Kevin Mattheus Moerman

Computational Mechanics & Design Engineer

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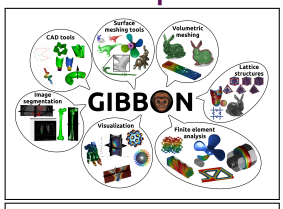
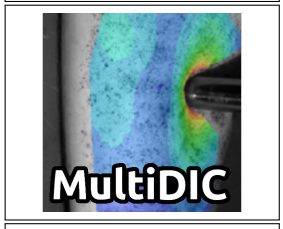
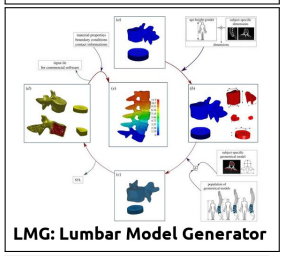
kevinmoerman.org

Software development







Programming

MATLAB ★★★★★
Octave ★★★★★
Julia ★★★☆☆
Python ★★★☆☆
LABVIEW ★★★☆☆
Git/GitHub ★★★★☆
LaTeχ ★★★★★
MarkDown ★★★★★
HTML ★★★★☆

CAD & FEA

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

Robotics

References

Dr. Patrick McGarry
Prof. Hugh Herr
Prof. Ciaran Simms
Prof. Aart Nederveen

Experience

07/2019-Now — **Lecturer Biomedical Engineering** — Biomedical Engineering, NUIG, Galway, Ireland
Responsibilities include teaching undergraduate and post graduate modules, and for supervision of (under)graduate students. Research: computational biomechanics and medical device optimization.

08/2018-Now — **Research Affiliate** — Biomechatronics, MIT Media Lab, Cambridge, MA, USA
Continued collaboration on computational mechanics and device design. Guidance and training of new staff for NIH RO1 clinical trial of prosthetic sockets.

08/2018-07/2019 — **Research Fellow** — Biomedical Engineering, NUIG, Galway, Ireland
The core research focussed on the development of computational tools for in-silico trials of mechanical thrombectomy. Other responsibilities include PhD student guidance and teaching of the module: *Engineering Analysis for Regulatory Approval*.

04/2017-08/2018 — **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 (under)graduate students.

09/2015-04/2017 — **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: grant writing, co-supervision of (under)graduate students.

01/2015-09/2015 — **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.

04/2013-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.

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.

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

08/2019-Now — **PgCert in Teaching and Learning in Higher Education** — NUIG, Galway, Ireland

05/2017-06/2017 — **Kaufman Teaching Certificate Program** — MIT, Cambridge, USA

02/2013-04/2013 — **Course: Advanced MR Physics** — Universiteit Utrecht, Utrecht, The Netherlands

08/2006-02/2012 — **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.

08/2008-08/2009 — **Postgraduate Diploma in Statistics** — University of Dublin, Trinity College, Dublin, Ireland

09/2006 — **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*

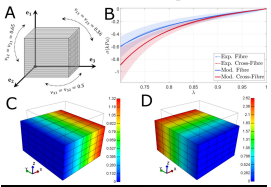
2000 - 2004 — **BEng in Mechanical Engineering** — The Hague University of Appl. Sciences, The Hague, NL
Major: *Product Design*. Final Project: *"The Design and Development of an Autonomic Solar Powered, Mobile Concentrate Feeding Robot for Cows"*.

