 2004)
Publication type		
Peer reviewed journal papers	10	18
Peer reviewed conference papers	5	7
Published research reports	4	4
Non-refereed conference papers	3	10
Total research publications	22	39

NOTABLE FUNDED RESEARCH PROJECTS AND RESEARCH REPORTS

National collaboration with other Educational Institutions, Engineering firms, Equipment suppliers, Municipalities and Water Services Providers is integral to most research outputs. Notable research projects as project leader included 5 projects worth total funding ≈ ZAR 3.5 million.

- “Expected Changes in Domestic Water Use in the Climate Change Context: Case of Southern Africa”. Current research project in collaboration with Prof. Fuamba, Polytechnique De Montréal, international funding secured in 2014, made available through the Association of Universities and Colleges of Canada as part of its funding of the Canada-Africa Research Exchange Grants programme. Total budget CAD 73000 (≈ ZAR 730 000); Project duration June 2014 - June 2016.
- Oppenheimer Memorial Trust - Sabbatical Support Grant 2012 (ZAR 45 000) in lieu of a project aimed at modelling residential water demand at the level of individual end-uses in Hermanus, South Africa and BC, Canada”. Collaborated on invitation from leading researchers at the South African National Space Agency (Dr. Kotze, Hermanus, South Africa), GLS Consulting Engineers (Dr. Geustyn, Stellenbosch, South Africa), University of Cape Town (Prof. JE Van Zyl, Cape Town, South Africa) and LandInfo Technologies (Mr. TJ Vanderberg, Vernon, BC, Canada).
- Jacobs HE, Fair KA, De Klerk AH and Bester AJ (2011). “Sewer system planning made simple - for small local authorities”, South African Water Research Commission Report No. 1828/1/11, Project No. K5/1828, Date Published: 01/04/2011. Project duration: 1 April 2008 - 31 March 2010; Total project budget: ZAR 600 000; Project Leader: Jacobs HE.
- Jacobs HE, Griffioen ML, Loubser C and Tulleken J (2013). “Understanding sewage pump stations”, South African Water Research Commission Research Report No: K5/2007/3, Project duration: 1 April 2010 - 31 March 2013; Total project budget: ZAR 1 000 000; Project Leader: Jacobs HE.
- Jacobs HE, Du Plessis JA, Kock J, Loubser C and Wright T (2011). “Strategic assessment of household on-site water as supplementary resource to potable municipal supply - current trends and future needs”. Date Published: 01/03/2011; South African Water Research Commission Report No: 1819/1/10; Project No: K5/1819; Project duration: 1 April 2008 - 31 March 2009; Total project budget: ZAR 300 000; Project Leader: Jacobs HE.
- Jacobs HE, Scheepers HM and Chibi C (2013). “Investigation into the correlation between modelled and measured residential water demand”. WRC Project No: K5/1995/3; Project duration: 1 April 2010 - 31 March 2013; Total project budget: ZAR 842 000; Project Leader: Jacobs HE.

C. TEACHING AND LEARNING

UNDER-GRADUATE

Overview of under-graduate lecturing experience:

- Aggregated lecturing experience includes the equivalent of 7 full semester modules prior to 2006, plus 9 as senior lecturer, plus 5 semester modules as Associate Professor, as per Table 1.
- Stellenbosch University: Acted as individual study leader to 42 final year students over a span of 10 years, as part of the module Final Year Project 458 (Civil). The module is allocated one full day per week on the student time table, allowing for individual meetings, project guidance, review of all written work including the final report (which is externally examined), and ultimately coaching the student to complete an externally assessed oral examination, with poster display. The number of students guided as part of Project 458, per year was: 2006 (1), 2007 (4), 2008 (4), 2009 (4), 2010 (6), 2011 (7), 2012 (-), 2013 (5), 2014 (7), 2015 (4).
- Final Year Project student Ms. Y. Skibbe, under my supervision, was selected as a finalist from the class of 145 candidates, representing the Department of Civil Engineering in the MTN-Jac van der Merwe Faculty competition for Innovation, November 2014.
- The SUN Centre for Teaching and Learning gathers, analyses and distributes anonymous student feedback upon request. The Engineering Faculty employs this service for all under-graduate modules, with subsequent Feedback Reports sent directly to the relevant lecturer and the Departmental Chairperson. Table 2 provides a brief overview of the formal, anonymous student feedback for various modules as applicable to this CV.
- Average mark for lecturer feedback over all modules listed in Table 2 = 73%.

External examiner for the following under-graduate courses at other institutions:

- Annually 2009 to 2014: Module CIV2040S Fluid Mechanics, Civil Engineering 3rd year, University of Cape Town (UCT)
- 2010: Module CIV3047S Urban Water Services, Civil Engineering 4th year, UCT
- 2010: Assessed 4 students in oral examination as part of Module PJO4B (Final Year Project), Civil Engineering 4th year, University of Johannesburg (UJ)
- 2009: Module CIV3047S Urban Water Services, Civil Engineering 4th year, UCT
- 2009: Assessed 4 students in oral examination as part of Module PJO4B (Final Year Project), Civil Engineering 4th year, UJ.

Table1: Summary of under-graduate lecturing experience.

