

# CURRICULUM VITAE

# LUCA MODENESE

## PERSONAL DETAILS

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Online id Google Scholar: [Luca Modenese](#) (h-index: 25, >1900 citations) | GitHub: [modenaxe](#) | SimTK: [modenaxe](#)

## EMPLOYMENT

- 2022 - present **Senior Lecturer in Biomechanics**, University of New South Wales, Sydney, Australia.
- Awarded a 4-year Scientia Fellowship from the University of New South Wales (\$200,000 / €132,000).
  - Currently establishing a state-of-the-art neuro-mechanics laboratory with gait analysis and high-density electromyography recording capabilities.
- 2017 - 2021 **Group Leader and Independent Research Fellow in Biomechanics**, Imperial College London, UK.
- Awarded more than £245,000 (€278,000) of funding from UK national sources.
  - Established and leading own research group (3 PhD students plus up to 2 MSc students per year).
- Published 13 papers in international journals.
- 2015 - 2017 **Postdoctoral Research Associate**, University of Sheffield, UK.
- Developed workflows to create “digital twins” of musculoskeletal system of children with juvenile idiopathic arthritis in the project “MD-Paedigree” (European Research Council).
  - Awarded a 4-year Imperial College Research Fellowship (£645,460 / €732,000).
  - Published 19 papers in international journals.
- 2013 - 2015 **Postdoctoral Research Associate**, Griffith University, Australia.
- Contributed to multiple projects in subject-specific modelling of the musculoskeletal system of healthy and clinical populations (cerebral palsy, osteoarthritis).
  - Awarded two early career grants from Griffith University and a visiting scholarship from Stanford University.
  - Published 5 papers in international journals, one of which was awarded a university-level prize.

## EDUCATION

- 2008 - 2013 Ph.D. in biomechanics and musculoskeletal modelling, Imperial College London. Degree awarded on the 1st March 2013.
- 2005 - 2008 Master's degree in Mechanical Engineering, University of Padua - Grades 110/110 magna cum laude.
- 2001 - 2004 Bachelor's degree in Mechanical Engineering, University of Padua - Grades 104/110.
- 2000 - 2001 Completed first year of Philosophy, Dept. of Literature and Philosophy, University of Padua - Grades 30/30.
- 1995 - 2000 Scientific High School Diploma, Liceo “G.B. Ferrari”, Este, Padova, Italy - Grades 98/100.

## PROFESSIONAL QUALIFICATIONS

- 2021 Nanodegree in “Deep Learning” from Udacity (4-month program).
- 2019 Associate Fellow of the Higher Education Academy (AFHED). Awarded by Higher Education Academy.
- 2018 “National Academic Qualification” as Associate Professor in Bioengineering, awarded by the Italian Ministry of Education (MIUR).
- 2018 “National Academic Qualification” as Associate Professor in Exercise and Sports Sciences, awarded by MIUR.
- 2017 “Introduction to R for Data Science”, Microsoft Professional Program in Data Science. Awarded by Microsoft via Edx.org.
- 2017 “Programming with R for Data Science”, Microsoft Professional Program in Data Science. Awarded by Microsoft via Edx.org.

## PROFESSIONAL MEMBERSHIPS

- 2013 - present Australia and New Zealand Society of Biomechanics.
- 2010 - present European Society of Biomechanics.
- 2009 - present International Society of Biomechanics.
- 2008 - present International Shoulder Group.

## TEACHING ACTIVITIES

- 2022 Lecturer in the Graduate School of Biomedical Engineering, University of New South Wales, Australia.  
Course BIOM9561: “Mechanical Properties of Biomaterials”.

