Kevin Mattheus Moerman
Computational (bio)mechanics & design

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Open Source Projects

GIBBON
The Geometry and Image-Based Bioengineering add-on

Programming

MATLAB ★★★★★
LABVIEW ★★★☆☆
Python ★★☆☆☆
Julia ★★☆☆☆

CAD & FEA

FEBio ★★★★★
ABAQUS ★★★☆☆
PTC/Creo ★★★★★
SolidWorks ★★★☆☆

Robotics Design

References
Prof. Hugh Herr
Dr. Ciaran Simms
Dr. Cees Oomens
Dr. Aart Nederveen

Experience

April. 17 - Now	**Research Scientist**	Biomechatronics, MIT Media Lab, Cambridge, MA, USA

Leader of the *Computational Biomechanics* research track, which focusses on the development of novel computational (and experimental) methods to study tissue biomechanics, and to design devices that interact with tissue. Responsibilities: grant writing, co-supervision of graduate and undergraduate students.

Sept. 15 - April. 17	**Post Doctoral Associate**	Biomechatronics, MIT Media Lab, Cambridge, MA, USA

Development of a framework for automated design and optimization of subject-specific prosthetic sockets. Leader of the *Computational Biomechanics* research track. Responsibilities: Co-supervisor of graduate and undergraduate students.

April 13 - Now	**Visiting Research Fellow**	University of Dublin, Trinity College, Dublin, Ireland

Collaboration on computational biomechanics, inverse finite element analysis, and the use of the GIBBON toolbox.

Jan. 15 - Sept. 15	**Research Affiliate**	Biomechatronics, MIT Media Lab, Cambridge, MA, USA

Development of computational design methods for prosthetic devices. Co-supervisor and co-promotor for a PhD student.

2011 - 2015	**Post Doctoral Research Fellow**	Academic Medical Centre, Amsterdam, The Netherlands

Development of novel methods for non-invasive analysis of soft tissue mechanical properties (and pressure ulcers) based on inversion of Magnetic Resonance Elastography data, SPAMM tagged MRI, and inverse finite element analysis.

2006 - 2008	**Teaching Assistant**	University of Dublin, Trinity College, Dublin, Ireland

Part-time teaching assistant position (during PhD) on MATLAB for undergraduate mechanical engineering students.

2003 - 2006	**Design Engineer**	Lely Technologies N.V., Maassluis, The Netherlands

Design and development of agricultural robotic systems, e.g. a robotic feed pusher and a solar energy powered mobile feeding robot.

Education

May. 17 - June 17	**Kaufman Teaching Certificate Program**	MIT, Cambridge, USA
Jan. 13 - April 13	**Course: Advanced MR Physics**	Universiteit Utrecht, Utrecht, The Netherlands
Aug. 06 - Feb. 12	**PhD in Bioengineering**	University of Dublin, Trinity College, Dublin, Ireland

Thesis: *An Improved Framework for the Inverse Analysis of Skeletal Muscle Tissue In-vivo*. Non-invasive assessment of the mechanical properties of skeletal muscle in-vivo based on dynamic MRI and inverse finite element analysis.

Aug. 08 - Aug. 09	**Postgraduate Diploma in Statistics**	University of Dublin, Trinity College, Dublin, Ireland
Sep. 06	**Course: Advances in Continuum Mechanics**	Durham University, Durham, UK

Mathematics for Engineers EPSRC Summer School: *Advances in Continuum Mechanics, The Nonlinear Deformation of Solids*.

2004 - 2005	**MSc in Bioengineering**	University of Dublin, Trinity College, Dublin, Ireland

Thesis: A Finite Element Model of the Human Head to Predict and Analyse Brain Injury due to Blast-Induced Acceleration

2000 - 2004	**BEng in Mechanical Engineering**	The Hague University of Appl. Sciences, The Hague, NL