Year	Semester & Term	Course year & Module name	Responsibility	University and academic position
2015 2014 2013 2012	1 st Semester (Both terms)	3 rd Year Hydraulics 324 (Formerly Fluid Mechanics)	Full responsibility for entire module	Stellenbosch University: Associate Professor
2013 2011	2 nd Semester, Term 1	4 th Year Advanced Design 446 (Water)	Full responsibility for one term, as well as module administration and marks coordinator for both terms	Stellenbosch University: Associate Professor
2010	2 nd Semester, Term 2	4 th Year Advanced Design 446 (Water)	Full responsibility for one term	Stellenbosch University: Senior Lecturer
2011 2010 2009 2008	1 st Semester (Both terms)	3 rd Year Hydraulics 324 (Formerly Fluid Mechanics)	Full responsibility for entire module	Stellenbosch University: Senior Lecturer
2010 2009 2008 2007	2 nd Semester, Term 1	3 rd Year Hydraulics 354: Open Channel Flow	Full responsibility for one term, as well as module administration and marks coordinator for both terms	Stellenbosch University: Senior Lecturer
2007	1 st Semester, Term 2	4 th Year Hydrology 424: Flood Hydrology	Full responsibility for Flood Hydrology (one term)	Stellenbosch University: Senior Lecturer
2007	1 st Semester (Both terms)	Fluid Mechanics 324	Full responsibility for entire module	Stellenbosch University: Senior Lecturer
2006	1 st Semester, Term 2	4 th Year Hydrology 424: Flood Hydrology	Full responsibility for Flood Hydrology (one term), all assessments and marks; under mentorship of Prof JA Du Plessis	Stellenbosch University: Post Doctoral fellow
2004 - 2000	Two weeks per year	4 th Year, Urban Hydraulics	Compiling notes and lecturing specific topics: Water Supply and Water Demand	Rand Afrikaans University (now University of Johannesburg): Part time visiting lecturer
1996	1 st Semester	2 nd Year Strength of Materials	Student mentoring during 3h weekly tutorial sessions; marking tutorials	Stellenbosch University: Part time teaching assistant
1995	Annual	1 st Year Engineering Analysis & Drawings	Setting and marking weekly minor assessments; student mentoring during 3h weekly practical sessions	Rand Afrikaans University: Part time lecturer
1994 1993	Annual	1 st Year Engineering Analysis & Drawings	Setting and marking weekly minor assessments; student mentoring during 3h weekly practical drawing sessions.	Rand Afrikaans University: Part time student assistant

Table2: Summary of formal under-graduate student feedback.

Module and Student Data for the past ≈5 years					Student Feedback, including anonymous student quotes extracted from the lecturer feedback reports				
Year	Semester & Term	Module	Year group	Number of registered students	General impression of lecturer	Number of students who submitted feedback	% Of registered students who gave feedback	What were the best aspects of the module?	Selected positive comments: Aspects of the lecturer's teaching
2015	1	Hydraulics 324	3 rd	119	74%	85	71%	- This module taught me how to solve problems fast... - Everything. Very good.	- Enthusiasm, readiness, teaching style in general - Passion; interesting case studies; highlighting important work
2014	1	Hydraulics 324	3 rd	107	61%	96	90%	- Interesting, relevant - Practical application to engineering problems - The fact that it was well structured - Very interesting. Enjoyed lectures.	- His enthusiasm. He sparks interest ... and puts effort into making lectures fun. - Very well prepared and intellectually stimulating
2013	2(1)	Advanced Design 446 (Water group)	4 th	42	75%	27	64%	- Practical problem solving - The lecturer - Relevance to industry	- Incredibly good understanding of topic, as well as work environment - Enthusiasm & structure
2013	1	Hydraulics 324	3 rd	166	76%	121	73%	- It's an enjoyable module with a great lecturer - Class was interesting and lecturer was stimulating	- His sense of humour in class & friendly nature - Very enthusiastic. Clear explanations - Best lecturer I've ever had.
2012	1	Hydraulics 324	3 rd	141	76%	97	69%	- Interesting & practical. - Class involvement & group practicals	- I really enjoyed these lectures, Prof Jacobs is a very good lecturer - Enthusiasm; well prepared
2011	2(1)	Advanced Design 446 (Water)	4 th	27	72%	22	81%	- Challenging; relevance to my career choice - Module was good; well presented	- Good subject knowledge - Enthusiasm & expertise...
2011	1	Hydraulics 324	3 rd	165	74%	95	58%	- I enjoyed the lectures - Interesting, system of Blits tests, compulsory tuts etc. is a good idea.	- Everything, his enthusiasm, friendliness & well structured lessons - Very well organised
2010	2(2)	Advanced Design 446 (Water)	4 th	15	81%	5	33%	- Well structured	- Enthusiastic
2010	1	Hydraulics 324	3 rd	122	64%	75	61%	- Interesting topics. Excellent examples. Relevant practicals. - Many assessment opportunities which assist learning	- Bring that Pratley Kinky Putty to class again - Good use of examples from beyond syllabus to explain work...
2010	2(1)	Hydraulics 354: Open Channel	3 rd	124	74%	50	40%	- Dr Jacobs is legendary - Very interesting & relevant	- Enthusiasm. Never stop believing - He is brilliant
2009	1	Hydraulics 324	3 rd	98	77%	85	87%	- Relevant examples were used that are found in industry. - Application of theory and logical thinking	- Keep it up. Amazing. - Enthusiasm. Knowledgeable. BlitsTests. Wider interest in students' complete development. - Enthusiasm & use of digital aid.

POST-GRADUATE

Supervision

Supervisor for the following post-graduates with full research theses:

- Masters: 12 graduated (details provided in Table 3) plus 10 currently enrolled (refer to Table 4)
- Doctorate: 3 currently enrolled (refer to Table 4)
- Post-Doctoral: 1 full time post-doctoral researcher (Dr. SN Sinske, 2011-2012).

Table3: Summary of post-graduate supervision - Graduated.

Candidate	Degree	Graduated	Final Mark (%)	Thesis title
Mr. WA. Wegelin	M.(Eng.)	2015	73	Guideline for robust assessment of the potential savings from water conservation and water demand management
Mr. G. Flores	M.(Eng.)	2015	63	A Stochastic model for sewer base flows using Monte Carlo simulation
Mr. JLJ. Du Plessis	M.(Eng.)	2014	67	Estimating domestic outdoor water demand for residential estates
Ms. OT. O'Brien	M.(Eng.)	2014	65	Domestic water demand for consumers with rainwater harvesting systems
Mr. GA. Van Heerden	M.(Eng.)	2014	63	Evaluation of alternatives for hydraulic analysis of sanitary sewer systems
Mr. T. Wright	M.(Eng.)	2013	78	Water demand of selected residential properties with access to groundwater in serviced areas of the Cape Peninsula
Mr. BJ. Kriegler	M.(Eng.)	2013	70	Probabilistic analysis of monthly peak factors in a regional water distribution system
Ms. HM. Scheepers	M.(Eng.)	2012	85	Deriving peak factors for residential indoor water demand by means of a probability based end-use model
Ms. HM. Myburgh	M.(Eng.)	2012	69	Evaluating methods for fire protection and related fire categories in South Africa
Mr. JT. Van der Walt	M.(Eng.)	2012	68	Development of a sustainability index for South African dwellings incorporating green roofs, rain water, harvesting and re-use
Mr. JLJ. Tulleken	M.(Eng.)	2012	58	Problems at small sewage pump stations with specific focus on removing solids from sewage
Mr. AJ. Bester	M.(Eng.)	2010	78	A multi-objective approach to incorporate indirect costs into optimisation models of waterborne sewer systems

SUN Departmental average for post-graduates ≈ 67%

Table4: Summary of current post-graduate supervision.