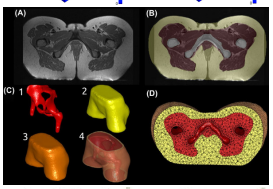
Patents

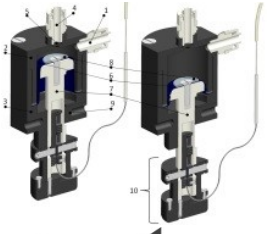
US20190021880A1

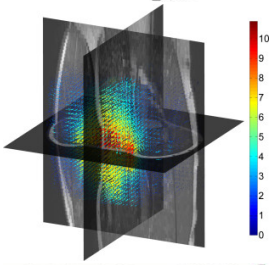
EP1683411

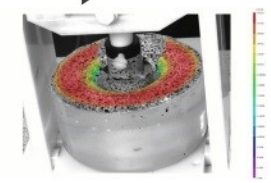
Publication figures











Languages

English ★★★★★
Dutch ★★★★★
German ★★☆☆☆

Membership

Senior Member IEEE
Euro. Soc. for Biomech.
Open Source Initiative

Awards & Grants

2017 **Research grant: $1,600,000 (R01 EB024531-01)** USA National Institute of Health
Herr HM. (PI), Moerman KM.(Key Person), *Computational Design, Fabrication, and Evaluation of Optimized Patient-Specific Transtibial Prosthetic Sockets*

2013 **Research grant: €710,500 (STW 12398)** Netherlands Organisation for Scientific Research
Oomens C.(PI), Nederveen A. (PI), Moerman KM.(Key person), *Early diagnosis and prevention of pressure related deep tissue injury*

2010 **Award: €1000 Engineers Ireland Biomedical Research Medal** Engineers Ireland
Awarded at the 16th Bioengineering in Ireland Conference. Paper: *Towards the Non-Invasive Determination of the Mechanical Properties of Living Human Soft Tissue.*

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

2005 **Award: €1000 Bachelor Thesis Prize** The Royal Netherlands Society of Engineers, KIVI
3rd prize best Dutch bachelor thesis: *The Design and Development of Autonomic Solar Powered, Mobile Concentrate Feeding Robot for the Australian Dairy Industry.*

2004 **Scholarship €7000** VSBfonds
Scholarship to study abroad awarded to a single shortlisted candidate per university

Selected publications (Full list, ORCID profile)

- Moerman KM et al.. **Novel Hyperelastic Models for Large Volumetric Deformations** *Open Sci. Framew. PREPRINT*
- Moerman KM et al.. **Automated and Data-driven Computational Design of Patient-Specific Biomechanical Interfaces** *Open Sci. Framew. PREPRINT*
- Solav D, Moerman KM, Jaeger AM, Genovese K, Herr HM. **A framework for measuring the time-varying shape and full-field deformation of residual limbs using 3D digital image correlation** *IEEE Transactions on Biomedical Engineering, 2019*
- Solav D, Moerman KM, Jaeger AM, Genovese K, Herr HM. **MultiDIC: An Open-Source Toolbox for Multi-View 3D Digital Image Correlation** *IEEE Access 2018;6:30520-30535.*
- Moerman, KM. **GIBBON: The Geometry and Image-Based Bioengineering add-On.** *Journal of Open Source Software. 2018;22:506.*
- 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 et al.. **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 Sciences 2016;75:937-937*

Editorial board experience

04/2017-Now **Section Editor** The Journal of Open Hardware
06/2016-Now **Engrχiv co-founder, steering committee member** EngrXiv: The Engineering Archive
02/2016-Now **Co-founder, Associate Editor in Chief** The Journal of Open-Source Software

Conference session and workshop organization

09/2019 **Organizer/chair of special sessions and workshop** CMBBE 2019
07/2018 **Organizer/chair of special sessions and workshop** WCB 2018
08/2017 **Organizer, host** MozillaScience Working Open Workshop Boston
09/2016 **Organizer, host** Open Source Tools for Computational Biomechanics, IEEE Boston
10/2014 **Committee member, chair special sessions, workshop organizer** CMBBE 2014
07/2014 **Organizer/chair for special sessions** World Congress of Biomechanics 2014
04/2013 **Organizer/chair special session** CMBBE 2013

Extra-curricular activities

2018-Now **Open Science MOOC content and website developer** Open Science MOOC
2017-Now **Developer of the Open Access Clinic website** Open Access Clinic
2018-Now **Volunteer Youth Judo instructor** Galway, Ireland
2008-2009 **Vice-Captain, Ju-Jutsu Instructor** Dublin University Judo Club
2007-2009 **Travel Officer** Dublin University Photography Association