Major: *Product Design*. Final Project: *"The Design and Development of an Autonomic Solar Powered, Mobile Concentrate Feeding Robot for Cows"*.
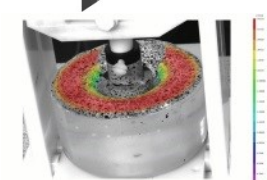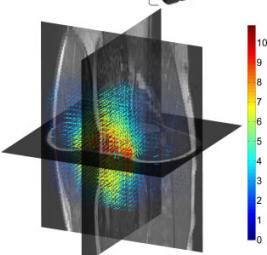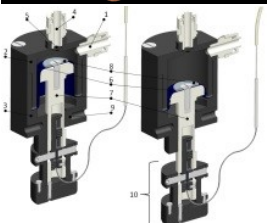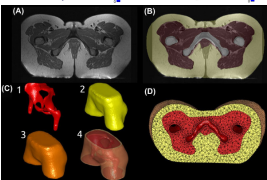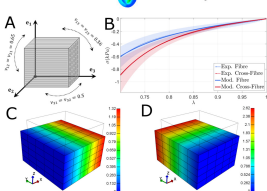
Awards

2010   **Engineers Ireland Biomedical Research Medal 2010**   Engineers Ireland
Awarded at the 16th Annual Bioengineering in Ireland Conference. Paper: *Towards the Non- Invasive Determination of the Mechanical Properties of Living Human Soft Tissue.*

2009   **Bioengineering in Ireland Bronze Medal**   Royal Academy of Medicine Ireland
1st Prize for best overall paper at the 15th Bioengineering in Ireland Conference, awarded by the Royal Academy of Medicine Ireland. Paper: *A validation method for motion tracking techniques based on tagged MRI.*

2005   **KIVI Dutch Bachelor Thesis Prize**   The Royal Netherlands Society of Engineers, KIVI
The 3rd prize for best Dutch bachelor thesis. Thesis: *The Design and Development of Autonomic Solar Powered, Mobile Concentrate Feeding Robot for the Australian Dairy Industry.*

2004   **VSBfonds international student scholarship**   VSBfonds
€ 7000 Scholarship for education or research outside the Netherlands. Awarded to a single shortlisted candidate per university by the VSBfonds organisation.

Selected publications

🛈 Full publication list

- Moerman KM, Sengeh DM, Herr HM. **Automated and Data-driven Computational Design of Patient-Specific Biomechanical Interfaces** *Open Sci. Framew. PREPRINT*

- Moerman, KM et al.. **On the importance of 3D, geometrically accurate, and subject-specific finite element analysis for evaluation of in-vivo soft tissue loads.** *Comput. Methods Biomech. Biomed. Engin. 2017;20:483–491.*

- Moerman KM, Simms CK, Nagel T. **Control of tension-compression asymmetry in Ogden hyperelasticity with application to soft tissue modelling** *J Mech Behav Biomed Mater. 2016;56:218–28.*

- Nagel, T, Görke, UJ, Moerman, KM, Kolditz, O. **On advantages of the Kelvin mapping in finite element implementations of deformation processes** *Environ. Earth Sci. 2016; 75*

- Gindre, J, Takaza, M, Moerman, KM, Simms, CK. **A structural model of passive skeletal muscle shows two reinforcement processes in resisting deformation** *J. Mech. Behav. Biomed. Mater. 2013; 22, 84–94.*

- Moerman KM, Sprengers AMJ, Simms CK, Lamerichs RM, Stoker J, Nederveen AJ. **Validation of continuously tagged MRI for the measurement of dynamic 3D skeletal muscle tissue deformation** *Medical Physics. 2012; 39(4):1793.*

Conference and editorial board experience

2018	**Organizer/chair for special sessions**	World Congress of Biomechanics 2018
April 2017-Now	**Section Editor**	The Journal of Open Hardware
June 2016-Now	**Co-founder, steering committee member**	EngrXiv: The Engineering Archive
March 2016-Now	**Editor**	The Journal of Open-Engineering
Feb 2016-Now	**Co-founder, editor**	The Journal of Open-Source Software
2014	**Organizer/chair for special sessions**	World Congress of Biomechanics 2014
2014	**Committee member, chair special sessions, workshop**	CMBBE 2014
2013	**Organizer/chair for special session**	CMBBE 2013

Extra-curricular activities

2014-2015	**Youth Judo instructor**	Baambrugge, Netherlands
2008-2009	**Vice-Captain, Ju-Jutsu Instructor**	Dublin University Judo Club
2007-2009	**Travel Officer**	Dublin University Photography Association