

**HELEN MARY INGLIS**  
**UNIVERSITY OF PRETORIA**  
**CURRICULUM VITAE**

**1. BIOGRAPHICAL SKETCH**

1.1 GENERAL INFORMATION										
<b>Surname</b>	Inglis									
<b>First names</b>	Helen Mary Musselman				<b>ID Number (or passport number)</b>					
<b>Citizenship</b>	South African				<b>Title</b>	Dr	<b>Female</b>	X	<b>Male</b>	
<b>Place of birth</b>	Pietermaritzburg, South Africa				<b>Date of birth</b>					
<b>Population group</b>	<b>African</b>		<b>Coloured</b>		<b>Indian</b>		<b>White</b>	x	<b>Other (Please specify)</b>	
<b>Department</b>	Mechanical and Aeronautical Engineering				<b>Position</b>		Senior Lecturer			
<b>Direct Telephone</b>	012-420-3125				<b>Direct Telefax</b>		012-362-5087			
<b>E-mail</b>	helen.inglis@up.ac.za									
<b>Date of appointment</b>	1 October 2008				<b>Permanent full-time</b>		x	<b>Temporary full-time</b>		

1.2 ACADEMIC QUALIFICATIONS OBTAINED				
Degree/ Diploma	Field of study	Higher education institution	Year	Distinctions
B.Sc (Eng)	Mechanical Engineering	University of Cape Town	1995	First Class Honours
MS	Mechanical Engineering	University of Illinois at Urbana-Champaign	2003	
PhD	Mechanical Engineering	University of Illinois at Urbana-Champaign	2014	

<b>1.3 WORK EXPERIENCE TO DATE</b>		
<b>Name of employer</b>	<b>Capacity and/or type of work</b>	<b>Period From (mm//yy to mm//yy)</b>
Defensetek, CSIR	Structural Design Engineer	08/96 to 04/00
University of Illinois at Urbana-Champaign	Teaching Assistant	08/00 to 12/01
University of Illinois at Urbana-Champaign	Research Assistant	01/02 to 08/07; 05/05 to 09/08
University of Illinois at Urbana-Champaign	Teaching Fellow	09/07 to 05/08
University of Pretoria	Senior Lecturer	10/08 to present

## 2. TEACHING ACTIVITIES

<b>2.1 Courses presented</b>		
<b>Course</b>	<b>Level (e.g. second year, Masters)</b>	<b>Self developed (Yes or No)</b>
MKM 320 – Continuum Mechanics	Third year	Yes
MKM 410 – Computational Mechanics	Fourth year	Yes
MKM 321 – Continuum and Computational Structural Mechanics / Solid Mechanics	Third year	Yes
MSY 310 – Structural Mechanics	Third year	Yes
MSD 210 – Dynamics	Second year	No
MSI 732 – Structural Integrity	Honours	No
MSY 732 – Structural Mechanics	Honours	Yes
MEE 732 – Advanced Finite Elements	Honours	No
MEE 780 – Finite Element Methods	Honours	Yes
MSE 780 – Theory of Elasticity	Honours	Yes
MSF 780 – Fracture Mechanics	Honours	Yes
TAM 451 – Intermediate Solid Mechanics	Fourth year / Masters	Yes

<b>2.2 Other education and pedagogic courses presented</b>		
<b>Course</b>	<b>Year</b>	<b>Institution</b>

## 3. TEACHING OUTPUTS

<b>3.1 Educational publications and products</b>
1. Contributor, “Construction Plant and Equipment”, FET College Series, Pearsons Educational Publishers (in press).

