

CURRICULUM VITAE
Dr Lukas du Plessis

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

1. BIOGRAPHICAL SKETCH

1.1 GENERAL INFORMATION

| | | | | | | | | | | |
|-------------------------|---|--------------------------|-----------------|--------------------------|---------------------------|--|---------------|-------------------------------------|-------------------------------|-------------------------------------|
| Surname | du Plessis | | | | Maiden name | | | | | |
| First names | Lukas Johannes | | | | ID Number | 7205135036083 | | | | |
| Citizenship | South Africa | | | | Title | Dr | Female | <input type="checkbox"/> | Male | <input checked="" type="checkbox"/> |
| Place of birth | Delmas, South Africa | | | | Date of birth | 13 May 1972 | | | | |
| Population group | African | <input type="checkbox"/> | Coloured | <input type="checkbox"/> | Indian | <input type="checkbox"/> | White | <input checked="" type="checkbox"/> | Other (Please specify) | |
| Marital status | Married | | | | Direct Telefax No. | +27 (0)12 362 5124 / 5087 | | | | |
| Direct Telephone | +27 (0)71 684 2246 | | | | E-mail | lukas.duplessis@up.ac.za | | | | |
| Work address | University of Pretoria Department of Mechanical & Aeronautical Engineering Engineering Building 1, Room 10-17 Cnr Lynnwood Road and Roper Street Hatfield 0083 South Africa | | | | Postal address | 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

| INSTITUTION | SUBJECTS | DISTINCTIONS |
|-----------------------------------|--|---------------------|
| Hoër Seunskool Hugonote (Springs) | Afrikaans (First Language) (HG) English (Second Language) (HG) Mathematics (HG) Science (HG) Accounting (HG) Metal Work (SG) Business Economics (SG) | All |

| 1.4 ACADEMIC QUALIFICATIONS OBTAINED | | | | | |
|---|------------------------|---|--|-------------------------------|---|
| Degree/ Diploma | Field of study | Higher education institution | Period | Year of graduation | Distinctions |
| 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 |

| 1.5 WORK EXPERIENCE TO DATE | | |
|--------------------------------------|---------------------------------------|-----------------------|
| Name of employer | Capacity and/or type of work | Period |
| 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

| 2.1 Courses/modules presented: UNDERGRADUATE | | | | | |
|---|--|---------------------------------|--|--|--|
| Course | Level (second year, etc.) | Academic Institution | Degree/ Diploma | Compilation of study guides (Yes or No) | Curriculum design (Yes or No) |
| MOX410: Design Project | 4 th year | University of Pretoria | B. Eng (Mechanical) | Yes | No |
| MOW217: Design and Manufacturing | 2 nd year | University of Pretoria | B. Eng (Mechanical & Industrial) | Yes | Yes |
| MGC110: Graphical Communication | 1 st year | University of Pretoria | B. Eng (All disciplines) | No | No |
| MOW323: Simulation-based Design | 3 rd year | University of Pretoria | B. Eng (Mechanical) | Yes | Yes |
| MVS311: Manufacturing Systems | 3 rd year | University of Pretoria | B. Eng (Industrial) | Yes | Yes |
| MSD210: Dynamics 210 (Practicals and Tutorials) | 2 nd year | University of Pretoria | B. Eng | No | Tutorials – No Practicals - Yes |

3. RESEARCH

| RESEARCH FIELD | SPECIALITY |
|---|---|
| Open-Source Computer-Aided Engineering (CAE) for Africa | Refining FreeCAD by implementing optimization & planar multibody dynamics |
| Advanced Manufacturing Technology | R&D of a hybrid parallel-serial 5-axis machine tool |

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 |
|-----------------|--|--|-------------|------------------|----------------------|
| 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) |
|--|---|----------------------|---------------------|
| This award is funded through Engineering X, an international collaboration founded by the Royal Academy of Engineering and Lloyd's Register Foundation | Open-source Computer-Aided Engineering (CAE) for Africa | June 2020 – May 2022 | ~R84 000 |
| 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. Jacobs B, Desai DA, and Du Plessis LJ, 'Novel autonomous lifting of a guyed V-tower: A case study', *Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie* 39(1) (2020). <https://doi.org/10.36303/SATNT.2020.39.1.732>
2. Jacobs B, Desai DA, and Du Plessis LJ, 'A Critical Review of Alternative Erection Methods for Overhead Line Towers', *International Journal of Engineering Research and Technology*, Vol. 13, No. 7, 2020, pp. 1747-1751
3. Du Plessis LJ and Snyman JA, 'An optimally re-configurable planar Gough-Stewart machining platform', *Mechanism and Machine Theory*, Vol. 41, 2006, pp. 334-357.
4. Du Plessis LJ and Snyman JA, '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.
5. Du Plessis LJ and Snyman JA, 'Trajectory-planning through interpolation by overlapping cubic arcs and cubic splines', *International Journal for Numerical Methods in Engineering*, Vol. 57, 2003, pp. 1615-1641.
6. Du Plessis LJ and Snyman JA, '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.
7. Snyman JA, Du Plessis and Duffy J, '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 LJ, 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 4th 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 LJ and Hay AM, 'A general mathematical programming method for the determination of manipulator workspaces', *International Workshop on Multidisciplinary Design Optimization*, Pretoria, South Africa, 2000.
2. Du Plessis LJ and Snyman JA, 'The determination of dexterous workspaces of Stewart platforms for machining', *SACAM 2000 International Conference on Applied Mechanics*, Durban, South Africa, 2000.
3. Snyman JA, Du Plessis LJ and Duffy J, '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. Jacobs B, Dasai D and Du Plessis LJ, 'An objective review of erection methods for overhead line towers devoid of cranes', *2020 IEEE PES/IAS PowerAfrica Conference*, 25 – 28 August 2020.
2. Botha A, Bezuidenhout S, Du Plessis LJ, 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
3. Du Plessis LJ and Snyman JA, 'Design and optimum operation of a re-configurable planar Gough-Stewart machining platform', *Parallel Kinematics Seminar (PKS)*, Chemnitz, Germany, April 2002.
4. Du Plessis LJ, Snyman JA and Smit WJ, '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.
5. Du Plessis LJ, Snyman JA and Smit WJ, '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
6. Du Plessis LJ and Snyman JA, '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. 'A Manipulating Device', South African National Patent, Application Number PCT/ZA2018/050065 – 30 June 2020

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)