

CURRICULUM VITAE

1. BIOGRAPHICAL SKETCH

1.1 General information										
Surname	Hamersma									
First names	Herman Adendorff			ID Number						
Citizenship	South African			Title	Dr	Female		Male	X	
Place of birth	Pretoria			Date of birth			19 September			
Population group	African		Coloured		Indian		White	X	Other	
Department	Mechanical and Aeronautical Engineering			Position			Senior Researcher			
Direct Telephone	+27 12 420 2926			Direct Telefax						
E-mail	hermanh@up.ac.za									
Date of appointment	1 September 2015			Permanent full-time			X	Temporary full-time		

1.2 Academic qualifications obtained				
Degree/ Diploma	Field of study	Higher education institution	Year	Distinctions
PhD	Mechanical Engineering	University of Pretoria	2017	Not applicable
MEng	Mechanical Engineering	University of Pretoria	2013	
BEngHons	Mechanical Engineering	University of Pretoria	2011	Cum laude
BEng	Mechanical Engineering	University of Pretoria (recognised by the Washington Accord)	2010	Cum laude

1.3 Other training courses attended		
Course	Institution	Year
Tuks Young Research Leadership Programme (TYRLP)	University of Pretoria	2017
Early Career Academics Workshop	University of Pretoria	2017
Writing for Success workshop	University of Pretoria	2016
University of Pretoria Orientation Programme	University of Pretoria	2016
Managing Design and CAE Model Changes in the Simulation Process	MSC Software Corporation webinar	2016

Early Career Researchers Orientation	University of Pretoria	2016
University of Pretoria Academic Induction Programme	University of Pretoria	2016
Model-based Design Workflow including StateFlow and SimMechanics	OPTI-NUM Solutions	2015
Designing Displays using Model-based Design	MathWorks webinar	2015
Simulink and StateFlow for Engineers	OPTI-NUM Solutions	2015
Computer Vision Made Easy	MathWorks webinar	2015
Conduct Vehicle Safety Analysis using Adams/Car	MSC Software Corporation webinar	2014
Tire Vehicle Dynamics Handling	Virginia Tech	2013
MATLAB and Simulink for Embedded Systems Development	OPTI-NUM Solutions	2013
Advanced Modelling Elements and Techniques with Adams/Solver	ESTEIQ	2012
Occupational Health and Safety Programme for OHS Representatives	University of Pretoria	2012
Basic Operation and Programming of Haas CNC Machining Centres	HAAS CNC Services S.A.C.C.	2011
Adams Basic Full Simulation	ESTEIQ	2011

1.4 Work experience to date		
Name of employer	Capacity and/or type of work	Period
University of Pretoria	<p>Senior Researcher in the Department of Mechanical and Aeronautical Engineering. My duties include assisting staff and students in the Vehicle Dynamics Group to conduct quality research in a highly productive manner; expanding the existing research programme of the Vehicle Dynamics Group, developing and commissioning state-of-the-art experimental equipment; broadening the expertise and relevance of the research group via consulting to local and international industry and managing research projects, facilities and equipment. I also supervise undergraduate final year project students in the Department. Undergraduate students completing their prescribed vacation work at the Vehicle Dynamics Group have done so under my supervision.</p> <p>I have also done consultation work to industry via UP's campus company, Enterprises University of Pretoria. The consultation services have ranged from vehicle subsystem modelling, testing of collision management systems implemented on mining vehicles to assessing technology readiness levels and performing technology capability assessments.</p>	September 2015 to present
South African Institute for Industrial Engineers	Technical Editor of the South African Journal of Industrial Engineering (SAJIE), responsible for layout editing of accepted papers, pre-submission screen of submitted papers for plagiarism and compliance to SAJIE formatting guidelines.	June 2013 to present

University of Pretoria	Teaching Assistant for Dynamics, Vehicle Engineering (Undergrad and Postgrad) and Continuum Mechanics. Since January 2015 I have been acting as a supervisor to final year undergraduate students completing their final year design and research projects in the Department of Mechanical and Aeronautical Engineering.	February 2011 to August 2015
Aurecon	Vacation work student, working in the Building Engineering Unit, specifically in the HVAC unit. Responsibilities included attending site	November 2008 to January 2010 (previously known as Africon)