#### 4. OTHER TEACHING CONTRIBUTIONS

##### 4.1 Membership of national and international bodies

1. Member of the South African Society for Engineering Education, 2013 - present

##### 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. POSTGRADUATE SUPERVISION

##### 5.1 Supervision or co-supervision of students who have completed degrees

Name of student	Degree <sup>1</sup> /Title of dissertation/thesis and date completed	Supervisor	Co-supervisor(s)	Duration of studies (years)
Lionel Prinsloo	Masters / A critical evaluation of the design of removable cover-plate header boxes for air-cooled heat exchangers / April 2011	Helen Inglis	Schalk Kok, CSIR	1 1/2
Natasha Botha	Honours / April 2010	Helen Inglis	Schalk Kok, CSIR	1
Christian Mpanga-A-kangaj	Honours / September 2011	Helen Inglis		1 1/2
Natasha Botha	Masters / Modelling of the human eye with focus on glaucoma / April 2014	Schalk Kok	Helen Inglis	3
Christian Mpanga-A-kangaj	Masters / Modelling fiber pullout from epoxy for application to high performance concretes / April 2014	Helen Inglis	Schalk Kok	2
Ncamisile Khanyile	Honours / April 2014	Helen Inglis	Schalk Kok	1
Suzanne Roberts	Honours / September 2014	Helen Inglis	Schalk Kok	1
Gareth Howard	Honours / December 2015	Helen Inglis	Francesco Pietra	1
Jacques Brits	Honours / December 2015	Stephan Heyns	Helen Inglis	1
Suzanne Roberts	Masters / Characterising the behavior of an electromagnetic levitation cell using numerical modeling / February 2017	Schalk Kok	Johan Zietsman, Helen Inglis	2 1/2
Gareth Howard	Masters / Finite Element modeling of creep for an industrial application / February	Helen Inglis	Francesco Pietra	1

<sup>1</sup> Indicate whether Honours, Masters research, Masters coursework with dissertation or Doctorate

	2017			
Jacques Brits	Masters / An experimental and stochastic approach to estimate the fatigue crack life of a turbomachinery blade using finite element modeling / February 2017	Stephan Heyns	Helen Inglis	1
Craig Nitzsche	Honours / December 2016	Helen Inglis	Johan Labuschagne	1
Leon Brits	Honours / December 2016	Stephan Heyns	Helen Inglis	1
Christian Bondo	Honours / December 2016	Stephan Heyns	Helen Inglis	2
Leon Brits	Masters / Modal analysis to identify cracked turbine blades / March 2019	Stephan Heyns	Helen Inglis	2

5.2 Current post-graduate students					
Name of student	Degree <sup>2</sup> enrolled for and date of first registration	Project title	Supervisor	Co-supervisor(s)	Year of registration
Ifeanyi Kalu	PhD/ February 2016	Modeling defects in boiler tubes	Helen Inglis	Schalk Kok	2016
Natasha Botha	PhD/ February 2017	Modeling polymer clay nanocomposites	Helen Inglis	Johan Labuschagne	2017
Crown Qambela	Masters / January 2018	Model updating for composite structures	Stephan Heyns	Helen Inglis	2018
Willem Wannenberg	Masters / January 2018	High cycle fatigue condition-based maintenance of reinforced composite beams	Chris Roth	Helen Inglis	2018
Khutso Mrwata	Honours / June 2018		Helen Inglis		2018

## 6. RESEARCH FUNDING

6.1 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)	
RDP	Mathematical and numerical investigation of heterogeneous microstructures	3 years	R40 000 per year (awarded 2010) R50 000 per year (renewed 2015)	
DHET Teaching Development Grants for Scholarship of Teaching and Learning Project	Improving the effectiveness of Dynamics tutorials	1 year	R63 500	

## 7. RESEARCH OUTPUTS

### 7.1 Publications in peer-reviewed or refereed journals

1. D. V. Deshmukh, E.J. Berger, T.J. Mackin, and H. Inglis (2005) "Convergence behaviors of

<sup>2</sup> Indicate whether Honours, Masters research, Masters coursework with dissertation or Doctorate

