

**CURRICULUM VITAE**  
Dr Lukas du Plessis

**UNIVERSITY OF PRETORIA**  
**FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY**

**1. BIOGRAPHICAL SKETCH**

**1.1 GENERAL INFORMATION**

<b>Surname</b>	du Plessis			<b>Maiden name</b>						
<b>First names</b>	Lukas Johannes			<b>ID Number</b>	7205135036083					
<b>Citizenship</b>	South Africa			<b>Title</b>	Dr	<b>Female</b>	<input type="checkbox"/>	<b>Male</b>	<input checked="" type="checkbox"/>	
<b>Place of birth</b>	Delmas, South Africa			<b>Date of birth</b>	13 May 1972					
<b>Population group</b>	<b>African</b>	<input type="checkbox"/>	<b>Coloured</b>	<input type="checkbox"/>	<b>Indian</b>	<input type="checkbox"/>	<b>White</b>	<input checked="" type="checkbox"/>	<b>Other (Please specify)</b>	
<b>Marital status</b>	Married			<b>Direct Telefax No.</b>	+27 (0)12 362 5124 / 5087					
<b>Direct Telephone</b>	+27 (0)12 420 2431			<b>E-mail</b>	lukas.duplessis@up.ac.za					
<b>Work address</b>	University of Pretoria Department of Mechanical & Aeronautical Engineering Engineering Building 1, Room 10-17 Cnr Lynnwood Road and Roper Street Hatfield 0083 South Africa			<b>Postal address</b>	University of Pretoria Department of Mechanical & Aeronautical Engineering Private Bag X20 Hatfield 0028 South Africa					

**1.2 LANGUAGE PROFICIENCY**

- Afrikaans (read fluently, write fluently, speak fluently)
- English (read fluently, write fluently, speak fluently)
- German (basic knowledge)

**1.3 HIGHEST SCHOOL QUALIFICATION**

<b>INSTITUTION</b>	<b>SUBJECTS</b>	<b>DISTINCTIONS</b>
Hoër Seunskool Hugenote (Springs)	Afrikaans (First Language) (HG) English (Second Language) (HG) Mathematics (HG) Science (HG) Accounting (HG) Metal Work (SG) Business Economics (SG)	All

<b>1.4 ACADEMIC QUALIFICATIONS OBTAINED</b>					
<b>Degree/ Diploma</b>	<b>Field of study</b>	<b>Higher education institution</b>	<b>Period</b>	<b>Year of graduation</b>	<b>Distinctions</b>
B Eng. Mechanical	Mechanical Engineering	University of Pretoria	1991-1994	1995	16 of 46 Final Year Average: 74%
M Eng. Mechanical (with Distinction)	Mechanical Engineering	University of Pretoria  Visiting student at the University of Florida (USA)	1997-1998  Jan 1998 – July 1998	1999	6 of 7  2 of 2
PhD Engineering	Mechanical Engineering	University of Pretoria	1999-2001	2002	Subjects: 1 of 1  Dissertation: N/A

<b>1.5 WORK EXPERIENCE TO DATE</b>		
<b>Name of employer</b>	<b>Capacity and/or type of work</b>	<b>Period</b>
University of Pretoria	Senior Lecturer	May 2016 - present
Self-employed	Consulting Mechanical Design Engineer	Aug 2015 – April 2016
Element Six Ltd (United Kingdom)	Principal Mechanical Engineer	Feb 2014 – May 2015
Element Six (Pty) Ltd (South Africa)	Senior Design Engineer	Jan 2011 – Jan 2014
Denel Dynamics	Principal Mechanical Engineer	Dec 2005 – Dec 2010
Denel Optronics	Specialist Mechanical Engineer	Feb 2002 – Nov 2005
De Beers Consolidated Mines Ltd	Engineer-in-Training	Jan 1995 – Jan 1997