- 2021 Guest lecturer in the Dept. of Industrial Engineering, University of Padua, Italy.  
Course: "Sports engineering and rehabilitation devices" for MSc in Mechanical Engineering and MSc in Bioengineering.
- 2019 Qualified Instructor of the [Software Carpentries](#) to run workshops and teach computing skills to researchers.
- 2019 Contract lecturer in the Dept. of Industrial Engineering, University of Padua.  
Course: "Sports engineering and rehabilitation devices" for MSc in Mechanical Engineering and MSc in Bioengineering.
- 2018 Lecturer at the OpenSim European Workshop, Leuven University, Belgium.
- 2018 Lecturer at the 2nd French OpenSim Workshop, Poitiers University, France.
- 2017 Lecturer at the 1st French OpenSim Workshop, Institut de Biomecanique G. Charpak, Paris, France.
- 2016 Lecturer at the OpenSim European Workshop, Bologna, Italy.
- 2013 Lecturer in the School of Allied Health Sciences of Griffith University, QLD, Australia.  
Course: "Neuroscience I" for Physiotherapy students, module on reflexes.
- 2013 Contract lecturer in the Dept. of Industrial Engineering, University of Padua, Italy.  
Course: "Sports engineering and rehabilitation devices" for MSc in Mechanical Engineering and MSc in Bioengineering.
- 2010 Contract lecturer in the Dept. of Industrial Engineering, University of Padua, Italy.  
Course: "Sports engineering and rehabilitation devices" for MSc in Mechanical Engineering and MSc in Bioengineering.
- 2010-2012 Graduate Teaching Assistant (GTA) for multiple courses in the Dept. of Civil and Environmental Engineering and Dept. of Bioengineering of Imperial College London. This included marking and developing new course materials.

### **AWARDS, EVIDENCE OF ESTEEM AND EXTERNAL VISIBILITY**

- 2022 Senior author of work awarded "Young Investigator Award" at XXVI Congress of International Society of Biomechanics.
- 2021 "Athanasiou ABME Award" for best article published in Annals of Biomedical Engineering by a postdoctoral researcher.
- 2021 Paper listed among "Top 25 most cited articles" of Journal of Biomechanics (04/2021) for previous 3 years.
- 2019 Two papers listed amongst "Most Cited Articles" of "Journal of Biomechanics" since 2016.
- 2019 Two papers listed amongst "Most Cited Articles" of "Gait and Posture" since 2016.
- 2018 OpenSim webinar (>7000 visualisations), recording available at [https://www.youtube.com/watch?v=0e6vQV\\_ioCI](https://www.youtube.com/watch?v=0e6vQV_ioCI).
- 2017 Publication of the year of the Australia and New Zealand Society of Biomechanics (co-author).
- 2016 Winner of the INSIGNEO Showcase image competition.
- 2016 Co-author of paper awarded "Young investigator award" at ABC10 (10th Australasian biomechanics conference).
- 2016 Co-author of work awarded "Best podium presentation award" at ABC10 (10th Australasian biomechanics conference).
- 2015 Paper of the Year for Musculoskeletal Research, Pro-Vice-Chancellor Research Excellence Awards, Griffith University, Australia. (first author).
- 2015 - present Adjunct Research Fellow in the Menzies Health Institute Queensland, Griffith University, Australia.
- 2014 - present Inaugural fellow on the "OpenSim Fellows" program, National Centre for Simulation in Rehabilitation Research of Stanford University, to recognise deep expertise in biomechanical modelling and simulation.
- 2013 Awarded a visiting scholar fellowship by the National Centre for Simulation in Rehabilitation Research, Stanford University.

### **INVITED TALKS**

- 2022 Nov 27-29, invited speaker at ABC13 (13th Australasian biomechanics conference)
- 2022 Jul 10-14 (virtual), session: "Modelling in Neuromechanics", 9th World Congress of Biomechanics.
- 2022 Jul 10-14 (virtual), session: "ISB 50 Years of International Biomechanics", 9th World Congress of Biomechanics.
- 2021 Apr 23 (virtual), OActive Conference, organized by the EU-funded OActive project.
- 2021 Mar 4 (virtual), University of Sheffield, Dept. Mechanical Eng, UK.
- 2021 Mar 3 (virtual), University of Aberdeen, School of Engineering, UK.
- 2019 Apr 17, University of Padua, Dept. of Industrial Engineering, Italy.
- 2018 Nov 8-9, "SimCP Symposium", Leuven, Belgium.
- 2018 Jun 26-27, "Forum Biomechanics Poitiers", Poitiers, France.
- 2018 Apr 26-28, University of Bath, Dept. for Health, Bath, UK.
- 2017 Jul 21, Griffith University, School of Allied Health Sciences, Australia.
- 2016 Apr 13, Liverpool John Moores University, Biomechanics Group, Liverpool, UK.

