

UNIVERSITY OF PRETORIA
CURRICULUM VITAE: STEPHAN SCHMIDT

EVALUATION DATE: *(Office use only)*

1. BIOGRAPHICAL SKETCH

1.1 GENERAL INFORMATION

Surname	Schmidt									
First names	Stephan			ID Number						
Citizenship	South African			Title	Dr	Female	<input type="checkbox"/>	Male	<input checked="" type="checkbox"/>	
Place of birth	Pretoria, South Africa			Date of birth						
Population group	African	<input type="checkbox"/>	Coloured	<input type="checkbox"/>	Indian	<input type="checkbox"/>	White	<input checked="" type="checkbox"/>	Other (Please specify)	
Department	Mechanical and Aeronautical Engineering			Position		Senior Lecturer				
Direct Telephone	+27 (0) 12 420 2781			Direct Telefax						
E-mail	stephan.schmidt@up.ac.za									
Date of appointment	1 April 2019			Permanent full-time	<input checked="" type="checkbox"/>	Temporary full-time	<input type="checkbox"/>			

1.2 ACADEMIC QUALIFICATIONS OBTAINED

Degree/ Diploma	Field of study	Higher education institution	Year	Distinctions
PhD	Mechanical Engineering	University of Pretoria	2019	N/A
MEng	Mechanical Engineering	University of Pretoria	2017	Cum Laude
BEng (Honours)	Mechanical Engineering	University of Pretoria	2015	Cum Laude
BEng	Mechanical Engineering	University of Pretoria	2014	Cum Laude

1.3 WORK EXPERIENCE TO DATE		
Name of employer	Capacity and/or type of work	Period From mm//yy to mm//yy
Invoke Analytics	Data Scientist	10/2018 – 01/2019
C-AIM consult, Business Enterprises, University of Pretoria	Contractor	02/2019 – 03/2019
University of Pretoria	Postdoctoral research fellow	02/2019 – 03/2019
University of Pretoria	Senior Lecturer	04/2019 - present

2. TEACHING ACTIVITIES

2.1 Courses presented		
Course	Level (e.g. second year, Masters)	Self developed (Yes or No)
MEV 781 (Vibration-based condition monitoring)*	BEng (Honours) (Post-graduate) (2019)	No
MOO 780 (Optimum Design)*	BEng (Honours) (Post-graduate) (2019, 2020)	No
MSY 781 (Empirical modelling for engineers)	BEng (Honours) (Post-graduate) (2020)	Yes
MPR 213 (Programming and information technology)	BEng (Second year) (2019, 2020)	No

*Presented a special lecture (or special lectures) for the course for which the material was self-developed.

2.2 Other education and pedagogic courses presented		
Course	Year	Institution

3 TEACHING OUTPUTS

3.1 Educational publications and products

4. OTHER TEACHING CONTRIBUTIONS

4.1 Membership of national and international bodies

4.2 Visits to local and overseas universities as guest professor or lecturer in regard to teaching

4.3 Participation in national and international teaching associations, bodies, committees

5 RESEARCH ACTIVITIES

5.1 Former supervision or co-supervision (*completed*)

Name of student	Degree/Title of dissertation/ thesis and date	Supervisor	Co-supervisor(s)	Duration of studies (years)
Niehaus W.N.	MEng, 2019 Informative frequency band selection for performing envelope analysis under fluctuating operating conditions in the presence of strong noise and deterministic components	Prof P.S. Heyns	Dr S. Schmidt	1

5.2 Current post-graduate students

Name of student	Degree	Short project title	Supervisor	Co-supervisor(s)	Year of registration
Marx, D.	MEng	Hybrid method for planetary gearbox prognosis	Prof P.S. Heyns	Dr S. Schmidt	2020
Balshaw, R.	MEng	Deep learning condition monitoring techniques	Prof P.S. Heyns	Prof D.N. Wilke Dr S. Schmidt	2020
Ellis, B.	PhD	Hybrid diagnostics and prognostics for rotating machines	Prof P.S. Heyns	Dr S. Schmidt	2020

Mashaba, K.P.	MEng	Calibration of rotating machine models	Dr S. Schmidt	Prof D.N.Wilke	2021
Van Eyk, L.	MEng	Combining physics-based models and data-driven models for diagnostics of mining machines	Prof P.S. Heyns	Dr S. Schmidt	2021

5.3 Obtaining research funds (Optional)			
Origin of research funds (e.g. contract research, THRIP, international funding organisations, other(s))	Title of research project or programme	Duration	Money allocated (R) (Optional - exact amounts not required)