2. TEACHING ACTIVITIES

2.1 Courses presented		
Course	Level (e.g. second year, Masters)	Self developed
MRN412/422 Research Project	Fourth year	No

2.2 Other education and pedagogic courses presented		
Course	Year	Institution
None		

3. TEACHING OUTPUTS

3.1 Educational publications and products
None

4. OTHER TEACHING CONTRIBUTIONS

4.1 Membership of national and international bodies
None

4.2 Visits to local and overseas universities as guest professor or lecturer in regard to teaching
None

4.3 Participation in national and international teaching associations, bodies, committees
None

5. RESEARCH ACTIVITIES

5.1 Former supervision or co-supervision (completed)					
Name of student	Degree	Title of dissertation/ thesis	Supervisor(s)	Co-supervisor(s)	Year
None					

5.2 Current post-graduate students					
Name of student	Degree	Project title	Supervisor	Co-supervisor(s)	Year
Master's degree students					
Jesse Declerq	MEng (Mechanical)	Mining collision avoidance system design with steering and braking	HA Hamersma	TR Botha	2021
Ricardo de Abreu	MEng (Mechanical)	Off-road ABS	HA Hamersma	TR Botha	2021
Ray Kruger	MEng (Mechanical)	Terramechanics	PS Els	HA Hamersma	2021
Simon Scholtz	MEng (Mechanical)	Improving off-road directional stability with integrated chassis control	HA Hamersma		2021
Ricardo de Sousa	MEng (Mechanical)	Multiple Object Detection And Tracking Using 3D-Lidar	TR Botha	HA Hamersma	2020
Janu Botha	MEng (Mechanical)	The Effect of Active Wheel Positioning on the Energy consumption and Vehicle Dynamic Behavior	HA Hamersma	PS Els	2020
Lafras Fritz	MEng (Mechanical)	Classification of Off-Road Terrains	HA Hamersma	TR Botha	2020

5.3 Obtaining research funds (Optional)			
Origin of research funds	Title of research project or programme	Duration	Money allocated (ZAR)
Mining3 research consultancy agreement	PDS Validation Framework Phase 3	9 months (January 2020 to September 2020)	±R400 000 (AUS\$40k)
Research Development Programme (RDP)	The development and testing of advanced chassis control systems	3 years (2018-2020)	R50 000 p.a.
DAAD-NRF Joint Scholarship Programme	Improving vehicle braking distance over rough roads through the intelligent application of a semi-active controllable suspension.	1 year (renewable based on progress) Initially awarded in 2014 and renewed for 2015	R90 000 p.a.

6. RESEARCH OUTPUTS

6.1 Publications in peer-reviewed or refereed journals
<p>Publications in peer-reviewed or refereed journals</p> <p>6.1.1 Title: Vehicle suspension force and road profile prediction on undulating roads Authors: Herman A. Hamersma & P.Schalk Els Publication: Vehicle System Dynamics, submitted on 9 Dec 2019, resubmitted after review on 13 March 2020, resubmitted again on 7 May 2020, accepted for publication 20 May 2020 Clarivate Analytics Impact factor 2018: 2.613 CiteScore 2019 (Scopus): 5.9</p> <p>6.1.2 Title: Review of Terramechanics Models and Their Applicability to Real-time Applications</p>

Authors: Rui He, Corina Sandu, Aamir K. Khan, A. Glenn Guthrie, P. Schalk Els & Herman A. Hamersma

Publication: Journal of Terramechanics, Volume 81 (2019), pages 3-22

Clarivate Analytics Impact factor 2018: 1.477

Scopus CiteScore 2019: 4.2

6.1.3 Title: ABS performance evaluation taking braking, stability and steerability into account

Authors: Herman A. Hamersma & P.Schalk Els

Publication: International Journal of Vehicle Systems Modelling and Testing, Vol 12, Nos. 3/4, 2017, pp. 262-283.