- 2016 Nov 13, University of Bath, Department of Health, Bath, UK.
- 2016 Jun 8, Keele University, Bioengineering Group, Keele, UK.
- 2014 Nov 6, University of Veterinary Science, Movement Science Group, Vienna, Austria.
- 2012 Feb 29, Liverpool John Moores University, Biomechanics Group, Liverpool, UK.

### **ATTENDED INTERNATIONAL CONFERENCES**

- 2022 July 10-14 (virtual), 9th World Congress of Biomechanics, Taipei, Taiwan
- 2021 Oct 6-8 (virtual), 26th Australian New Zealand Orthopaedic Society (ANZORS) Annual Conference.
- 2021 Jul 25-29 (virtual), XXVI Congress of International Society of Biomechanics (ISB2021), Stockholm, Sweden.
- 2021 Jul 21-23 (virtual), XVIII International Symposium on Computer Simulation (TGCS).
- 2020 Sep 7-8 (virtual), British Orthopaedic Research Society (BORS) annual meeting.
- 2019 Jul 31- Aug 4, ISB/ASB 2019 (XXVII Congress of International Society of Biomechanics), Calgary, Canada.
- 2018 Jul 8-12, 8th World Congress of Biomechanics, Dublin, Ireland.
- 2017 Jul 23-27, XXVI Congress of International Society of Biomechanics, Brisbane, Australia.
- 2016 Jul 10-13, 22nd Congress of European Society of Biomechanics, Lyon, France.
- 2015 Jul 12-16, XXV Congress of International Society of Biomechanics, Glasgow, Scotland, UK.
- 2014 Jul 6-11, 7th World Congress of Biomechanics, Boston, MA, USA.
- 2013 Aug 1-3, XIV International Symposium on Computer Simulation (TGCS), Natal Brazil.
- 2013 Aug 04-09, XXIV Congress of International Society of Biomechanics, Natal, Brazil.
- 2013 Apr 3-7, 11th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Salt Lake City, Utah.
- 2011 Jul 03-07, XXIII Congress of International Society of Biomechanics, Brussels, Belgium.
- 2011 Mar 9-12, Colloquium 511 of European Mechanics Society: Biomechanics of Human Motion, Ponta Delgada, Azores, Portugal.
- 2010 Aug 1-6, 6th World Congress of Biomechanics (WCB2010), Singapore.
- 2010 Jul 5-8, 17th Congress of European Society of Biomechanics, Edinburgh, Scotland, UK.
- 2009 Jul 5-9, XXII Congress of International Society of Biomechanics, Cape Town, South Africa.
- 2008 Jul 10-13, VII Congress of the International Shoulder Group, Bologna, Italy.

### **CHAired SESSIONS AT CONFERENCES**

- 2022 Session: "Modelling in Neuromechanics: From Simulations to Clinical Applications", 9th World Congress of Biomechanics (virtual)"
- 2021 Session: "Orthopaedic Biomechanics session", XXVI Congress of European Society of Biomechanics, Milan, Italy.
- 2017 Session: "5.8 Experimental technologies", XXVI Congress of International Society of Biomechanics (ISB), Brisbane, Australia.
- 2015 Session: "Modelling & Computer Simulation 9", XXV Congress of ISB, Glasgow, Scotland, UK.
- 2015 Session: "Predictive Modelling of the Musculoskeletal System", XXV Congress of ISB, Glasgow, Scotland, UK.
- 2011 Session: "Musculoskeletal Modelling – Tools", XXIII Congress of ISB, Brussels, Belgium.