Candidate	Degree	Expected graduation	Research title
Mr. AH. De Klerk	M.(Eng.)	2015	Development and application of a risk based multi-year pipe replacement model in water distribution systems
Mr. JL. Strijdom	M.(Eng.)	2015	Criteria for minimum residual pressure in potable water distribution systems
Mr. M. Richard	M.(Eng.)	2015	A model for estimating indoor hot water demand
Mr. C. Makwiza	PhD	2016	Assessing effects of climate change on water demand for homestead gardening (urban agriculture)
Mr. JLJ. Du Plessis	PhD	2016	A Stochastic end-use model to estimate outdoor water demand of properties situated in residential estates
Mr. G. Van Wageningen	M.(Eng.)	2016	Spatial distribution of known unaccounted-for-water volumes over nodes in pipe network models
Mr. N. Meyer	M.(Eng.)	2016	Prediction of pipe burst reduction through pressure management
Mr. AJ. Bester	PhD	2017	Hybrid optimisation approach for the conceptual design of sanitary sewers
Mr. D. Pretorius	M.(Eng.)	2017	Diurnal water use patterns for low-income housing units
Ms. B. Botha	M.(Eng.)	2017	Not yet finalised

Full promoter for research students who won awards:

- HM Scheepers winner SUN GLS prize for Best Post-Graduate Thesis in Water Engineering, 2012
- HM Scheepers winner SUN Haw & Inglis prize for Best Civil Engineering Master's Student, 2012
- AJ Bester Joint-winner of SUN GLS prize for Best Thesis in Water Engineering, 2011
- Three post-graduate students have won grants from Canadian Bureau for International Education (CBIE) for 4-month exchange programmes to Canada (2010 & 2012), and through the SKILL programme funded by the Royal Netherlands Embassy to Delft University of Technology (2013).

Post Graduate Teaching

Organiser of the following 7 post-graduate block courses, open to engineers from industry as part of Continuing Professional Development (CPD) - chaired the event and presented sessions at each course:

- Drinking Water Reticulation: 19-21 June 2014, TechnoPark, Stellenbosch
- Sewer Systems: 10-13 June 2013, SUN Gericke Library Main Auditorium
- Water Network Analysis: 4-6 June 2012, Stias Conference Centre
- Sewer Systems: 8-10 June 2011, Stias Conference Centre
- Water Network Analysis: 15-17 March 2010, SUN Gericke Library Main Auditorium
- Sewer Systems Planning & Design: 22-24 June 2009, SUN Gericke Library Main Auditorium
- Water and Sewer Networks: 18-20 June 2008, SUN Gericke Library Main Auditorium.

Presenter at the following 10 post-graduate block courses, in addition to the courses listed above:

- Water and wastewater treatment, Stellenbosch University (presented one session: 14 Feb 2012)
- Integrated Urban Water Management, UCT (presented one session: Oct 2011)
- Integrated Urban Water Management, UCT (presented one session: Oct 2010)
- Integrated Urban Water Management, UCT (presented one session: Oct 2009)
- Pipeline & pump station hydraulics, Stellenbosch University (presented one session: 15 April 2009)
- Integrated Urban Water Management, UCT (presented one session: 21 Oct 2008)
- Water supply & sanitation systems, University of Pretoria (presented a session: 13 Aug 2008)
- Water resources management, Stellenbosch University (presented one session: 15 Aug 2007)
- Pipeline and pump station hydraulics, Stellenbosch University (presented 2 sessions: 29 Jan 2007)
- Flood hydrology, Stellenbosch University (presented one session: 11 Sep 2006).

Post Graduate Examination Experience

Independent examiner for post-graduate research candidates, or modules:

- External examiner, Master's degree candidate: --- In progress --- (Prof.JE Van Zyl, UCT, 2015)
- External examiner, Master's degree candidate: Mr D Coulson (Prof.N Armitage, UCT, 2014)
- External examiner, Master's degree candidate: Mr S Scruton (Prof.D Stretch, UKZN, 2013)
- External examiner, Doctoral degree candidate: Ms A Cassa (Prof.JE Van Zyl, UJ, 2012)
- External examiner, Master's degree candidate: Ms Jacqui Allen (Prof.J Haarhoff, UJ, 2012)
- External examiner, Master's degree candidate: Ms S Pan (Prof.N Armitage, UCT, 2011)
- Post graduate module Integrated Urban Water Management (Prof.N Armitage, UCT, 2009)
- External examiner, Master's degree candidate: Ms A Cassa (Prof.JE Van Zyl, UJ, 2008)
- External examiner, Master's degree candidate: Ms C Mureverwi, (Prof.N Armitage, UCT, 2008)
- External examiner, Master's degree candidate: Mr M Buckley (Prof.JE Van Zyl, UJ, 2007)
- Internal examiner for ≈15 post-graduate candidates from own institution (2007-2015).