Clarivate Analytics Impact factor 2018: N/A

Scopus CiteScore 2019: 1.3

6.1.4 Title: The dynamic rolling radius of a pneumatic tyre on hard terrains

Authors: Herman A. Hamersma, Theunis R. Botha & P.Schalk Els

Publication: International Journal of Vehicle Systems Modelling and Testing, Vol. 11, No. 3, 2016, pp. 234-251

Clarivate Analytics Impact factor 2018: N/A

Scopus CiteScore 2019: 1.3

6.1.5 Title: Parameterization and validation of an all-terrain SUV FTire model

Authors: Hans-Rudolf B. Bosch, Herman A. Hamersma & P.Schalk Els

Publication: Journal of Terramechanics 67 (2016), 11-23

Clarivate Analytics Impact factor 2018: 1.477

Scopus CiteScore 2019: 4.2

6.1.6 Title: Improving the braking performance of a vehicle with ABS and a semi-active suspension system on a rough road

Authors: Herman A. Hamersma & P. Schalk Els

Publication: Journal of Terramechanics 56 (2014) 91-101

Clarivate Analytics Impact factor 2018: 1.477

Scopus CiteScore 2019: 4.2

6.1.7 Title: Longitudinal vehicle dynamics control for improved vehicle safety

Authors: Herman A. Hamersma & P. Schalk Els

Publication: Journal of Terramechanics 54 (2014) 19-36

Clarivate Analytics Impact factor 2018: 1.477

Scopus CiteScore 2019: 4.2

Publications submitted to accredited journals

6.1.8 Title: Collision Avoidance System Vendor Readiness for the South African Mining Industry

Authors: Herman A. Hamersma & W.C.W. Penny

Publication: Journal of the Southern African Institute of Mining and Metallurgy

Clarivate Analytics Impact factor 2019: 0.643

Scopus CiteScore 2019: 1.1

6.2 Books and/or chapters in books

None

6.3 Published full-length conference papers/keynote addresses

6.3.1 Title: Evaluation of cooperative collision avoidance algorithms for sensor selection by Monte Carlo Simulation

Authors: Keletso S. Maake, Theunis R. Botha, P. Schalk Els and Herman A. Hamersma

Conference: 15th ISTVS European-African Regional Conference, Prague, Czech Republic, September 8-11, 2019

6.3.2 Integrated chassis control for improved braking performance on rough roads

Authors: Herman A. Hamersma and P. Schalk Els

Conference: 26th IAVSD Symposium on Dynamics of Vehicles on Roads and Tracks, 12-16 August 2019 Gothenburg, Sweden

6.3.3 Evaluation of trackless mobile machine collision management systems

Authors: Herman A. Hamersma, Chris Doran & Schalk Els

Conference: Application Of Computers And Operations Research In The Mineral Industry, June 4-6, 2019, Wroclaw, Poland

6.3.4 Title: Road profile estimation with modulation function based sensor fusion and series expansion for input reconstruction

Authors: Noack, M., Botha, T.R., Hamersma, H.A., Ivanov, V., Reger, J. & Els, S.

Conference: The IEEE 15th International Workshop on Advanced Motion Control, Tokyo, Japan, March 9-11, 2018. (pp. 547-552). IEEE

6.3.5 Title: Wheel hop estimation on rough roads

Authors: Herman A. Hamersma, Theunis R. Botha & P. Schalk Els

Conference: 25th International Symposium on Dynamics of Vehicles on Roads and Tracks, 14-18 August 2017, Rockhampton, Queensland, Australia

6.3.6 Title: Off-road tyre state and parameter estimation

Authors: Herman A. Hamersma & P. Schalk Els

Conference: International Society for Terrain-Vehicle Systems 8th American Conference, Detroit, Michigan, USA, 12-14 September 2016.