## 2. TEACHING AND LECTURING DUTIES

<b>2.1 Courses/modules presented: UNDERGRADUATE</b>					
<b>Course</b>	<b>Level (second year, etc.)</b>	<b>Academic Institution</b>	<b>Degree/ Diploma</b>	<b>Compilation of study guides (Yes or No)</b>	<b>Curriculum design (Yes or No)</b>
MOW217 Design and Manufacturing	2 <sup>nd</sup> year	University of Pretoria	B. Eng (Mechanical & Industrial)	Yes	Yes
MGC110 Graphical Communication	1 <sup>st</sup> year	University of Pretoria	B. Eng (All disciplines)	No	No
MOW323: Simulation-based Design	3 <sup>rd</sup> year	University of Pretoria	B. Eng (Mechanical)	Yes	Yes
MVS311: Manufacturing Systems	3 <sup>rd</sup> year	University of Pretoria	B. Eng (Industrial)	Yes	Yes
MSD210: Dynamics 210 (Practicals and Tutorials)	2 <sup>nd</sup> year	University of Pretoria	B. Eng	No	Tutorials – No Practicals - Yes

### 3. RESEARCH

RESEARCH FIELD	SPECIALITY
Open-Source CAD 7 Simulation Software	Refining FreeCAD by implementing AI, multibody-dynamics & mechanical tolerance analysis
Advanced Manufacturing Technology	High Speed Machining

#### 3.1 RESEARCH DUTIES

##### 3.1.1 Current postgraduate students

Name of student	Degree enrolled for and date of first registration	Project title	Supervisor	Co-supervisor(s)	Year of registration
MC de Beer	B. Eng Honors Mechanical	Development of a Tolerance Analysis methodology in Open-Source CAD	Dr L du Plessis	TBC	2020
PJ Joubert	M. Eng Mechanical	Implementing Artificial Intelligence (AI) in Open-Source CAD	Prof S Kok	Prof N Wilke Dr L du Plessis	2018
BJ Jacobs	PhD Engineering (TUT)	The development of a numerical methodology for optimized erection of guyed V-towers without cranes	Dr DA Desai	Dr L du Plessis	2017

##### 3.1.2 Obtaining research funds

Origin of research funds (e.g. contract research, THRIP, international funding organisations, other(s))	Title of research project or programme	Duration	Money allocated (R)
University of Pretoria's Research Development Programme (RDP)	Development of a 5-axis CNC machine tool	2017 - 2019	R50 000 per year

## 3.2 RESEARCH OUTPUT

### 3.2.1 Publications in refereed accredited journals

1. Du Plessis, L.J. and J.A. Snyman, 'An optimally re-configurable planar Gough-Stewart machining platform', *Mechanism and Machine Theory*, vol. 41, 2006, pp. 334-357.
2. Du Plessis, L.J. and J.A. Snyman, 'Determination of optimum geometries for a planar re-configurable machining platform using the LFOPC optimization algorithm', *Mechanism and Machine Theory*, vol. 41, 2006, pp. 307-333.
3. Du Plessis, L.J. and J.A. Snyman, 'Trajectory-planning through interpolation by overlapping cubic arcs and cubic splines', *International Journal for Numerical Methods in Engineering*, vol. 57, 2003, pp. 1615-1641.
4. Du Plessis, L.J. and J.A. Snyman, 'A numerical method for the determination of dexterous workspaces of Gough-Stewart platforms', *International Journal for Numerical Methods in Engineering*, vol. 52, 2001, pp. 345-369.
5. Snyman, J.A., L.J. du Plessis and J. Duffy, 'An optimization approach to the determination of the boundaries of manipulator workspaces', *ASME Journal of Mechanical Design*, vol. 122, 2000, pp. 447-456.

### 3.2.2 Refereed Chapters in Books

1. Botha, A., Bezuidenhout, S., Du Plessis, L.J., Muller, E., Steyn, R., Weilbach, L., Jansen, R., Maritz, J. and Cronje, T., 'Implementing an online tool for teamwork assessment in real time: A faculty initiative across disciplines', *The 4<sup>th</sup> e-Learning Excellence Awards, Edited by Dan Remenyi, ISBN 978-1-912764-06-8, 2019.*

### 3.2.3 Papers presented and published in national conference proceedings

1. Du Plessis, L.J. and A.M. Hay, 'A general mathematical programming method for the determination of manipulator workspaces', *International Workshop on Multidisciplinary Design Optimization*, Pretoria, South Africa, 2000.
2. Du Plessis, L.J. and J.A. Snyman, 'The determination of dexterous workspaces of Stewart platforms for machining', *SACAM 2000 International Conference on Applied Mechanics*, Durban, South Africa, 2000.
3. Snyman, J.A., L.J. du Plessis and J. Duffy, 'An optimization approach to the determination of the boundaries of manipulator workspaces', *International Conference on Quality Manufacturing*, Stellenbosch, South Africa, 1999.