6 RESEARCH OUTPUTS

6.1 Publications in peer-reviewed or refereed journals

- Schmidt, S., Heyns, P.S. and De Villiers, J.P., 2018. A novelty detection diagnostic methodology for gearboxes operating under fluctuating operating conditions using probabilistic techniques. *Mechanical Systems and Signal Processing*, 100, pp.152-166. (Impact factor: 4.370)
- Schmidt, S., Heyns, P.S. and De Villiers, J.P., 2018. A tachless order tracking methodology based on a probabilistic approach to incorporate angular acceleration information into the maxima tracking process. *Mechanical Systems and Signal Processing*, 100, pp.630-646 (Impact factor: 4.370).
- Schmidt, S., Heyns, P.S. and Gryllias, K.C., 2019. A discrepancy analysis methodology for rolling element bearing diagnostics under variable speed conditions. *Mechanical Systems and Signal Processing*, 116, pp.40-61. (Impact factor: 4.370)
- Schmidt, S., Heyns, P.S., 2019, An open set recognition methodology utilising discrepancy analysis for gear diagnostics under varying operating conditions. *Mechanical Systems and Signal Processing*, 119, pp.1-22. (Impact factor: 4.370)
- Schmidt, S., Heyns, P.S., 2019, Localised gear anomaly detection without historical data for reference density estimation. *Mechanical Systems and Signal Processing*, 121, pp.615-635. (Impact factor: 4.370)
- Schmidt, S., Heyns, P.S. and Gryllias, K.C., 2019, A pre-processing methodology to enhance novel information for rotating machine diagnostics. *Mechanical Systems and Signal Processing*, 124, pp.541-561. (Impact factor: 4.370)
- Schmidt, S. and Heyns, P.S., 2020. Normalisation of the amplitude modulation caused by time-varying operating conditions for condition monitoring. *Measurement*, p.106964. (Impact factor: 3.364)
- Schmidt, S., Heyns, P.S. and Gryllias, K.C., 2020, A methodology using the spectral coherence and healthy historical data to perform gearbox fault diagnosis under varying operating conditions. *Applied Acoustics*, 158, p.107038. (Impact factor: 2.440)
- Schmidt, S., Mauricio, A., Heyns, P.S. and Gryllias, K.C., 2020. A methodology for identifying information rich frequency bands for diagnostics of mechanical components-of-interest under time-varying operating conditions. *Mechanical Systems and Signal Processing*, 142, p.106739. (Impact factor: 6.471)
- Schmidt, S., Zimroz, R., Chaari, F., Heyns, P.S. and Haddar, M., 2020. A Simple Condition Monitoring

Method for Gearboxes Operating in Impulsive Environments. *Sensors*, 20(7), p.2115. (Impact factor: 3.031)

11. Niehaus, W.N., Schmidt, S. and Heyns, P.S., 2020. NIC Methodology: A probabilistic methodology for improved informative frequency band identification by utilizing the available healthy historical data under time-varying operating conditions. *Journal of Sound and Vibration*, 488, p.115642. (Impact factor: 3.429)
12. Schmidt, S. and Gryllias, K.C., 2021. Combining an optimisation-based frequency band identification method with historical data for novelty detection under time-varying operating conditions. *Measurement*, 169, p.108517. (Impact factor: 3.364)

Publications accepted in peer-reviewed or refereed journals

1. Chen, Y., Schmidt S., Heyns, P.S., Zuo, M.J., A time series model-based method for gear tooth crack detection and severity assessment under random speed variation. Submitted to *Mechanical Systems and Signal Processing*.
2. Schmidt S., Zimroz, R., and Heyns, P.S. Enhancing gearbox vibration signals under time-varying operating conditions by combining a whitening procedure and a synchronous processing method. Submitted to *Mechanical Systems and Signal Processing*

6.2 Books and/or chapters in books

Provide full details, including full titles, names of all the authors, publishers, dates, page numbers etc. Specify your exact contribution to the book e.g. editorial role, co-author

6.3 Published full-length conference papers/keynote addresses

Provide full details of each publication, including full titles, names of all the authors, journals, dates, page numbers etc.

1. Schmidt, S., Heyns, P.S. and De Villiers, J.P., Discrepancy signal processing techniques for gearbox condition monitoring applications, First World Congress on Condition Monitoring, London, United Kingdom, 13-16 June, 2017.
2. Schmidt, S., Heyns, P.S. and Gryllias, K.C., A probabilistic novelty detection methodology based on the order-frequency spectral coherence, The sixth International Conference on Condition Monitoring of Machinery in Non-Stationary Operations, Santander, Spain, 20-22 June, 2018.
Nominated for the best paper in the category: Young researcher.
3. Schmidt, S., Heyns, P.S. and Gryllias, K.C., Discrepancy analysis for gearbox condition monitoring: A comparison of different healthy data models, The 31st International Congress and Exhibition on Condition Monitoring and Diagnostic Engineering Management, Sun City, South Africa, 2-5 July, 2018.
4. Schmidt, S., Heyns, P.S. and Gryllias, K.C., A comparison of different features for discrepancy analysis-based bearing diagnostics, The 28th Biennial ISMA conference on Noise and Vibration Engineering, Leuven, Belgium, 17-19 September, 2018.
5. Schmidt, S., Mauricio, A, Heyns, P.S. and Gryllias, K.C., A new method for identifying diagnostic rich frequency bands under varying operating conditions, SURVISHNO, Lyon, France, 8-10 July, 2019.
6. Schmidt, S., Heyns, P.S. and Gryllias, K.C., Towards prognostics under time-varying operating conditions: A frequency band identification approach, The 29th Biennial ISMA conference on Noise and Vibration Engineering, Leuven, Belgium, 7-9 September, 2020.