6.3.7 Title: Estimating the kinetic roll radius of a tyre on rough terrain

Authors: Herman A. Hamersma, Theunis R. Botha & P. Schalk Els

Conference: Proceedings of the 13th International Society for Terrain-Vehicle Systems European Conference, Rome, October 21-23, 2015

6.3.8 Title: A comparison of quarter, half and full vehicle models with experimental ride comfort data

Authors: Herman A. Hamersma & P. Schalk Els

Conference: Proceedings of the ASME 2015 International Design Engineering Conferences & Computers and Information in Engineering Conference IDETC/CIE 2015, August 2-5, 2015, Boston, Massachusetts, USA

6.3.9 Title: Kinetic vs. kinematic roll radius on rough roads

Authors: Herman A. Hamersma, Theunis R. Botha & P. Schalk Els

Conference: Proceedings of the 18th International Conference of the International Society for Terrain-Vehicle Systems, Seoul, Korea, September 2014

6.3.10 Title: FTire parameterisation of an SUV tyre

Authors: Hans-Rudolf B. Bosch, Herman A. Hamersma & P. Schalk Els

Conference: Proceedings of the 18th International Conference of the International Society for Terrain-Vehicle Systems, Seoul, Korea, September 2014 (the paper received the Best Paper Award at the Conference)

6.3.11 Title: The effect of controllable suspension settings on the ABS braking performance of an off-road vehicle on rough terrain

Authors: Herman A. Hamersma, P. Schalk Els, Theunis R. Botha, Carl M. Becker, Dzmitry Savitski, Lukas Heidrich and Kristian Höpping

Conference: Proceedings of the 7th Americas Regional Conference of the International Society for Terrain- Vehicle Systems, Tampa, Florida, October 2013.

6.3.12 Title: The development of a longitudinal control system for a sports-utility-vehicle

Authors: Herman A. Hamersma & P. Schalk Els

Conference: Proceedings of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE2013, August 4-7, 2013, Portland, Oregon, USA

6.3.13 Title: A multi-body longitudinal dynamics model of a sports-utility-vehicle

Authors: Herman A. Hamersma & P. Schalk Els

Conference: Proceedings of the 12th European Regional Conference of the International Society for Terrain- Vehicle Systems, Pretoria, South Africa, September 24-27, 2012

Conference papers submitted to international conferences for review

Title: The effect of heat transfer on hydro-pneumatic springs

Authors: Herman A. Hamersma & P. Schalk Els

Conference: 27th International Symposium on Dynamics of Vehicles on Roads and Tracks, 14-18 August 2021, St Petersburg, Russia

6.4 Non-refereed publications or popular articles

Mining3 launches an online sensor technology capability toolkit, July 2020, online article available from <https://www.mining3.com/mining3-launches-an-online-sensor-technology-capability-toolkit/>

Press release from Mining3 reporting on a collaborative project between UP and Mining3 featuring work I did.

Moore, P. 2020. 'Stop...go - Collision awareness and avoidance', *International Mining*, January 2020.

Available from <https://view.joomag.com/im-2020-january-2020/0547965001578053571>

Popular media article containing an interview with me and details on the work I am doing in the mining collision avoidance system field

6.5 Patents

None

6.6 Technical reports

6.6.1 Test of Altech Netstar's Surface Mining Equipment Collision Management System at Glencore's Wonderkop smelter

Technical report on the single-machine capability testing of Altech Netstar's surface mining equipment collision management system, conducted at Glencore's Wonderkop smelter.

Date: 11 June 2020

6.6.2 Test of Favorssea Africa (Pty) Ltd's Underground Equipment Collision Management System

Technical report on the lab scale capability testing of Favorssea Africa (Pty) Ltd underground mining equipment collision management system.

Date: 27 March 2020

6.6.3 Test of EWCop (Pty) Ltd's Surface Mining Equipment Collision Management System

Technical report on the lab scale capability testing of EWCop (Pty) Ltd surface mining equipment collision management system.

Date: 19 March 2020

6.6.4 Bell Equipment (Pty) Ltd ISO21815 test report

Technical report of Bell Equipment (Pty) Ltd's ISO21815 compliance test, including brake response testing.

Date: 28 February 2020

6.6.5 Technical summary of CMS test reports submitted to FOSKOR

Technical summary of CMS test reports submitted to FOSKOR during their tender process.

Date: 12 December 2019

6.6.6 Test of Expert Mining Solutions (Pty) Ltd's Underground Mining Equipment Collision Management System at Exxaro's Forzando South mine

Technical report on the single-machine capability testing of Expert Mining Solutions' underground mining equipment collision management system, conducted at Exxaro's Forzando South coal mine.