### 3.2.4 Papers presented and published in international conference proceedings

1. Botha, A., Bezuidenhout, S., Du Plessis, L.J., Muller, E., Steyn, R., Weilbach, L., Jansen, R., Maritz, J. and Cronje, T., 'Implementing an online tool for teamwork assessment in real time: A faculty initiative across disciplines', *European Conference on e-Learning*, Copenhagen, Denmark, 7-8 November 2019

2. Du Plessis, L.J. and J.A. Snyman, 'Design and optimum operation of a re-configurable planar Gough-Stewart machining platform', *Parallel Kinematics Seminar (PKS)*, Chemnitz, Germany, April 2002.
3. Du Plessis, L.J., J.A. Snyman and W.J. Smit, 'Optimization of the adjustable geometry of a planar Stewart platform machining center with respect to placement of work piece relative to tool path', *Year 2000 Parallel Kinematic Machines International Conference (2000-PKM-IC) and the Second European-US PKM Forum, Ann Arbor, Michigan, USA, 13-15 September, 2000.*
4. Du Plessis, L.J., J.A. Snyman and W.J. Smit, 'A configurationally adjustable planar Stewart platform machining center with feasible and optimal placement of workspace relative to tool path', *ASME 2000 26th Biennial Mechanisms and Robotics Conference*, Baltimore, Maryland, USA, 10-13 September, 2000
5. Du Plessis, L.J. and J.A. Snyman, 'The determination of the workspace of a spatial 6-3 Stewart platform by mathematical optimization', *Tenth World Congress on the Theory of Machines and Mechanisms*, Oulu, Finland, 1999.

### **3.2.5 Patents – pending**

1. Inventor: 'A Manipulating Device', PCT, Application Number PCT/ZA2018/050065 – 6 December 2018

## **4 OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS**

### **4.1 Visits to local and overseas universities or research institutes as guest professor or researcher**

1. 1998: Visiting student (from 15 January 1998 – 15 July 1998) to the Centre for Intelligent Machines and Robotics (CIMAR), Department of Mechanical Engineering, University of Florida in the USA.

## **5. COMMUNITY SERVICE OR PROFESSIONAL SKILLS**

### **5.1 Involvement with other universities/scientific institutions**

(e.g. external examiner, editor of journal, advisory council, CSIR, SA Council for Scientific Professions)

Appointed as external examiner for the following courses:

1. MPR210: Second year programming course, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2003 - 2004
2. MSC422: Final year undergraduate Project, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2015
3. MSS781 & MSS781: Honors Independent Study, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2015

## **5.2 Refereeing duties**

(e.g. journals, dissertations/theses)

Refereed papers for the following journals:

1. International
  - a. Mechanism and Machine Theory (2011, 2013 (x2))
2. Local
  - a. South African Journal of Science (2006)

## **5.3 Professional registration (e.g. Pr Eng)**

1. Registered as Professional Engineer with ECSA, Registration No.: 20170143

# **6. AWARDS AND SCIENTIFIC/SCHOLARY RECOGNITION**

## **6.1 Research awards and prizes**

1. 1999: Sasol Medal and Prize, for best master's student in Mechanical Engineering at the University of Pretoria.
2. 1999: S 2 A 3 Bronze Medal and Prize for the best master's thesis in a scientific discipline at the University of Pretoria.

## **6.2 Other honors and awards**

1. One of 16 short-listed entrants of the Africa Prize for Engineering Innovation hosted by the UK Royal Academy of Engineering (2018 – 2019)
2. Mellon Foundation Postgraduate Mentoring Program (2000-2002: mentor/student-pair Snyman / Du Plessis)