SCHOLARSHIP OF TEACHING AND LEARNING

Successfully won three grants and completed research projects with subsequent papers or research reports, each presented at the annual SUN Teaching and Learning Conference. Each project was funded by the SUN Centre for Teaching and Learning FINLO-grant:

- “Development of video clips to enhance e-learning in Hydraulics 324”, 2009-2010.
- “Investigation to improve the alignment of school Mathematics Grades 10 to 12 and SUN first year Engineering Mathematics” - project adopted from the late Prof. P Dunaiski. The report was presented on request to the Dean and Vice Dean for Teaching and Learning in 2013.
- Project leader for “A review of SUN Civil Engineering Department's first flexible assessment cohort in 2012”, 2012-2014. The project team comprised two other lecturers from Civil Engineering and a number of research assistants. The conference paper of 2014 was again presented, on invitation by the Vice Dean Teaching and Learning, at the Faculty Teaching and Learning day (May 2015).

TEACHING AND LEARNING IN PRACTICE - PRIOR TO ACADEMIC CAREER

Presented a one day workshop on “Peak factors and water demand modelling” to the Western Cape Civil Engineering Water Division, KV3 Engineers, presented at Bellville office main board room, June 2002.

D. SERVICE, MANAGEMENT AND LEADERSHIP

INTERNATIONAL EXPOSURE AND COLLABORATION

Networking with peers and served the fraternity via committees and collaboration efforts, both nationally and internationally:

- Chairman of organising committee, International Water Association's African Regional Water Leakage Summit, Stellenbosch (2015)
- Member of organising committee, 12th Water Institute of Southern Africa Conference (2012)
- Member of organising committee, 10th American Society of Civil Engineers (ASCE) Annual Water Distribution Systems Analysis Conference (2008)
- Chaired various conference sessions, including international (2006-2014)
- Hosted Prof. Fuamba from Canada for 6 weeks during a sabbatical visit in 2014 and again for 4 weeks in June 2015
- Spent two concise research periods abroad:
 - 2009: L'ecole Polytechnique De Montréal, Montréal, Quebec, Canada, hosted by Prof. M. Fuamba for two weeks while absorbing knowledge from renowned Prof. Francois G. Brière (author of text book "Drinking water distribution, sewage, and rainfall collection, 1997).
 - 2009: Met on invitation at her home institution with Prof.K.Bakker, Geography, University of British Columbia, Vancouver, BC, Canada.
 - 2011: University of Sheffield, UK, hosted by Prof.J.B.Boxall for two weeks learning more about under-graduate teaching, post-graduates and post-doctoral research. Also held various discussions with post-doctoral researcher Dr.J.Blanksby in the group of Prof.R.Ashley and investigated the University's green roofs projects.
 - 2011: Met on invitation at his home institution with Prof.A.Borthwick, Oxford University, Civil Engineering in order to discuss student mentorship and appreciate the Oxford system.

Professional international experience:

- Lead researcher from the African Institution, collaboration with L'ecole Polytechnique De Montréal through the Association of Universities and Colleges of Canada as part of its funding of the Canada-Africa Research Exchange Grants (CAREG) programme (2014-2016).
- Responsible for managing a Canadian-South African consulting team of 5 people, working simultaneously in both countries with time zones ± 10 h apart; under the mentorship of the Director while employed by Canadian Consulting firm Quaddra Development Solutions (Vernon, BC). Client: Greater Vernon Services Council - Water. Forecast modelling and Hydraulic modelling support services & GIS Plan Books (2005 - 2006).
- Junior Resident Engineer, Edwaleni Hydro-Power Station refurbishment project, Ezulwini Valley, Swaziland. Contractor: Sulzer Switzerland; Client: Swaziland Electricity Board (1995 - total 20 weeks on site as the Consultant's only full time representative).
- Junior Engineer, monthly site visits during the decommissioning and sale of Selebi Phikwe coal fired power station, Selebi Phikwe, Botswana. Client: Botswana Power Corporation (1995).

EDITORIAL AND REVIEWS

Served peers and the fraternity via editorial commitments and reviews:

- Editorial Board (2014-2016): Suid-Afrikaanse Tydskrif vir Natuurwetenskap & Tegnologie (South African Journal for natural Sciences and Technology, which is the only ISI-listed journal publishing in Afrikaans and Dutch)
- Jacobs HE & A Ilemobade (2012-2013), Guest Editors WaterSA Journal's WISA2012 Special Edition
- Editorial Board of WaterSA, ISI listed Journal (2008 - 2011)
- Journal of the South African Institute of Civil Engineers, Editorial Panel, assessor for the Water Division (2009-2012)
- Van Zyl, JE, Ilemobade, AA and Jacobs, HE (2008), Editors of the Proceedings of the 10th ASCE Annual Water Distribution Systems Analysis Conference, WDSA2008, 17-20 August 2008, Kruger National Park, South Africa
- Jacobs HE (2009), Guest Editor WaterSA Journal's WISA2008 Special Edition
- Has peer reviewed numerous articles for 6 different ISI-listed journals: Journal of the South African Institute of Civil Engineers' (since 2005); WaterSA (since 2006); ASCE's Journal of Water Resources Planning and Management (since 2008); Journal Water Resources Management (since 2010); Journal AWWA (since 2012); Urban Water Journal (since 2013)
- Conducted peer rating for the South African National Research Foundation as part of the Rated Researcher programme (2013)
- Has reviewed numerous South African Water Research Commission research proposals and various research reports (since 2007)
- Served on the following South African Water Research Commission Reference Groups (Steering Committees) for research projects by other institutions:
 - K5/2370 on Advanced Water Metering, led by UCT, 2014 - 2015
 - K5/2135 on Practical guidelines for operation and maintenance of water distribution systems in South Africa, led by UCT, 2013-2014
 - K5/1821 on Dual grey and drinking water reticulation systems for high-density urban residential dwellings in South Africa: A pilot study, led by WITS University, 2008-2010
 - K5/1721 on Inverse transients to determine deficiencies in pipelines, led by University of Pretoria, 2007-2008;
 - K5/1744 on Waterborne sanitation operating and maintenance guide" & "Waterborne sanitation design guide, led by University of Pretoria, 2007-2009.

LOCAL UNIVERSITY

SUN involvement at Departmental, Faculty and University levels:

- Departmental coordinator of the Module "Final Year Project 458" annually since 2008 (excluding 2012 while on sabbatical). FYP458 is the only module in the Civil Engineering programme where numerous (7) ECSA Exit Level Outcomes are assessed externally in a single module. The coordinator is faced with a particularly challenging and time consuming task involving coordination between all ±30 Departmental academic staff members and internal examiners, ±10 external examiners as well as all final year students (100-140). Setting the three day final oral examination schedule, for example, has been compared by colleagues to planning an annual mini-conference

with 100+ speakers in parallel sessions.