- reduced order models for frictional contacts.” *Journal of Vibration and Acoustics*, **127**, 370-381.
2. K. Matouš, H. M. Inglis, X. Gu, D. Ryppl, T. L. Jackson, and P. H. Geubelle (2007) “Multiscale modeling of solid propellants: From particle packing to failure.” *Composites Science and Technology*, **67**, 1694-1708.
  3. H. M. Inglis, P. H. Geubelle, K. Matouš, H. Tan, and Y. Huang (2007) “Cohesive modeling of dewetting in particulate composites: Micromechanics vs. multiscale finite element analysis.” *Mechanics of Materials*, **39**, 580-595.
  4. H. Tan, Y. Huang, G. Ravichandran, H. M. Inglis, and P. H. Geubelle (2007) “The uniaxial tension of particulate composite materials with nonlinear interface debonding.” *International Journal of Solids and Structures*, **44**, 1809-1822.
  5. H. M. Inglis, P. H. Geubelle, and K. Matouš (2008) “Boundary condition effects on multiscale analysis of damage localisation.” *Philosophical Magazine*, **88**, 2373-2397.
  6. Brassart, L., Inglis, H. M., Delannay, L., Doghri, I. and Geubelle, P. H. (2009) “An extended Mori-Tanaka homogenization scheme for finite strain modeling of debonding in particle-reinforced elastomers.” *Computational Materials Science*, **45**, 611-616.
  7. Kok, S., Botha, N. and Inglis, H. M. (2014) “Calibrating corneal material model parameters using only inflation data: An ill-posed problem”, *International Journal for Numerical Methods in Biomedical Engineering*, **30**, 1460-1475.

#### Articles in preparation / in review

1. Simpson, Z., Inglis, H. M. and Sandrock, C., “Reframing resources in engineering teaching and learning”, accepted with revisions, *Africa Education Review*.
2. Brits, J. C. P., Heyns, S. P. and Inglis, H. M., “Probabilistic fatigue crack life estimation of an axial fan blade during resonance conditions”, submitted to *Engineering Failure Analysis*.
3. Roberts, S. E., Kok, S., Inglis, H. M. and Zietsman, J., “Towards improved understanding of an electromagnetic levitation cell through numerical modeling”, submitted to *Metallurgical and Materials Transactions A*.
4. Howard, G. J., Inglis, H. M., Pietra, F. and Kok, S., “A multi-model methodology to estimate creep life of a 1-Cr-1Mo-0.25V cast alloy steel”, submitted to *Engineering Failure Analysis*.
5. Brits, L., Heyns, P. S. and Inglis, H. M., “Feasibility of Vibration-based Damage Detection for Turbine Blades”, submitted to *Journal of Nondestructive Evaluation*.