Date: 9 December 2019

6.6.7 Test of Favorsa Africa (Pty) Ltd's Surface Mining Equipment Collision Management System at Glencore's Graskop Colliery

Technical report on the single-machine capability testing of Favorsa Africa's surface mining equipment collision management system, conducted at Glencore's Graskop Colliery.

Date: 20 November 2019

6.6.8 Test of Wabtec Corporation's Surface Mining Equipment Collision Management System at Pilanesberg Platinum Mine

Technical report on the single-machine capability testing of Wabtec Corporation's surface mining equipment collision management system, conducted at Pilanesberg Platinum Mine.

Date: 20 November 2019

6.6.9 Test of Altech Netstar's Surface Mining Equipment Collision Management System at Glencore's Wonderkop smelter

Technical report on the single-machine capability testing of Altech Netstar's surface mining equipment collision management system, conducted at Glencore's Wonderkop smelter.

Date: 28 October 2019

6.6.10 Test of Matrix Design Africa's Underground Mining Equipment Collision Management System

Technical report on the lab scale capability testing of Matrix Design Africa's underground mining equipment collision management system.

Date: 28 October 2019

6.6.11 Test of ElectroDiesel Group's Underground Mining Equipment Collision Management System

Technical report on the lab scale capability testing of ElectroDiesel Group's underground mining equipment collision management system.

Date: 13 September 2019

6.6.12 Test of ElectroDiesel Group's Surface Mining Equipment Collision Management System

Technical report on the lab scale capability testing of ElectroDiesel Group's surface mining equipment collision management system.

Date: 13 September 2019

6.6.13 Test of Wabtec Corporations Surface Mining Equipment Collision Management System (high precision GPS, phase 1 and 2 scenarios)

Technical reports on the lab scale capability testing of Wabtec Corporation's surface mining equipment collision management system, using a high precision GPS and testing both phase 1 (straight line) and phase 2 (intersections and curves) interaction scenarios.

Date: 1 September 2019

6.6.14 Test of Wabtec Corporations Surface Mining Equipment Collision Management System (standard precision GPS, phase 1 and 2 scenarios)

Technical reports on the lab scale capability testing of Wabtec Corporation's surface mining equipment collision management system, using a standard precision GPS and testing both phase 1 (straight line) and phase 2 (intersections and curves) interaction scenarios.

Date: 1 September 2019

6.6.15 Test of Booyco Electronic's Underground Mining Equipment Collision Management System

Technical report on the lab scale capability testing of Booyco Electronic's underground hard rock mining equipment collision management system.

Date: 19 August 2019

6.6.16 Test of Booyco Electronic's Surface Mining Equipment Collision Management System

Technical report on the lab scale capability testing of Booyco Electronic's surface mining equipment collision management system.

Date: 19 August 2019

6.6.17 Test of Altech Netstar's Surface Mining Equipment Collision Management System

Technical report on the lab scale capability testing of Altech Netstar's surface mining equipment collision management system.

Date: 6 August 2019

6.6.18 Test of ElectroDiesel Group's Underground Mining Equipment Collision Management System

Technical report on the lab scale capability testing of ElectroDiesel Group's underground mining equipment collision management system.

Date: 6 July 2019

6.6.19 Test of ElectroDiesel Group's Surface Mining Equipment Collision Management System

Technical report on the lab scale capability testing of ElectroDiesel Group's surface mining equipment collision management system.

Date: 6 July 2019

6.6.20 Test of Booyco Electronic's Underground Mining Equipment Collision Management System

Technical report on the lab scale capability testing of Booyco Electronic's underground hard rock mining equipment collision management system.

Date: 15 May 2019

6.6.21 Test of Booyco Electronic's Surface Mining Equipment Collision Management System

Technical report on the lab scale capability testing of Booyco Electronic's surface mining equipment collision management system.

Date: 14 May 2019

6.6.22 Test of Embedded IQ's Underground Mining Collision Management System

Technical report on the lab scale capability testing of Embedded IQ's underground mining collision management system.