- Leader of the Water Services Planning (WASP) research group (2014 - 2015).
- Serves on the Management Board of the Engineering Faculty's Institute for Thermodynamics and Mechanics (2015-2016 term).
- Faculty representative for the Extended Degree Programme (EDP), presented by the Natural Sciences Faculty. The EDP provides an alternative access route to formerly disadvantaged students into Engineering Courses (2009 - 2012).
- Acted as Water Division Head during sabbatical of Prof GR Basson (2012).
- Served as Departmental representative on the Faculty's Marketing Committee (2007-2010).

LEADERSHIP

Beyond academic responsibilities and professional practice the following items underscore leadership qualities and leadership training over a notable period of time, focusing on personal life after graduation:

- Regularly acts as weekend expedition leader for Mountain Club of South Africa (MCSA) hikes and rock climbing events (1995-2015); leads about two events per year and has been involved in a Metro-led Search and Rescue mission in the Western Cape mountains
- Served on the MCSA management committee for the Stellenbosch Section (2005, 2006)
- Attended the Willow Creek Global Leadership Summit and the Willow Creek Small Groups Conference, Willow Creek Community Church Conference Centre, Chicago, USA as a sponsored delegate from the local Stellenbosch church (April 2000).
- One of two resident staff members in hostel Karee (Huis Karee) at School for the Blind (Pionierskool), Worcester, South Africa. Responsible after hours during school terms for ±30 sight-impaired senior level boys (1996-2002).
- Completed the 6-month part time "Kingdom Advancement Ministries" Course by Frontline Ministries, with weekly group outreach sessions, in Worcester, South Africa (January - June 1998).
- Completed the 6-month part time "Evangelism Explosion (EE3) course", presented by Rhema Ministries, Randburg, South Africa (January - June 1995)
- Served on the RAU University Table Tennis committee (1993-1994 & 1995 as vice-chairman)
- Attended the 5 day "Youth Pastors and Children's Ministry Conference" presented by Rhema Ministries, Randburg, South Africa (1994)
- Youth group leader, Lugnos church, Randburg, South Africa (1993 & 1994).

E. ENGINEERING PRACTICE**CAREER PROFILE - OVERVIEW****Academic**

Jul 2011 to date	Stellenbosch University (Associate Professor / Pr.Eng.)
Apr 2006 - Jun 2011	Stellenbosch University (Senior lecturer / Pr.Eng.)
2000 - 2004	RAU - University of Johannesburg (Part time visiting lecturer)
1993 - 1995	RAU - University of Johannesburg (Part time research assistant & lecturer).

Consulting Engineering Practice

Aug 2005 - Mar 2006	GLS Consulting Engineers (Pr.Eng.), Stellenbosch office (Pr.Eng.)
Jan 2005 - Aug 2005	Quaddra Development Solutions (Inc.), Vernon office, British Columbia, Canada (ECSA Pr.Eng. registration recognised as per the Washington accord)
Oct 2002 - Dec 2004	GLS Consulting Engineers, Stellenbosch office (Pr.Eng.)
May 1998 - Sep 2002	KV3 Consulting Engineers, Worcester office (Professional Engineer)
May 1996 - April 1998	KV3 Consulting Engineers, Worcester office (Engineer in Training)
1996 (Jan - May)	Kruger & Pretorius Research and Development Engineers, Cape Town office (Engineer in Training)
1995 (Jan to Dec)	Merz & McLellan (South Africa) Consulting Engineers, Johannesburg office (Engineer in Training).

COMPREHENSIVE LIST OF COMPLETED ENGINEERING PROJECTS**Quaddra Development Solutions, BC, Canada (Professional Engineer)**

Greater Vernon Services Council (Water). Forecast modelling and Hydraulic modelling support services & GIS Plan Books. Project completed in collaboration with Consulting firms GLS (South Africa), LandInfo Technologies (Vancouver) and Kerr Wood Leidal Associates Ltd. (Vancouver).

Geustyn Loubser Streicher Inc. Consulting Engineers (Professional Engineer)

Project coordinator for Water and Sewer Master Planning of 18 Municipalities (about 100 different towns) in the Western Cape as part of the Government's Municipal Infrastructure Programme (CMIP) capacity building process
 Master planning of Meadowlands and Roodepoort sewer systems, Johannesburg Water
 Water and sewer system modelling for numerous sections of pipe network systems and pump systems
 Reliability analysis of Onrus-Vermont sewer system.

KV3 Consulting Engineers (Engineer in Training; as Professional Engineer after 1998)

Tasks at KV3 included various aspects of water engineering and the design and provision of water services, as well as shared responsibility for office management and administration in the final year of employment.

Water Reticulation System Planning and Analysis Using Wadiso

Langebaan : Computer Model, Master Planning (Jun 2002)
 Yzerfontein : Computer Model, Master Planning (Jan 1999)
 Stilbaai : Computer Model, Master Planning (Oct 1998)
 Doringbaai-Strandfontein : Computer Model (no report, 1997)
 Saldanha RDP 500 sites : Computer model (no report, 1996).

Bulk and Irrigation Water Supply Planning / Design / Investigations

(Using Wadiso software in most cases)

'Noord Boland Landbou' (Boland Agri) : Compilation of a technical report on the Bergsig Irrigation Scheme and system failure investigation for Supreme Court hearing (Jun 2002).

