

JACOBUS H. MULLER

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EDUCATION

Stellenbosch University, South Africa Ph.D. in Mechanical Engineering Dissertation: "Modelling subject specific patellofemoral joint dynamics"	2010
Stellenbosch University, South Africa M.Sc. in Mechanical Engineering (cum laude) Thesis: "Design, building and testing of a fibre optic force sensor and its application in an in vitro and in vivo study investigating the biomechanical properties of the patella tendon"	2007
Stellenbosch University, South Africa B.Eng. in Mechanical Engineering Final year script: "The design, build and testing of an acceleration simulator"	2004

AWARDS AND GRANTS

National Research Foundation rated researcher (h-index: 4 (Scopus 2016))	2015 - 2019
National Research Foundation Competitive Support for Rated Researchers Grant – Patellofemoral contact	2018 - 2020
National Research Foundation Competitive Support for Rated Researchers Grant – Motion capturing*	2018 - 2020
National Research Foundation SA/Mexico Joint Science and Technology Research Collaboration – Additive manufacturing of knee implants*	2018 - 2020
National Research Foundation Competitive Support for Unrated Researchers Grant – Anterior Knee pain	2014 - 2016

* Co-applicant

TEACHING EXPERIENCE

Lecturer – Engineering Drawings 123 First year course in B.Eng. Class size > 175 students	2011 - 2016
Lecturer – Mechatronics 424 Fourth year course in B.Eng Mechanical and Mechatronic Engineering. Administrator for the group project segment of the course.	2011 - 2016
Lecturer – Machine Design B344 Third year course in B.Eng Mechanical and Mechatronic Engineering. Taught machine design theory: AGMA gear design.	2011 - 2018
Supervisor – Mechatronic Project 478 and Mechanical Project 478 I have acted as the supervisor for 30 final year Mechatronic Engineering B.Eng students.	2011 - 2018
Supervisor – M.Eng candidates I have acted as the supervisor or co-supervisor for 15 Masters Students.	2011 - 2018
Supervisor – PhD candidates I have acted as the supervisor or co-supervisor for two PhD candidates.	2011 - 2018

RELATED EXPERIENCE

Tornier, Inc. / Wright Medical (Montbonnot, France) / Corin / Amplitude / Smith and Nephew Consultant I have acted as a consultant to an international knee prosthesis manufacture. The projects involved computational analysis of total and partial knee prosthesis biomechanics.	2011 - 2018
American Journal of Engineering and Applied Sciences Reviewer Reviewer of scientific paper submissions to American Journal of Engineering and Applied Sciences.	2017 - current
BMC Musculoskeletal Disorders	

Reviewer Reviewer of scientific paper submissions to BMC Musculoskeletal Disorders.	2016 - current
Sensors Reviewer Reviewer of scientific paper submissions to Sensors.	2013 - current
IEEE Sensors Reviewer Reviewer of scientific paper submissions to IEEE Sensors.	2014 - current
R&D Journal Reviewer [Provided content design feedback to program managers to create accessible segue between English and French versions of related content.]	2012 - current
SAIMechE Branch council member Council member of the Western Cape branch South African Institute of Mechanical Engineers.	2011 - 2016

PUBLICATIONS IN REFEREED AND/OR PEER REVIEWED JOURNALS

M. Saffarini, J.H. Müller, G. La Barbera, G. Hannink, K.J. Cho, C. Toanen, D. Dejour, "Inadequacy of computed tomography for pre-operative planning of patellofemoral arthroplasty", <i>Journal of Mechanics in Medicine and Biology</i> , 2017, doi:10.1007/s00167-017-4474-1	2017
F.J. Wiesner, P.J. Erasmus, KJ Cho, JH Muller, "PATELLOFEMORAL ARTHROPLASTY CHANGES THE TROCHLEAR GROOVE ANGLE," <i>Journal of Sports Engineering and Technology</i> , 2017, doi: http://dx.doi.org/10.1142/S0219519417500683	2017
J. Cockcroft, J.H. Muller, C Scheffer, "Robust tracking of bicycle crank angles using magneto-inertial sensors, domain constraints and functional frame alignment techniques," <i>Journal of Sports Engineering and Technology</i> , 2016, doi: 10.1177/1754337116652048	2016
K. Cho, P. Erasmus, and J. Müller, "The effect of axial rotation of the anterior resection plane in patellofemoral arthroplasty," <i>The Knee</i> , 2016.	2016
J. Müller, T. Zakaria, W. van der Merwe, and F. D'Angelo, "Computational modelling of mobile bearing TKA anterior-posterior dislocation," <i>Computer methods in biomechanics and biomedical engineering</i> , vol. 19, pp. 549-562, 2016.	2016
K. Cho, J. Mueller, and P. Erasmus, "TROCHLEAR GROOVE ALIGNMENT MEASUREMENT METHOD FOR SURGICAL APPLICATIONS," <i>Journal of Mechanics in Medicine and Biology</i> , vol. 15, p. 1540033, 2015.	2015
J. Cockcroft, J. H. Muller, and C. Scheffer, "A Complementary Filter for Tracking Bicycle Crank Angles Using Inertial Sensors, Kinematic Constraints, and Vertical Acceleration Updates," <i>Sensors Journal, IEEE</i> , vol. 15, pp. 4218-4225, 2015.	2015
K. J. Cho, J. H. Mueller, P. J. Erasmus, D. Dejour, and C. Scheffer, "Application of an artificial neural network and morphing techniques in the redesign of dysplastic trochlea," <i>Acta of Bioengineering and Biomechanics</i> , vol. 16, 2014.	2014
J. Cockcroft, J. Muller, and C. Scheffer, "A novel complimentary filter for tracking hip angles during cycling using wireless inertial sensors and dynamic acceleration estimation," 2014.	2014
K. Cho, J. H. Mueller, C. Scheffer, and P. J. Erasmus, "Application of an artificial neural network for the quantitative classification of trochlear dysplasia," <i>Journal of Mechanics in Medicine and Biology</i> , vol. 13, p. 1350059, 2013.	2013
J. van der Merwe, J. Muller, and C. Scheffer, "Parameter Identification and Evaluation of a Proportional Directional Flow Control Valve Model," <i>R\ & D Journal, of the South African Institution of Mechanical Engineering</i> , pp. 18-25, 2013.	2013

