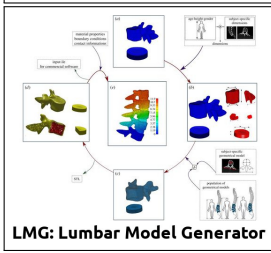
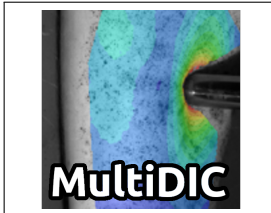




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## Software development



## Programming

MATLAB ★★★★★  
Octave ★★★★★  
Julia ★★★★★  
LABVIEW ★★★★★  
Git/GitHub ★★★★★  
LaTeX ★★★★★  
Markdown ★★★★★  
HTML ★★★★★

## CAD & FEA

FEBio ★★★★★  
ABAQUS ★★★★★  
FreeCAD ★★★★★  
PTC/Creo ★★★★★  
Inventor ★★★★★

## Robotics



## References

Prof. Peter McHugh  
Dr. Patrick McGarry  
Prof. Aart Nederveen  
Prof. Ciaran Simms

# Kevin Mattheus Moerman

## Computational Biomechanics & Design Engineer

7 St.Annes | Lower Dangan | H91T29F Galway | Ireland | +353 876492484 | [kevin.moerman@gmail.com](mailto:kevin.moerman@gmail.com)

## Experience

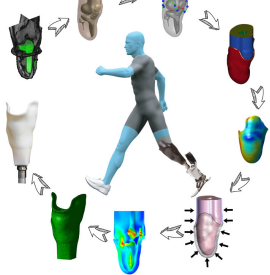
- 07/2019-Now **Lecturer Biomedical Engineering** [Biomedical Engineering, NUIG, Galway, Ireland](#)  
Responsibilities include teaching undergraduate/postgraduate modules (e.g. Comp. Methods in Eng. Analysis, and Advanced FEA), and supervision of (under)graduate students. Research: computational biomechanics 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.
- 04/2013-2018 **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*
- 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

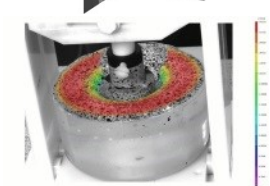
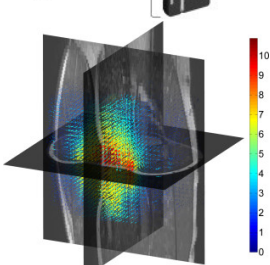
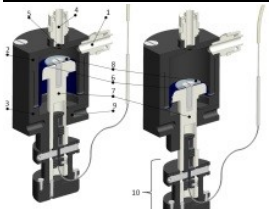
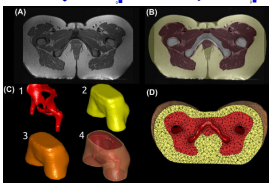
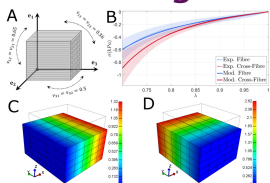
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EP1683411



## Publication figures



## Languages

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

## Membership

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

## Awards & Grants

- 2021 **Research grant: €265,532 (LERO/SFI Platform grant)** [LERO SFI research centre](#)  
Moerman KM (PI), Margaria T.(PI), *An MDD Platform for Automated Computational Design and Optimization of Prosthetic Sockets.*
- 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.*

## Selected publications\*

\*full list available at end of CV or online through [ImpactStory](#) and [ORCID](#) profile.