Date: 9 May 2019

6.6.23 Test of Strata Worldwide's Underground Mining Collision Management System

Technical report on the lab scale capability testing of Strata Worldwide's underground mining collision management system.

Date: 5 April 2019

6.6.24 Test of Schauenburg Surface Mining Collision Management System

Technical report on the single machine testing of Schauenburg's surface mining collision management system at Bell Equipment's test farm in Empangeni.

Date: 15 April 2019

6.6.25 Test of GE's Surface Mining Collision Management System

Technical report on the lab scale capability testing of GE's surface mining collision management system.
Date: 27 March 2019

6.6.26 Test of PBE's Surface Mining Collision Management System

Technical report on the lab scale capability testing of PBE's surface mining collision management system.
Date: 28 February 2019

6.6.27 Glencore Technology Capability Assessment: Intelligent LHD (Phase 1)

Technical report on a technology capability assessment done on a rebuilt LHD at Glencore FerroAlloys.
Date: 15 February 2019

6.6.28 Test of Netstar's Surface Mining Collision Management System

Technical report on the lab scale capability testing of Netstar's surface mining collision management system.
Date: 13 December 2018.

6.6.29 Test of MPI Surface Mining Collision Management System

Technical report on the single machine testing of MPI's surface mining collision management system at Glencore Rietvly Mine. Date: 12 December 2018

6.6.30 Test of Favorssea Surface Mining Collision Management System

Technical report on the lab scale capability testing of Favorssea's surface mining collision management system. Date: 11 December 2018

6.6.31 Test of Schauenburg Surface Mining Collision Management System

Technical report on the lab scale capability testing of Schauenburg's surface mining collision management system. Date: 27 November 2018

6.6.32 Test of General Electric Surface Mining Collision Management System

Technical report on the lab scale capability testing of General Electric's surface mining collision management system. Date: 12 November 2018

6.6.33 Test of General Electric Surface Mining Collision Management System

Technical report on the lab scale capability testing of General Electric's surface mining collision management system. Date: 11 October 2018

6.6.34 Test of Booyco Surface Mining Collision Management System

Technical report on the lab scale capability testing of Booyco Electronics (Pty) Ltd's surface mining collision management system. Date: 16 August 2018

6.6.35 Test of Motion Perfection Industries Surface Mining Collision Management System

Technical report on the lab scale capability testing of Motion Perfection Industries (Pty) Ltd's surface mining collision management system. Date: 16 August 2018

6.6.36 Test of Favorssea Surface Mining Collision Management System

Technical report on the lab scale capability testing of Favorssea Africa (Pty) Ltd's surface mining collision management system. Date: 15 August 2018

6.6.37 Test of PBE Surface Mining Collision Management System

Technical report on the lab scale capability testing of PBE South Africa (Pty) Ltd's surface mining collision management system. Date: 7 August 2018

6.6.38 Test of two Strata Proximity Detection Systems – Coal Gen System and Gen2

Technical report on the lab scale capability testing of Strata Mine Safety underground mining collision management systems. Date: 4 July 2018

6.6.39 Test of Expert Mining Solutions Underground Mining Proximity Detection System

Technical report on the lab scale capability testing of Expert Mining Solutions' underground mining collision management system. Date: 28 June 2018

6.6.40 Glencore PDS current status

Project investigated Glencore's Waterval mine's current proximity detection system status. Date: 26 June 2018

6.6.41 Test of Booyco Proximity Detection System (PDS)

Technical report on the lab scale capability testing of Booyco's underground mining collision management system. Date: 31 May 2018

6.6.42 Hydropneumatic spring modelling

Project modelled a hydropneumatic spring making use of experimental data provided by Liebherr. Date 16 April 2018

6.6.43 Agricultural tire testing and modelling

Technical report on work performed through Enterprises University of Pretoria (Pty) Ltd. The report contains discussions of test setups, experimental procedures and a discussion of the results of the tests performed for Deere & Company. The tests discussed include static and dynamic tests of large agricultural tyres used by the customer on its agricultural tractors and harvesters.

7. OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

7.1 Participation in conferences, workshops and short courses - specify type of contribution

7.1.1 Technical Programme Committee member for 2020 IEEE Vehicle Power and Propulsion Conference (IEEE-VPPC2020)

I served as part of the technical programme committee and as a reviewer for the IEEE-VPPC2020 conference held in Gijón, Spain.

7.1.2 Tuks Young Research Leadership Programme 2017

I was selected as a Tuks Young Research Leadership (TYRLP) fellow in 2017. I attended the workshop hosted from 3-4 October 2017. The workshop provided a framework for young research leaders working at the University of Pretoria to determine the future direction of research at UP. It also provided a platform for collaboration between the research fellows, who represent a variety of different departments and faculties at UP. The workshop emphasised the importance of responsible leadership and forms part of the Future Africa initiative.

7.1.3 2015 Adams Car User Meeting

I presented at the 2015 Adams Car User Meeting held in Frankfurt, Germany from 6-7 October 2015. My presentation was titled "Improving the braking performance of a vehicle on rough terrain" and focussed on the development of the full vehicle models and their subsystems used by the Vehicle Dynamics Group to do research, in this case specifically on improving the braking performance of vehicles on rough roads

7.2 Teamwork and collaboration with others:

I have been a permanent member of the Vehicle Dynamics Group (VDG) at UP since 2011. My duties include doing research leading to the publication of articles in accredited academic journals and international conferences. Furthermore, I assist in doing experimental vehicle related tests in both the laboratory and in the

field on a regular basis. I have supervised undergraduate Research Project since 2015 and have supervised postgraduate Honours and Master's degree students since 2018.

7.3 Membership in national and international bodies

Professional Engineer (Pr Eng), Engineering Council of South Africa (ECSA), Reg. No. 202001399
International Association of Vehicle System Dynamics (IAVSD)
South African Association for Theoretical and Applied Mechanics (SAAM)
Marie Curie Alumni Association

7.4 Visits to local and overseas universities or research institutes as guest professor or researcher

7.4.1 Innovative Engineering of Ground Vehicle with Integrated Active Chassis Systems (EVE Project)

Innovation technologies in ground vehicle engineering require strong interdisciplinary and intersectoral investigations with an international dimension. In this context the project EVE proposes a sustainable approach based on intensive staff exchange that leads to collaborative research and training between universities and industrial organizations from Germany, Belgium, Spain, The Netherlands, South Africa, and the USA. A synergetic effect from the EVE networking will be realized in the development of innovative integrated chassis control systems. The project EVE has several phases including basic and applied research, development design, experimentations, networking, and dissemination and exploitation activities. The research objectives are focused on the development of (i) experimental tyre database that can be used in the design of new chassis control systems and subjected to inclusion into Horizon 2020 pilot on Open Research Data, (ii) advanced models of ground vehicles and automotive subsystems for real-time applications, and (iii) novel integrated chassis control methods. For more info visit <http://eve-project.eu>. I performed visits to the following universities/institutions as part of the EVE Project:

- Visit to Aragon Institute of Technology, Zaragoza, Spain, 16 January 2017-18 February 2017
During this visit I was working on state and parameter estimation as it may be applied to vehicles. The emphasis was on estimating states to be used by integrated chassis control systems and obtaining vehicle parameters using readily available laboratory equipment.
- Visit to Technical University of Ilmenau, 11 April to 6 May 2016
This visit focussed on vehicle modelling using different modelling approaches. The approaches investigated were the use of a full multi-body dynamics models and lumped mass parameter models that are capable of real-time simulation. The real-time simulation models were compiled on an embedded platform (DSPACE) and included the use of Hardware-in-the-Loop (HIL). Some initial work on network distributed real-time platforms and the effect of introducing lag to the models was also done.
- Visit to Technical University of Ilmenau, 28 September to 29 October 2015
This visit focussed on modelling the test vehicle used in the EVE Project in Adams Car.

7.4.2 Intelligent Control on Terramechanic Systems with Application to Ground Vehicles

Collaboration between the University of Pretoria and the Technical University Ilmenau (Germany). The research objectives are the development of generic intelligent stability control of ground vehicle motion on rough surfaces, progress in the identification and prediction methods of parameters of the operational environment of complex terramechanic systems and validation and demonstration of project results by way of simulation and development testing. Funding was provided by the German Research Foundation (DFG). I formed part of a delegation of researchers who visited the Technical University Ilmenau in April 2012.