## 7.2 Books and/or chapters in books

### 7.3 Published full-length conference papers/keynote addresses

1. Brandi, M. X., Inglis, H. M. and Mackin, T. J., "Infrared imaging of slip zones in a model fretting geometry", Proceedings of the Society for Experimental Mechanics Spring Conference on Experimental Mechanics , Portland, OR, June 2001.
2. Inglis, H. M. and Mackin, T. J., "Failure analysis of a particulate composite cutoff wheel with fiber reinforcing", Proceedings of the 10th International Conference on Fracture, Honolulu, HI, December 2 – 6, 2001 (CD-ROM).
3. Inglis, H. M, Mackin, T. J. and Seghi, S., "Damage evolution in composites with varying fiber-matrix interfaces", Proceedings of the SEM X International Congress on Experimental Mechanics, Milwaukee, WI, June 2002 (CD-ROM).
4. Matouš, K., Inglis, H. M., Gu, X., Rypl, D., Jackson, T. L., and Geubelle, P. H., "Multiscale Damage Modeling of Solid Propellants: Theory and Computational Framework.", Proceedings of the 41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit (CD-ROM), American Institute of Aeronautics and Astronautics, 2005.
5. P. H. Geubelle, H. M. Inglis, J. D. Kramer, J. J. Patel, N. C. Kumar and H. Tan, "Multiscale modeling of dewetting damage in highly filled particulate composites." in Paulino, G. et al., eds, Multiscale and Functionally Graded Materials 2006, AIP Conference Proceedings, 2008.
6. N. Botha, S. Kok and H. M. Inglis, "Intraocular pressure estimation using proper orthogonal decomposition" in Pimenta, P. M. and Campello, E. M. B., eds, Computational Mechanics 2012 Proceedings, ISBN 978-85-86686-70-2.
7. N. Botha, S. Kok and H. M. Inglis, "Finite element modeling of corneal strip extensometry" in Proceedings of the South African Conference on Computational and Applied Mechanics, Johannesburg, September 2012.
8. Kangaj, C. M., Inglis, H. M., Pietra, F. and Kok, S., "Numerical modelling of the pull-out of hooked end steel fibre from epoxy matrix" in Proceedings of the 9th South African Conference on Computational and Applied Mechanics, Somerset West, January 2014.
9. Inglis, H. M. and Sandrock, C., "How do students pass Dynamics without understanding it?" in Proceedings of the 9th South African Conference on Computational and Applied Mechanics, Somerset West, January 2014.
10. Roberts, S. E. and Inglis, H. M., "Development of an experimental technique to characterise the material behavior of modelling dough" in Proceedings of the 9th South African Conference on Computational and Applied Mechanics, Somerset West, January 2014.
11. Sandrock, C. and Inglis, H. M., "A randomised control trial to assess the effectiveness of a tutorial" in Proceedings of the 3<sup>rd</sup> Biennial Conference of the South African Society for Engineering Education, Durban, June 2015.
12. Roberts, S. E., Kok, S., Zietsman, J. and Inglis, H. M., "Electromagnetic levitation coil design using gradient-based optimization" in Proceedings of the 11<sup>th</sup> World Congress on Structural and

Multidisciplinary Optimization, Sydney, 7 – 12 June 2015.

13. Brits, J.C.P., Heyns, S. P. and Inglis, H. M., “Fatigue Crack Life Estimation of a Notched Blade-Like Component using Finite Element Modelling” in Proceedings of the 10<sup>th</sup> South African Conference on Computational and Applied Mechanics, Potchefstroom, October 2016.
14. Howard, G. J., Inglis, H. M., Pietra, F. and Kok, S. “Developing a methodology to fit a constitutive creep model to 1Cr-1Mo-0.25V cast alloy steel” in Proceedings of the 10<sup>th</sup> South African Conference on Computational and Applied Mechanics, Potchefstroom, October 2016.
15. Roberts, S.E., Kok, S., Inglis, H. M. and Zietsman, J., “Uncertainties in modeling an Electromagnetic Levitation Cell (EMLC)” in Proceedings of the 10<sup>th</sup> South African Conference on Computational and Applied Mechanics, Potchefstroom, October 2016.
16. Kalu, I.E., Inglis, H. M. and Kok, S., “Effect of defect geometry of localized external erosion on failure of boiler tubes” in Proceedings of the ASME 2018 Pressure Vessels and Piping Conference, Prague, July 15-20, 2018.
17. Botha, N. and Inglis, H. M., “Open source implementation of a user material subroutine for composite materials” in Proceedings of the 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, Vanderbijlpark, September 2018.
18. Brits, L., Heyns, P. S. and Inglis, H. M., “Comparison between free vibration response of healthy and damaged pinned turbine blades” in Proceedings of the 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, Vanderbijlpark, September 2018.
19. Kalu, I. E., Inglis, H. M. and Kok, S., “Non-linear finite element analysis of boiler tubes under localized thinning caused by wall loss mechanisms” in Proceedings of the 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, Vanderbijlpark, September 2018.
20. Botha, N., Inglis, H. M. and Labuschagne, F. J. W. J., “Analysis of Mechanical Property Degradation in Polymer Nanoclay Composites” in Proceedings of the 3<sup>rd</sup> International Conference on Composites, Biocomposites and Nanocomposites, Port Elizabeth, November 2018.
21. Qambela, C. J., Heyns, P. S. and Inglis, H. M., “Characterisation of a laminated composite plate using modal analysis and full field Digital Image Correlation” in Proceedings of the 3<sup>rd</sup> International Conference on Composites, Biocomposites and Nanocomposites, Port Elizabeth, November 2018.