- Moerman KM et al., **Development of a Patient-Specific Cerebral Vasculature Fluid-Structure-Interaction Model**, *Open Sci. Framew. PREPRINT*, 2021. DOI: 10.31224/osf.io/qaujs.
- Moerman KM et al., **Automated and Data-driven Computational Design of Patient-Specific Biomechanical Interfaces** *Open Sci. Framew. PREPRINT*, 2021. DOI: 10.31224/osf.io/g8h9n.
- Moerman KM et al., **Novel Hyperelastic Models for Large Volumetric Deformations** *Int. J. of Solids and Structures*, 2020. DOI: 10.1016/j.ijsolstr.2020.01.019. [OPEN ACCESS LINK](#)
- Moerman KM., **GIBBON: The Geometry and Image-Based Bioengineering add-On.** *Journal of Open Source Software*, 2018. DOI: 10.21105/joss.00506. [OPEN ACCESS LINK](#)
- 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**, *Comp. Meth. Biomech. Biomed. Engin.*, 2017. DOI: 10.1080/10255842.2016.1250259. [OPEN ACCESS LINK](#)
- Moerman KM et al., **Control of tension-compression asymmetry in Ogden hyperelasticity with application to soft tissue modelling**, *J.Mech.Behav.Biomed.Mater.*, 2016. DOI: 10.1016/j.jmbbm.2015.11.027. [OPEN ACCESS LINK](#)

## Editorial board experience

- 01/2020-Now **Academic Editor** [PLOS ONE](#)  
04/2017-Now **Section Editor** [The Journal of Open Hardware](#)  
06/2016-Now **EngrXiv 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

- 07/2022 **Organizer of special session and workshop** [ESMC 2022](#)  
09/2021 **Organizer of workshop** [CMBBE 2021](#)  
06/2021 **Organizer of workshop** [VPH 2021](#)  
09/2019 **Organizer of special session and workshop** [CMBBE 2019](#)  
07/2018 **Organizer of special session 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, organizer of special session and workshop** [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

- 2019 **Science outreach** [PubhD Galway](#)  
2018-Now **Open Science MOOC content and website developer** [Open Science MOOC](#)  
2017-Now **Developer of the Open Access Clinic website** [Open Access Clinic](#)

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## Published works

This section lists all scientific outputs which includes articles, pre-prints, data, software, hardware, and patents. The list is also available online through my [ORCID](#) and [ImpactStory](#) profile, the latter providing open access links.

## Preprints

- [1] Kevin Mattheus Moerman, Praneeta Konduri, Behrooz Fereidoonhezah, Henk Marquering, Aad van der Lugt, Giulia Luraghi, Sara Bridio, Francesco Migliavacca, Jose Felix Rodriguez Matas, and Patrick McGarry. *Development of a Patient-Specific Cerebral Vasculature Fluid-Structure-Interaction Model*. type: article. engrXiv, Mar. 30, 2021. DOI: [10.31224/osf.io/qaujs](https://doi.org/10.31224/osf.io/qaujs). URL: <https://engrxiv.org/qaujs/> (visited on 05/24/2021).
- [2] Kevin Moerman, Kevin Moerman, David Sengeh, and Hugh Herr. *Automated and Data-driven Computational Design of Patient-Specific Biomechanical Interfaces*. 2016. DOI: [10.17605/OSF.IO/G8H9N](https://doi.org/10.17605/OSF.IO/G8H9N). URL: <http://doi.org/10.17605/OSF.IO/G8H9N>.