8. MANAGEMENT AND ADMINISTRATIVE DUTIES

8.1 Mine collision management systems

I have been managing the Vehicle Dynamics Group's collision management system (CMS) effort. Recent changes to relevant legislation requires that CMS be installed on trackless mobile machines (TMMs) where a significant risk exists. Through Enterprises UP, the VDG has rendered services related to CMS to the mining industry. My role involved organising tests, performing tests and analysing the resulting test data. Management duties included liaising with clients, scheduling, quoting, disseminating and invoicing for work done.

8.2 EVE project

Since the beginning of 2016 I have been in charge of managing and administrating the University of Pretoria's participation in the EVE project (see section 7.4.1). This includes arranging secondments from UP to other consortium partners, including booking flights, accommodation and transport; coordinating researchers visiting UP with regards to their accommodation and access to UP facilities; the management of the secondment agreements between UP and the consortium partners regarding payment of the EVE stipends; scheduling the visits of UP researchers to other consortium partners and vice versa.

8.3 Undergraduate student vacation work

I have managed undergraduate students performing vacation work as part of their undergraduate training. The students supervised varied from second to third year academic students. second year students are required to perform hands-on work, manufacturing components and assembling mechanisms as required by the Vehicle Dynamics Group. Third year vacation work students are required to do higher level engineering work, conceptualising, designing and implementing small projects as required by the Vehicle Dynamics Group.

9. COMMUNITY SERVICE OR PROFESSIONAL SKILLS

9.1 Outreach projects

9.1.1 JCP Community Based Project –July 2008

The JCP project formed part of our formal training as undergraduate engineers. The goal of the project was twofold. The main goal of the project was to do basic computer training in Mamelodi. The course attendees were introduced to the MS Office suite, learning how to use MS Word and MS Excel specifically. Upon arrival at the training centre, several discarded computers and printers in disrepair were found. Taking our own initiative we managed to assemble approximately ten working computers and three printers from the heap of scrap. Exchange students from the Netherlands assisted in the training and their exchange formed the second goal of the project, namely introducing the exchange students to the student life at the University of Pretoria. The exchange students lived with our families and were introduced to South African cooking, shown the South African night life, taken to the Pretoria Zoo and taken on a safari at a game lodge close to Hammanskraal.

9.1.2 First Aid Level One

Since February 2019 I am certified as a First Aid Level One care provider.

9.2 Professional service performed

None

9.3 Involvement with other universities/scientific institutions

I formed part of the Working Group tasked with reviewing the SANS1589 standard. SANS1589 governs the braking performance requirements of underground trackless mobile machines.

9.4 Referee duties

I have acted as a reviewer to the following journals:

- Journal of Terramechanics
- Journal of Computational Methods in Sciences and Engineering
- Journal of Advances in Vehicle Engineering
- South African Journal of Industrial Engineering
- International Journal of Heavy Vehicle Systems

- Journal of Traffic and Transportation Engineering (English Edition)
- IEEE Transactions on Vehicular Technology
- Vehicle System Dynamics - International Journal of Vehicle Mechanics and Mobility

I have also acted as a reviewer for the following conferences:

- 12th European Regional Conference of the ISTVS, 24-27 Sept 2012
- 8th ISTVS Americas Regional Conference, 12-14 Sept 2016
- IEEE AMC 2018 15th International Workshop on Advanced Motion Control, 9-11 March 2018
- IEEE-VPPC2020

I have also evaluated candidates for participation in the Future Africa Early Career Research Leadership Fellowship (ECRLF).

10. AWARDS AND SCIENTIFIC/SCHOLARLY RECOGNITION

10.1 Evaluation status as scientist/scholar

None

10.2 Research awards and prizes

10.2.1 The conference paper entitled "FTire parameterisation of an SUV tyre", presented at the 18th International Conference of the International Society for Terrain-Vehicle Systems, Seoul, Korea, September 2014 was awarded the Best Paper Award at the Conference.

10.3 Teaching awards and prizes

None