West Coast District Municipality : Report on the Berg River-Saldanha and Berg River Swartland Water Schemes with a 5-year planning time frame (Mar 2002)

Analysis of the new bulk water supply to Stilbaai (no report, 2002)

Analysis of the bulk water supply to Willowmore (no report, 2001)

Rainbow Chickens : Report on the water reticulation system of Rainbow Chickens, Broiler Farms B1 to B10 (Jan 1999)

Van Breda Consulting Engineers and DWAF : Water consumption downstream of "Sesbek" diversion and optional supply from Brandvlei dam (Mar 1998)

West Coast District Council : Report on the Berg River-Saldanha and Berg River Swartland Water Schemes with a 30-year planning time frame (Des 1997)

De Doorns Municipality : Investigation into the purchase of water (bulk) from Hex Valley Irrigation Board (Sep 1997)

Hex Valley Irrigation Board : Master planning of irrigation water distribution system in association with Ninham Shand (1997)

Design of Rohihlahla 310 RDP sites (Worcester) bulk water supply (no report, 1997)

Design of Robertson-North (Môreson & Droëheuwel, 818 sites) bulk water supply and internal reticulation system (no report, 1997).

Water Demand and Water Resources Management and Analysis

Overstrand Municipality : Overstrand Water Resource Investigation Technical Report, Klein River (Sep 2002)

West Coast District Council : Goedverwacht - Investigation into water demand and supply (Nov 2000).

Hex Valley Irrigation Board : Investigation into the effect of the redistribution of demand over time and the effect of measured versus originally designed flows in the system (Oct 2000)

DWAF : Western Overberg Coastal Zone Water Supply Situation Analysis with a 30-year planning time frame (Feb 2000)

Tenants of Paragon : Water Resource Management Plan for the farms Vredehoek and Lorelei in the Upper Wagenbooms River (Jan 1999)

West Coast District Council : '16-Mile Resort' and its impact on the capital expenditure programme of the West Coast District Municipality (1998).

Water Services Development Plans (As required by South African law)

!Kheis Municipality, Status Quo and Water Balance Components (Feb 2002)

Kareeberg Municipality, Status Quo and Water Balance Components (Oct 2001)

Dikgatlong Municipality, Status Quo and Water Balance Components (Sep 2001)

Worcester Municipality (Jun 2000)

Wolseley Municipality (Jun 2000)

De Doorns Municipality (Jun 2000).

Construction Projects

Direct involvement and responsibility in the following projects included the design, tender phase, contract administration, site supervision, and project management :

Hex Valley Irrigation Board : B-Line failure repair (R 177 000).

Hex Valley Irrigation Board : Sewerage and water connection for offices (R 160 000).

Darling Bridge Irrigation Board : Repair of diversion structure in the Wagenbooms River (R 90 000) - V3 involvement terminated before construction.

Hex Valley Irrigation Board : Protection of pipeline crossings in the Hex River (R 140 000 & R70 000).

Hex Valley Irrigation Board : Pipe system maintenance, Phase1 (R 50 000).

Hex Valley Irrigation Board : Pipe system maintenance, Phase2 (R 130 000).

West Coast District Municipality : Saldanha Underground Water Scheme - Main water supply pipeline (R 2 190 400).

Kruger & Pretorius Research and Development Engineers (Engineer in Training)

Research and development of polymer concrete products, including sewer manhole covers.

Merz & McLellan (South Africa) Consulting Engineers (Engineer in Training)

Site visits to Maun diesel power station during the 'Maun Energy Supply Agreement', and decommissioning of the plant.

Maintenance programme and marketing of the "mothballed" 60MW Mmamatsuwe power station in the former Bophuthatswana, including monthly site inspections.

Inventory compilation, Morupule coal mine, Botswana.

Engineer's Representative at Edwaleni hydropower plant, Swaziland, during the repair and refurbishment of Turbine No.2.

Analysis of failures regarding mechanical insurance claims.

Monthly site inspections / meetings to the 80 MW Selebi Phikwe power station (Botswana) during the decommissioning and sale of the power station.

Inspection of City of Cape Town's Steenbras hydroelectric equipment during workshop repair in Johannesburg.

APPENDIX A: RESEARCH OUTPUTS

INTERNET LINKS

http://scholar.google.co.za/citations?hl=en&user=OmX3I4kAAAAJ&view_op=list_works&is_public_preview
https://www.researchgate.net/profile/Heinz_Jacobs2/publications

OVERVIEW

Peer reviewed journal papers	= 18
Peer reviewed conference papers	= 8
Papers at non-refereed conferences	= 10
Research reports	= 4
Total number of publications	= 39

PEER REVIEWED JOURNAL PAPERS

18. Bester AJ, Jacobs HE, Tulleken J (2015). Conceptual framework for sewer pump problems allowing for fuzzy logic application, *WaterSA* 41(3):335-342 <http://dx.doi.org/10.4314/wsa.v41i3.05>
17. Scheepers HM and Jacobs HE (2014). Simulating residential indoor water demand by means of a probability based end-use model, *Journal of Water Supply: Research and Technology - AQUA* 66(3):476-488 (doi: 10.2166/aqua.2014.100)
16. Myburgh HM and Jacobs HE (2014). Water for fire fighting in five South African towns, *WaterSA* 40(1):11-18 <http://dx.doi.org/10.4314/wsa.v40i1.2>
15. Jacobs HE, Scheepers HM and Sinske SA (2013). Effect of land area on average annual suburban water demand. *WaterSA* 39(5): 687-694 <http://dx.doi.org/10.4314/wsa.v39i5.13>
14. Jacobs HE and Illembade AA (2013). Preface: Water footprint. *WaterSA* 39(3):341-344
13. Wegelin WA and Jacobs HE (2013). The development of a municipal water conservation and demand management strategy and business plan as required by the Water Services Act, South Africa, *Water SA* 39(3):415-422
12. Sinske SA & Jacobs HE (2013). Applying geographic information systems to delineate residential suburbs and summarise data based on individual parcel attributes, *SA Journal of Information Management* 15(1), Art. #538, 7 pages. <http://dx.doi.org/10.4102/sajim.v15i1.538>
11. Jacobs HE and Fair KA (2012). A tool to increase information processing capacity for consumer water meter data, *SA Journal of Information Management* 14(1), Art. #500, 7 pages. <http://dx.doi.org/10.4102/sajim.v14i1.500>
10. Jacobs HE and Strijdom JL (2009). Evaluation of minimum residual pressure as design criterion for South African water distribution systems. *Water SA*, 35(2), 183-191 <http://www.wrc.org.za>
9. Jacobs HE (2009). Prologue to the WISA 2008 Conference Special Edition. *Water SA*, 35(2) Special WISA 2008 edition, 139-143 <http://www.wrc.org.za>