- J. H. Mueller, P. J. Erasmus, and C. Scheffer, "Comparison of commercial patellofemoral arthroplasty systems on the basis of patella kinematics, peri-patellar soft tissue tension and prosthesis design," *Journal of Mechanics in Medicine and Biology*, vol. 12, p. 1250086, 2012. 2012
- J. Müller, C. Scheffer, A. Elvin, P. Erasmus, and E. Dillon, "Patella tracking with peripatellar soft tissue stabilizers as a function of dynamic subject-specific knee flexion," *Journal of Mechanics in Medicine and Biology*, vol. 11, pp. 1025-1043, 2011. 2011
- E. M. Dillon, P. J. Erasmus, J. H. Müller, C. Scheffer, and R. V. de Villiers, "Differential forces within the proximal patellar tendon as an explanation for the characteristic lesion of patellar tendinopathy an in vivo descriptive experimental study," *The American journal of sports medicine*, vol. 36, pp. 2119-2127, 2008. 2008
- J. Muller, C. Scheffer, and A. Elvin, "In-vivo detection of patellar tendon creep using a fibre-optic sensor," *International Journal of Medical Engineering and Informatics*, vol. 1, pp. 155-173, 2008. 2008

REFEREED AND/OR PEER REVIEWED CONFERENCE OUTPUTS

- P. G. Menon and J. H. Muller, "Characterization of a Novel Imaging-Based Metric of Patellofemoral Separation Using Computational Modeling," in *Computational Modeling of Objects Presented in Images. Fundamentals, Methods, and Applications*, ed: Springer International Publishing, 2014, pp. 188-203. 2014
- J. Muller, T. Zakaria, E. Renault, and W. van der Merwe, "Application of an in-vivo validated lower body musculoskeletal model as a test platform for different total knee prostheses," in *9th South African Conference on Computational and Applied Mechanics*, 2014. 2014
- J. H. Müller, "Simulating Instrumented Knee Implant Forces With a Simplified Computational Model," in *ASME 2013 Summer Bioengineering Conference*, 2013, pp. V01BT27A001-V01BT27A001. 2013
- J. Muller, "Simulating In-Vivo Tibiofemoral Loads With the Aid of a Customised LifeModeler Musculoskeletal System," in *ASME 2012 Summer Bioengineering Conference*, 2012, pp. 195-196. 2012
- J. Muller, C. Scheffer, P. Erasmus, E. Dillon, and A. Elvin, "Comparison of two commercial patellofemoral prostheses by means of computational modeling," in *Engineering in Medicine and Biology Society (EMBC), 2010 Annual International Conference of the IEEE*, 2010, pp. 5105-5108. 2010
- J. Müller, C. Scheffer, P. Erasmus, E. Dillon, and A. Elvin, "Patellofemoral contact load as a function of the tibial tubercle medial-lateral position," 2009. 2009
- J. Müller, C. Scheffer, P. Erasmus, E. Dillon, and A. Elvin, "Simulation of a volunteer-specific patellofemoral joint," 2009. 2009
- C. Scheffer, D. Frew, T. V. França, M. Del Guerra, and J. Müller, "Development of a High-Speed Sawing Machine through a Global Engineering Team," *Proceedings of the 2007 International Conference on Competitive Manufacturing (COMA'07)*, Stellenbosch, South Africa, vol. 31, pp. 101-106, 2007. 2007

CHAPTERS IN BOOKS

- Müller, Jacobus H. ;van der Merwe, Willem, "Primary Principles in Soft Tissue Balancing" in *Soft Tissue Balancing in Total Knee Arthroplasty*, ed: Matsuda, Shuichi; Lustig, Sébastien; van der Merwe, Willem. Springer Berlin Heidelberg, 2017, pp. 41-48. 2017
- J. Muller, "Computational modelling of knee implants," in *Computational modelling of biomechanics and biotribology in the musculoskeletal system Biomaterials and tissues*. vol. 1, ed: Woodhead Publishing Ltd. Cambridge, UK, 2014, pp. 417-466. 2014

OTHER RESEARCH OUTPUTS

- J.H. Muller, "Articulatio Genus: An overview over the past 10 years' endeavours at BERG. Grand Rounds Lecture at the Albany Bone and Joint Centre. 2016
- P. Erasmus, K. Cho, and J. Muller, "The effect of the anterior cut on the trochlea in PFR," in *17th ESSKA Conference, Barcelona, Spain*, 2016. 2016

P. Erasmus, K. Cho, and J. Muller, "Robot, trochlea and PFJ arthroplasties," in 16 emes Journees Lyonnaises Chirurgies Genou - The young arthritic knee, Lyon, France, 2014. 2014

P. Erasmus, K. Cho, and J. Muller, "Robot, trochlea and PFJ arthroplasties," in 16th ESSKA Congress 14-17 May 2014, Amsterdam, 2014. 2014

STUDENT SUPERVISION RECORD

DEGREE	TOTAL
PHD	3
M.ENG	27
B.ENG	37

RESEARCH FUNDING

Total amount (government and industry) from 2011: R 4 222 040.00 (R 603 149.00/year).

LANGUAGES

Afrikaans – Native language
 English – Speak fluently and read/write proficiently