Conference papers accepted:

1. Schmidt, S., Heyns, P.S., Gryllias, K.C., Combining the spectral coherence with informative frequency band features for condition monitoring under time-varying operating conditions, COMADEM 2020.
2. Schmidt, S., Zimroz, R., Chaari, F., Heyns, P.S. and Haddar, M., Gearbox fault identification under non-Gaussian noise and time-varying operating conditions, ICAV 2021

6.4 Non-refereed publications or popular articles

6.5 Patents

6.6 Technical reports

7 OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

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

7.2.1 National

- 1 2017 Eskom Power Plant Engineering Institute Student Workshop (EPPEI); Attended, authored and presented one paper.
- 2 2018 Eskom Power Plant Engineering Institute Student Workshop (EPPEI); Attended, authored and presented one paper.

7.2.2 International

- 1 First World Congress on Condition Monitoring (WCCM2017), London, England, June 13-16, 2017. Attended, authored and presented one paper.
- 2 The Sixth International Conference on Condition Monitoring of Machinery in Non-Stationary Operations (CMMNO2017), Santander, Spain, June 20-22, 2018. Attended, authored and presented one paper.
- 3 The 31st International Congress and Exhibition on Condition Monitoring and Diagnostic Engineering Management (COMADEM2018), Sun City, South Africa, 2-5 July, 2018. Attended, authored and presented one paper. Reviewer for three papers.
- 4 28th Biennial ISMA conference on Noise and Vibration Engineering (ISMA2018), Leuven, Belgium, 17-19 September, 2018. Attended, authored and presented one paper.
- 5 SURVISHNO: First joint organization of the conferences Surveillance, VISHNO (Vibration Shocks and Noise) and EVA (Experimental Vibration Analysis, Lyon, France, 8-10 July, 2019. Attended, authored and presented one paper.
- 6 29th Biennial ISMA conference on Noise and Vibration Engineering (ISMA2020), Leuven, Belgium, 7-9 September, 2020. Virtually attended, authored and presented one paper.

7.2 Teamwork and collaboration with others:

Other researchers (national and international)

- Prof. Konstantinos Gryllias – KU Leuven, Belgium
- Prof. Radoslaw Zimroz - Wroclaw University of Technology, Poland

- Prof. Fakher Chaari - École nationale d'ingénieurs de Sfax, Tunisia
- Other research institutions (national and international)*

Industry

7.3 Membership in national and international bodies

None

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

2018: Visiting post-graduate student at KU Leuven, hosted by Professor Konstantinos C Gryllias (2 weeks)
2019: Visiting scholar at École nationale d'ingénieurs de Sfax, hosted by Professor Fakher Chaari (1 week)
2019: Visiting scholar at KU Leuven, hosted by Professor Konstantinos C Gryllias (5 weeks)
2019: Visiting scholar at INSA Lyon, hosted by Professor Jerome Antoni and Professor Quentin Leclere (4 weeks)

8 ARTISTIC OUTPUTS (*if applicable*)

None

9 MANAGEMENT AND ADMINISTRATIVE DUTIES

9.1 List your involvement in departmental activities (e.g. administrative functions), faculty (e.g. faculty committees) or other university activities.

10 COMMUNITY SERVICE OR PROFESSIONAL SKILLS

10.1 Outreach projects

10.2 Professional service performed

10.3 Clinical service

10.4 Involvement with other universities/scientific institutions

External examiner

- MEC4047F - Mechanical Vibrations: University of Cape Town, South Africa (2020)

10.5 Referee duties

Conferences:

- Refereed 3 papers for the 31st International Congress and Exhibition on Condition Monitoring and Diagnostic Engineering 2018

- Refereed 4 papers for the Turbo Expo Turbomachinery Technical Conference & Exposition 2020

Journals:

- Mechanical Systems and Signal Processing
- Shock and Vibration
- MDPI Sensors
- IEEE Sensors
- Measurement
- Engineering Failure Analysis

11 AWARDS AND SCIENTIFIC/SCHOLARLY RECOGNITION

11.1 Evaluation status as scientist/scholar

11.2 Research awards and prizes

11.3 Teaching awards and prizes

11.4 Artistic awards and prizes