8. Jacobs HE (2008). 'n Chronologiese oorsig van Suid-Afrikaanse riglyne vir residensiële gemiddelde jaarlikse waterverbruik met erf grootte as onafhanklike veranderlike : navorsings- en oorsigartikel. Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie, 27(4), 240-265, December 2008. <http://search.sabinet.co.za.ez.sun.ac.za/WebZ/AdvancedQuery?sessionid=01-34827-1852270009>
7. Jacobs HE (2008). Residential water information management. South African Journal of Information Management, 10(3), September 2008. Only published electronically: www.sajim.co.za/default.asp?to=peer3vol10nr3.
6. Jacobs HE and Haarhoff J (2007). Prioritisation of parameters influencing residential water use and wastewater flow. Journal of Water Supply: Research and Technology - AQUA, 56(8), 495-514, December 2007. <http://www.iwaponline.com/jws/toc.htm>
5. Jacobs HE (2007). The first reported correlation between end-use estimates of residential water demand and measured use in South Africa. Water SA, 33(4), 549-558, July 2007.
4. Jacobs HE, Fair K, Geustyn LC, Daniels J & Du Plessis JA (2007). Analysis of water savings: A Case study during the 2004-2005 water restrictions in Cape Town. Journal of the South African Institute of Civil Engineering, 49(3), 16-26, July 2007.
3. Jacobs HE, Geustyn LC, Loubser BF, Van Der Merwe B (2004). Estimating residential water demand in Southern Africa. Journal of the South African Institution of Civil Engineers, 46(4), 2-13, 2004.
2. Jacobs HE and Haarhoff J (2004b). Application of a residential end-use model for estimating cold and hot water demand, wastewater flow and salinity. Water SA, 30(3), 305-316, July 2004.
1. Jacobs HE and Haarhoff J (2004). Structure and data requirements of an end-use model or residential water demand and return flow. Water SA, 30(3), 293-304, July 2004.

B. CONFERENCE PAPERS - PEER REVIEWED

8. Du Plessis JL and Jacobs HE (2014) Model for estimating domestic outdoor water demand of properties in residential estates. Procedia Engineering 00 (2014) 000-000 1, 16th Conference on Water Distribution System Analysis (WDSA 2014), Bari, Italy, pp.1-8. DOI: 10.13140/2.1.1631.1681
7. Wright T and Jacobs HE (2010). Methodology for identifying, verifying and assessing groundwater use in serviced residential areas of the Cape Peninsula. Proceedings of the Water Institute of South Africa Biennial Conference, Durban, South Africa, 18-22 April 2010. <http://www.ewisa.co.za/literature/>
6. Van Heerden GA and Jacobs HE (2010). Internet based tool to provide correlation data for residential water use dynamics. Proceedings of the Water Institute of South Africa Biennial Conference, Durban, South Africa, 18-22 April 2010. <http://www.ewisa.co.za/literature/>
5. Jacobs HE (2010). Assessing the impact of personal on-site water resources in serviced residential areas on water demand and wastewater flow. Proceedings of the Water Institute of South Africa Biennial Conference, Durban, South Africa, 18-22 April 2010. http://www.ewisa.co.za/literature/literature_details.aspx?id=64bc96bb-ea67-4c2c-947c-d4b0a2855ad3
4. De Klerk AH and Jacobs HE (2010). Description of the Sanitown model as a benchmark for comparative hydraulic analyses of waterborne sewer systems. Proceedings of the Water Institute of South Africa Biennial Conference, Durban, South Africa, 18-22 April 2010. <http://www.ewisa.co.za/literature/>

3. Bester AJ, Jacobs HE, van der Merwe J and Fuamba M (2010). Unit cost functions for value estimation of waterborne sewer infrastructure. Proceedings of the Water Institute of South Africa Biennial Conference, Durban, South Africa, 18-22 April 2010. <http://www.ewisa.co.za/literature/>
2. Fair KA, Loubser BF, Jacobs HE & Van der Merwe J (2008). The Dynamic Master Planning Process - Integrated and continuous updating and planning of sewer systems. Proceedings of the 11th International Conference on Urban Drainage, Edinburgh, Scotland, UK, 31 August - 5 September 2008.
1. Sinske AN & Jacobs HE (2008). Modelling residential water use with a web-based tool. Proceedings of the 10th Annual Conference on World Wide Web Applications. 3-5 September 2008, Cape Town, South Africa Ed. Van Brakel, PA, Cape Peninsula University of Technology. <http://www.zaw3.co.za>

CONFERENCE PAPERS - NOT PEER REVIEWED

10. Jacobs HE (2012). Sewer pump station problems. Proceedings of the Water Institute of South Africa Conference, Cape Town, South Africa, 6-10 May 2012. <http://www.ewisa.co.za/literature/>
9. Jacobs HE, Compion JK and Van Heerden MJ (2011). The analysis of water and sewage flows from mega stadiums during the soccer world cup 2010 matches in South Africa. Proceedings of the International Conference on Computing and Control for the Water Industry, CCWI2011, 5-7 September 2011, University of Exeter, UK.
8. Jacobs HE and Van Dijk M (2009). Conceptual description of a novel three-tiered philosophy for sewer network master planning in South Africa. Integrating water systems. Proceedings of the Tenth International Conference on Computing and Control for the Water Industry, CCWI 2009 - 'Integrating Water Systems', 1-3 September 2009, The Edge, University of Sheffield, Sheffield, UK. <http://www.cabdirect.org/abstracts/20103313398.html;jsessionid=D2DD08086E32D6E1979D52B352A94CC8?freeview=true>
7. Jacobs HE and Van Staden S (2008). Direct on-site grey water reuse - an illicit or illustrious option? Proceedings of the Water Institute of South Africa Conference, Sun City, South Africa, 18-22 May 2008. http://www.ewisa.co.za/literature/literature_details.aspx?id=5bb88444-9de0-448f-a64a-0e92aecbe053
6. Jacobs HE and Strijdom JL (2008). Current minimum residual pressure in South African water distribution systems under theoretical peak demand. Proceedings of the Water Institute of South Africa Conference, Sun City, South Africa, 18-22 May 2008. <http://www.ewisa.co.za/literature/>
5. Kriegler BJ and Jacobs HE (2008). Development of a practical guideline for estimating non-domestic water use in South Africa based on data from the National Water Consumption Archive. Proceedings of the Water Institute of South Africa Conference, Sun City, South Africa, 18-22 May 2008. <http://www.ewisa.co.za/literature/>
4. Jacobs HE, Geustyn LC & Loubser BF (2006) Water - How is it used at home? Proceedings of the Water Institute of South Africa Conference, Durban, South Africa, 22-25 May 2006. http://www.ewisa.co.za/literature/literature_details.aspx?id=688f4997-4ada-42ee-b343-c32c5832c562
3. Sinske AN, Jacobs HE and Geustyn LC (2006). Internet-based water demand management. In proceedings of the Water Institute of South Africa Conference, Durban, May 2006.