#### **7.4 Non-refereed publications or popular articles**

#### **7.5 Patents**

#### **7.6 Technical reports**

## 8. OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

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

#### 8.1.1 National

1. Conference Presentation: "Cohesive modeling of debonding in particulate composites - multiscale analysis", 5<sup>th</sup> South African Conference on Computational and Applied Mechanics, Cape Town, 16-18 January, 2006.
2. Conference Presentation: "Micromechanics model for debonding of elliptical particles", 1<sup>st</sup> African Conference on Computational Mechanics, Sun City, 7-11 January 2009.
3. Co-chair, 7<sup>th</sup> South African Conference on Computational and Applied Mechanics, Pretoria, 10-13 January 2010.
4. Member of Scientific Committee and Local Organising Committee, 8<sup>th</sup> South African Conference on Computational and Applied Mechanics, Johannesburg, September 2012.
5. Conference Presentation: "Using the Dynamics Concept Inventory to Assess Teaching Effectiveness", 2<sup>nd</sup> Biennial Conference of the South African Society for Engineering Education, Cape Town, June 2013.
6. Article reviewer for 9<sup>th</sup> South African Conference on Computational and Applied Mechanics, Somerset West, January 2014.
7. Article reviewer for 3<sup>rd</sup> Biennial Conference of the South African Society for Engineering Education, Durban, 4 – 5 June 2015.
8. Symposium presentation: "A randomised control trial to assess the effectiveness of a tutorial", EBIT Teaching and Learning Seminar, 18 November 2015.
9. Article reviewer for 10<sup>th</sup> South African Conference on Computational and Applied Mechanics, Potchefstroom, October 2016.
10. Conference presentation: "Survey of student perceptions of tutorial activities and learning practices in Dynamics", 10<sup>th</sup> South African Conference on Computational and Applied Mechanics, Potchefstroom, October 2016.
11. Member of organizing committee for EBIT Teaching and Learning Seminar, 14 October 2016.
12. Symposium presentation: "Survey of student perceptions of tutorial activities and learning practices in Dynamics", EBIT Teaching and Learning Seminar, 14 October 2016.
13. Member of organizing committee for EBIT Teaching and Learning Seminar, 3 November 2017.
14. Article reviewer for 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, Vanderbijlpark, September 2018.
15. Member of organizing committee for EBIT Teaching and Learning Seminar, 1 November 2018.
16. Member of organizing committee for EBIT Teaching and Learning Seminar, 30 October 2019.
17. Article reviewer for 10<sup>th</sup> Annual Conference on Mathematics, Science and Technology

Education, October 2019.

### 8.1.2 International

1. Conference Presentation: "Using thermoelasticity to track and quantify damage evolution in CFCC's", 10th International Conference on Fracture, Honolulu, HI, December 2 – 6, 2001.
2. Conference Presentation: "Experimental measurement of the displacement field at a partial slip interface", ASME International Mechanical Engineering Congress and Exposition, Washington, DC, November 16 - 21, 2003.
3. Conference Presentation: "Representative Volume Element for Multiscale Modeling of Damage in Solid Propellant", ASME International Mechanical Engineering Congress and Exposition, Chicago, November 5 - 10, 2006.
4. Conference Presentation: "Boundary condition effects on damage localization in multiscale analysis", 9th US National Congress on Computational Mechanics, San Francisco, July 23-26, 2007.
5. Conference Presentation: "Micromechanics model for debonding of elliptical particles", 17<sup>th</sup> US National Congress on Theoretical and Applied Mechanics, Michigan State University, June 15 – 20, 2014.
6. Conference Presentation: "Resources for Teaching and Learning: Reflections of Engineering Educators", Scholarship of Teaching and Learning in the South Conference, University of Johannesburg, July 24-27, 2017.
7. Article reviewer for 8<sup>th</sup> Research in Engineering Education Symposium, Cape Town, July 2019.
8. Conference Presentation: "Using a diagnostic test to inform and improve teaching for first year engineering students", 8<sup>th</sup> Research in Engineering Education Symposium, Cape Town, July 10-12, 2019.
9. Conference Presentation: "Student Voices: Insights from a qualitative student survey on curriculum transformation", 2<sup>nd</sup> Biennial SOTL in the South Conference, Central University of Technology, October 9-11, 2019.