## Journal articles

- [1] Fergal B. Coulter, Ruth E. Levey, Scott T. Robinson, Eimear B. Dolan, Stefano Deotti, Michael Monaghan, Peter Dockery, Brian S. Coulter, Liam P. Burke, Aoife J. Lowery, Rachel Beatty, Ryan Paetzold, James J. Prendergast, Gabriella Bellavia, Stefania Straino, Francesca Cianfarani, Monica Salamone, Carmelo M. Bruno, Kevin M. Moerman, Giulio Gherzi, Garry P. Duffy, and Eoin D. O'Cearbhaill. "Additive Manufacturing of Multi-Scale Porous Soft Tissue Implants That Encourage Vascularization and Tissue Ingrowth". In: *Advanced Healthcare Materials* 10.14 (2021), p. 2100229. ISSN: 2192-2659. DOI: [10.1002/adhm.202100229](https://doi.org/10.1002/adhm.202100229).
- [2] B. Fereidoonhezah, K.M. Moerman, S. Johnson, R. McCarthy, and P.J. McGarry. "A new compressible hyperelastic model for the multi-axial deformation of blood clot occlusions in vessels". In: *Biomechanics and Modeling in Mechanobiology* (2021). DOI: [10.1007/s10237-021-01446-4](https://doi.org/10.1007/s10237-021-01446-4).
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- [4] Concannon J, Moerman KM, Hynes N, Sultan S, and McGarry JP. "Influence of shape-memory stent grafts on local aortic compliance." In: *Biomechanics and modeling in mechanobiology* (Dec. 2021). DOI: [10.1007/s10237-021-01514-9](https://doi.org/10.1007/s10237-021-01514-9).
- [5] Nataliya Perevoshchikova, Kevin Moerman, Bardiya Akhbari, Randy Bindra, Jayishni N. Maharaj, David G. Lloyd, Maria Gomez Cerezo, Amelia Carr, Cedryck Vaquette, and David J. Saxby. "Finite element analysis of the performance of additively manufactured scaffolds for scapholunate ligament reconstruction". In: *PLOS ONE* (2021). DOI: [10.1371/journal.pone.0256528](https://doi.org/10.1371/journal.pone.0256528). URL: <http://doi.org/10.1371/journal.pone.0256528>.
- [6] Georgakopoulou T, van der Wijk AE, Bakker ENTP, vanBavel E, and INSIST investigators. "Quantitative 3D analysis of tissue damage in a rat model of microembolization." In: *Journal of biomechanics* (Sept. 2021). DOI: [10.1016/j.jbiomech.2021.110723](https://doi.org/10.1016/j.jbiomech.2021.110723).
- [7] Concannon J, Hynes N, McMullen M, Smyth E, Moerman K, McHugh PE, Sultan S, Karmonik C, and McGarry JP. "A Dual-VENC Four-Dimensional Flow MRI Framework for Analysis of Subject-Specific Heterogeneous Nonlinear Vessel Deformation." In: *Journal of biomechanical engineering* (Nov. 2020). DOI: [10.1115/1.4048649](https://doi.org/10.1115/1.4048649).
- [8] Kevin M. Moerman, Behrooz Fereidoonhezah, and J. Patrick McGarry. "Novel hyperelastic models for large volumetric deformations". In: *International Journal of Solids and Structures* 193-194 (June 2020), pp. 474–491. DOI: [10.1016/j.ijsolstr.2020.01.019](https://doi.org/10.1016/j.ijsolstr.2020.01.019). URL: <https://doi.org/10.1016%2Fj.ijsolstr.2020.01.019>.
- [9] Ted J. Vaughan, Frank Kirrane, Kevin M. Moerman, Tara Cahill, Anthony O'Regan, and Derek T. O'Keeffe. "A Novel Dual Non-Invasive Ventilator Continuous Positive Airway Pressure Non-Aerosolization Circuit for Emergency Use in the COVID-19 Pandemic". In: *Journal of Open Hardware* 4.1 (2020). DOI: [10.5334/joh.23](https://doi.org/10.5334/joh.23). URL: <https://doi.org/10.5334%2Fjoh.23>.
- [10] J. Concannon, P. Dockery, A. Black, S. Sultan, N. Hynes, P. E. McHugh, K. M. Moerman, and J. P. McGarry. "Quantification of the regional bioarchitecture in the human aorta". In: *Journal of Anatomy* (Sept. 2019). DOI: [10.1111/joa.13076](https://doi.org/10.1111/joa.13076). URL: <https://doi.org/10.1111%2Fjoa.13076>.