2. Jacobs HE and Haarhoff J (2004c). Modelling salinity contributions in domestic sewer flow in response to some water demand measures. In proceedings of the Water Institute of South Africa Conference, Cape Town, 2-5 May 2004.
http://www.ewisa.co.za/literature/literature_details.aspx?id=2c427a31-a040-4dd0-bc60-71dac125c758
1. Jacobs HE and Haarhoff J (2002). End-Use Modelling as a Means to Predict the Effects of Water Demand Management. In proceedings of the Water Institute of South Africa Conference, Durban, May 2002.
http://www.ewisa.co.za/literature/literature_details.aspx?id=2695e881-03e9-426a-a401-20dc92d9088c

CONFERENCE PRESENTATIONS (ABSTRACT ONLY)

4. Barcelo, P, Jacobs, HE, Bester, AJ and Fuamba, M (2009). Conceptual description of a best modelling and planning procedure for separate sewer systems. 62nd Annual conference of the Canadian Water Resources Association, Loews Le Concorde, Quebec City, June 9-12, 2009.
3. Jacobs, HE and Vanderberg, T (2009). Interactive calculation of household water use - development of a new tool for the home owner. British Columbia Water and Wastewater Annual Conference, BCWWA2009, Penticton Trade and Convention Center, Penticton, BC, Canada, April 25 to 29, 2009.
2. Kinch J, Jacobs H E, Vandenberg T and Radford J (2005). Significant advances in information technology and water supply and demand management at Greater Vernon Services - Lessons learned. British Columbia Water and Waste Association, Conference, Penticton (Canada), 19 April 2005.
1. Vandenberg T, Kinch J and Jacobs H (2005). Significant advances in information technology and water supply and demand management at Greater Vernon Services. Canadian Water Resource Association, Conference, Kelowna (Canada), 21-24 February 2005.

OTHER (BOOKS AND EDITORIAL)

Jacobs HE & Ilemobade AA (2013). Guest editor of WaterSA WISA2012 Special Edition, WaterSA

Jacobs HE (2009). Guest editor of WaterSA WISA2008 Special Edition, WaterSA

Van Zyl, JE, Ilemobade, AA and Jacobs, HE (2008). Proceedings of the 10th Annual Water Distribution Systems Analysis Conference, WDSA2008, 17-20 August 2008, Kruger National Park, South Africa

TECHNICAL RESEARCH REPORTS

Sewer services

South African Water Research Commission: Sewer system planning made simple - for small local authorities. Jacobs HE; Fair KA; De Klerk AH; Bester B; Date Published: 01/04/2011; WRC Research Report No: 1828/1/11; ISBN No: 978-1-4312-0114-3; Project No: K5/1828. Project duration: 1 April 2008 - 31 March 2010; Total project budget: ZAR 600 000; Project Leader: Jacobs HE.

South African Water Research Commission: Understanding sewer pump stations. HE Jacobs, ML Griffioen, C Loubser and J Tulleken; Submitted for final publication: 04/08/2013; WRC Project No: K5/2007/3; Project duration: 1 April 2010 - 31 March 2013; Total project budget: ZAR 1 000 000; Project Leader: Jacobs HE.

Water services

South African Water Research Commission: Strategic assessment of household on-site water as supplementary resource to potable municipal supply - current trends and future needs. Jacobs HE; Du Plessis JA; Kock J; Loubser C; Wright T; Date Published: 01/03/2011; WRC Research Report No: 1819/1/10; ISBN No: 978-1-4312-0077-1; Project No: K5/1819; Project duration: 1 April 2008 - 31 March 2009; Total project budget: ZAR 300 000; Project Leader: Jacobs HE.

South African Water Research Commission: Investigation into the correlation between modelled and measured residential water demand. HE Jacobs, HM Scheepers and C Chibi; Submitted for final publication: 26/08/2013; Project Leader: Jacobs HE; WRC Project No: K5/1995/3; Project duration: 1 April 2010 - 31 March 2013; Total project budget: ZAR 842 000; Project Leader: Jacobs HE.

PERSONAL POST-GRADUATE STUDIES

Jacobs HE (2004). "A Conceptual end-use model for residential water demand and return flow". Doctoral thesis submitted in the fulfilment of the requirements for the degree Doctor Ingenieriae in Civil Engineering in the Faculty of Engineering at the Rand Afrikaans University (Now University of Johannesburg), Promoter Prof.J.Haarhoff, January 2004. Available online at the UJ Library and Information centre repository: <https://ujdigispace.uj.ac.za/handle/10210/468>

Jacobs HE (1997). "Investigation into the application of just-in-time principles in small South African firms". thesis submitted in the fulfilment of the requirements for the degree Magister Ingenieriae in Engineering Management in the Faculty of Engineering at Rand Afrikaans University (Now University of Johannesburg), Promoter Prof.J.Gouws, November 1997. Available online at the UJ Library and Information centre repository: <https://ujdigispace.uj.ac.za/handle/10210/6570>