### 8.2 Teamwork and collaboration with others:

### 8.3 Membership in national and international bodies

South African Association of Theoretical and Applied Mechanics (SAAM), Member of Executive Committee, 2010 – 2013.

International Union for Theoretical and Applied Mechanics (IUTAM) National Committee, 2018 -

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

## 9. ARTISTIC OUTPUTS (if applicable)

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## 10. MANAGEMENT AND ADMINISTRATIVE DUTIES

1. Department of Mechanical and Aeronautical Engineering, UP, Marketing Committee, 2010 – 2013
2. Mechanical Engineering Postgraduate Research Seminar, Convenor, 2015 – 2018
3. EBIT Faculty representative on UP Language Policy Workstream as part of Transformation process, 2016
4. Member of EBIT Teaching and Learning Committee, 2016 –
5. Member of EBIT Curriculum Transformation Committee, 2017 –
6. Member of Quality Enhancement Project Committee, Group 3, 2017.
7. Chair of EBIT Curriculum Transformation Committee, 2018 –

## 11. COMMUNITY SERVICE OR PROFESSIONAL SKILLS

### 11.1 Outreach projects

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### 11.2 Professional service performed

1. Served on NRF panel adjudicating applications for Blue Skies Programme, February 2009

### 11.3 Clinical service

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### 11.4 Involvement with other universities/scientific institutions

1. External examiner for Masters thesis, Yaseen Kajee, supervised by Daya Reddy, UCT, 2010
2. External examiner for Masters thesis, Sicelo Goqo, supervised by Daya Reddy, Robert Tait, Sebastian Skatulla and Thorsten Becker, UCT, 2013
3. External examiner for UCT postgraduate course Continuum Mechanics: June 2015, June 2016, June 2017, June 2019.
4. External examiner for UCT postgraduate course Nonlinear Materials: October 2015,

October 2019

5. External examiner for UCT undergraduate course Dynamics: June 2016, November 2016, June 2017, October 2017, January 2018, June 2018, January 2019, June 2019.

### **11.5 Referee duties**

1. Reviewer for *International Journal for Numerical Methods in Biomedical Engineering*
2. Reviewer for chapter in book, "Projects as Socio-Technical Systems in Engineering Education", CRC press, 2018.
3. Reviewer for *European Journal of Engineering Education*.

## **12. AWARDS AND SCIENTIFIC/SCHOLARLY RECOGNITION**

### **12.1 Evaluation status as scientist/scholar**

### **12.2 Research awards and prizes**

1. 5<sup>th</sup> South African Conference on Computational and Applied Mechanics: John Martin Award for best doctoral student presentation in Mechanics

### **12.3 Teaching awards and prizes**

1. 2001 Selected to the Incomplete list of teachers ranked as excellent, University of Illinois at Urbana-Champaign, USA.
2. 2007 MechSE Alumni Association Teaching Fellowship, University of Illinois at Urbana-Champaign, USA.
3. 2019 Merit Award for Recognition of Contribution to Teaching and Learning in EBIT, University of Pretoria.

### **12.4 Artistic awards and prizes**