- [11] Bryan J. Ranger, Micha Feigin, Xiang Zhang, Kevin M. Moerman, Hugh Herr, and Brian W. Anthony. "3D ultrasound imaging of residual limbs with camera-based motion compensation". In: *IEEE Transactions on Neural Systems and Rehabilitation Engineering* (2019), pp. 1–1. DOI: [10.1109/tnsre.2019.2894159](https://doi.org/10.1109/tnsre.2019.2894159). URL: <https://doi.org/10.1109/2Ftnsre.2019.2894159>.
- [12] Dana Solav, Kevin M. Moerman, Aaron M. Jaeger, and Hugh Herr. "A framework for measuring the time-varying shape and full-field deformation of residual limbs using 3D digital image correlation". In: *IEEE Transactions on Biomedical Engineering* (2019), pp. 1–1. DOI: [10.1109/tbme.2019.2895283](https://doi.org/10.1109/tbme.2019.2895283). URL: <https://doi.org/10.1109/2Ftbme.2019.2895283>.
- [13] C. E. Lavecchia, D. M. Espino, K. M. Moerman, K. M. Tse, D. Robinson, P. V. S. Lee, and D. E. T. Shepherd. "Lumbar model generator: a tool for the automated generation of a parametric scalable model of the lumbar spine". In: *Journal of The Royal Society Interface* 15.138 (Jan. 2018), p. 20170829. DOI: [10.1098/rsif.2017.0829](https://doi.org/10.1098/rsif.2017.0829). URL: <https://doi.org/10.1098/2Frif.2017.0829>.
- [14] Kevin Moerman. "GIBBON: The Geometry and Image-Based Bioengineering add-On". In: *The Journal of Open Source Software* (2018). DOI: [10.21105/joss.00506](https://doi.org/10.21105/joss.00506). URL: <http://doi.org/10.21105/joss.00506>.
- [15] A.M. Smith, K.E. Niemeyer, D.S. Katz, L.A. Barba, G. Githinji, M. Gymrek, K.D. Huff, C.R. Madan, A.C. Mayes, K.M. Moerman, P. Prins, K. Ram, A. Rokem, T.K. Teal, R.V. Guimera, and J.T. Vanderplas. "Journal of Open Source Software (JOSS): Design and first-year review". In: *PeerJ Computer Science* 2018.2 (2018). DOI: [10.7717/peerj-cs.147](https://doi.org/10.7717/peerj-cs.147).
- [16] Dana Solav, Kevin M. Moerman, Aaron M. Jaeger, Katia Genovese, and Hugh M. Herr. "MultiDIC: An Open-Source Toolbox for Multi-View 3D Digital Image Correlation". In: *IEEE Access* 6 (2018), pp. 30520–30535. DOI: [10.1109/access.2018.2843725](https://doi.org/10.1109/access.2018.2843725). URL: <https://doi.org/10.1109/2Faccess.2018.2843725>.
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- [18] B. Lin, K.M. Moerman, C.G. McMahan, K.A. Pasch, and H.M. Herr. "Low-Cost Methodology for Skin Strain Measurement of a Flexed Biological Limb". In: *IEEE Transactions on Biomedical Engineering* 64.12 (2017), pp. 2750–2759. DOI: [10.1109/tbme.2016.2626442](https://doi.org/10.1109/tbme.2016.2626442).
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- [21] K.M. Moerman, C.K. Simms, and T. Nagel. "Control of tension-compression asymmetry in Ogden hyperelasticity with application to soft tissue modelling". In: *Journal of the Mechanical Behavior of Biomedical Materials* 56 (2016), pp. 218–228. DOI: [10.1016/j.jmbbm.2015.11.027](https://doi.org/10.1016/j.jmbbm.2015.11.027).
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- [23] D.M. Sengeh, K.M. Moerman, A. Petron, and H. Herr. "Multi-material 3-D viscoelastic model of a transtibial residuum from in-vivo indentation and MRI data". In: *Journal of the Mechanical Behavior of Biomedical Materials* 59 (2016), pp. 379–392. DOI: [10.1016/j.jmbbm.2016.02.020](https://doi.org/10.1016/j.jmbbm.2016.02.020).
- [24] Kevin Moerman and. "Open source publishing to boost your career". In: (2015). DOI: [10.15200/winn.144174.45345](https://doi.org/10.15200/winn.144174.45345). URL: <https://doi.org/10.15200/2Fwinn.144174.45345>.
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- [32] K.M. Moerman, A.M.J. Sprengers, C.K. Simms, R.M. Lamerichs, J. Stoker, and A.J. Nederveen. “Validation of SPAMM tagged MRI based measurement of 3D soft tissue deformation”. In: *Medical Physics* 38.3 (2011), pp. 1248–1260. DOI: [10.1118/1.3533942](https://doi.org/10.1118/1.3533942).
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