### **PERIODS AS VISITING RESEARCHER**

- 2019 Apr-May, Dept. of Industrial Engineering of the University of Padua, hosted by Dr N. Petrone.
- 2014 Nov-Mar 2015, Dept. of Management and Engineering of the University of Padua, hosted by Dr M. Reggiani.
- 2013 Oct-Nov, Auckland Bioengineering Institute, hosted by Dr T. Besier and Dr J. Fernandez.
- 2013 Jul-Oct, Neuromuscular Lab at Stanford University funded by a visiting scholar fellowship.

### **EDITORIAL, REFEREE AND CONSULTANCY WORK**

- 2022-present Member of Editorial Board of Scientific Reports (<https://www.nature.com/srep>).
- 2021 Guest Associate Editor for Frontiers in Sports and Active Living, Biomechanics and Control of Human Movement, Topic: Neuromechanics of Hip Osteoarthritis.
- 2017 - present Grant reviewer for agencies and universities, including Leuven University, Vrije Universiteit Brussel and NFRFE (Canada).
- 2011 - present Reviewer for more than 15 international journals. See details on Publons verified record (<https://publons.com/a/1179084>).

## PARTICIPATION AND ORGANIZATION OF OUTREACH EVENTS

- 2019 "Patient and Public Involvement Group" event at Charing Cross Hospital, London, UK (presenter).
- 2017 "MultiSim Modelathon", multiscale modelling competition event, University of Sheffield, UK (co-organiser).
- 2017 Sheffield Festival of science 2017, event "Dem Bones Gonna Walk Around", Sheffield, UK.
- 2017 "University options in Engineering, Science and Math (STEM)", outreach events organised by the University of Sheffield to present STEM academic options to school children (volunteer).
- 2016 "MultiSim Modelathon", multiscale modelling competition event, University of Sheffield, UK (co-organiser).

## OPEN-SOURCE PROJECTS AND PUBLIC RESOURCES

- 2021 Tools for deforming the bones of existing OpenSim musculoskeletal models: <https://github.com/modenaxe/msk-bone-deformation>.
- 2021 STAPLE (Shared Tools for Automatic Personalised Lower Extremity modelling) MATLAB toolbox, (>4500 visitors): <https://github.com/modenaxe/msk-STAPLE>
- 2020 "Awesome Biomechanics", a curated list of public biomechanical resources (>30,000 access, >350 stars): <https://github.com/modenaxe/awesome-biomechanics>.
- 2018 A step-by-step guide and MATLAB scripts to generate subject-specific musculoskeletal models from medical images (>2800 combined downloads): <https://doi.org/10.15131/shef.data.5863422> and <https://doi.org/10.15131/shef.data.6392423>.
- 2018 A plugin to compute joint angles from inertial measurement unit orientations using an inverse kinematics approach: <https://github.com/RehabEngGroup/ob-ik-opensim-plugin>.
- 2017 Teaching materials (slides and tutorials) on musculoskeletal biomechanics used in public workshops: <https://stanford.io/2HQIU2k>.
- 2017 Involved as tester in the development of NMSBuilder (<http://www.nmsbuilder.org>) and BuilderM2O (<http://www.builderm2o.org>).
- 2016 A plugin and MATLAB tool to optimize muscle parameters in musculoskeletal models (>300 downloads): [https://simtk.org/projects/opt\\_muscle\\_par](https://simtk.org/projects/opt_muscle_par).
- 2016 A knee model to estimate joint moments in the frontal plane (>180 downloads): <https://simtk.org/projects/knee-front-mom>.
- 2013 A plugin to interface musculoskeletal models with finite element packages (>1600 downloads): [https://simtk.org/projects/force\\_direction](https://simtk.org/projects/force_direction)
- 2011 An open source lower limb model (>1600 downloads) usable to estimate hip joint contact forces: [https://simtk.org/projects/low\\_limb\\_london](https://simtk.org/projects/low_limb_london).

## LANGUAGES

- Italian (native)
- English (excellent)
- Spanish (fluent)
- French (beginner)

## OPERATIVE SYSTEMS

- Microsoft Windows, including Office package
- GNU/Linux (Ubuntu)
- VirtualBox and Vagrant (OS virtualization)

## PROGRAMMING LANGUAGES

- MATLAB
- Python
- Deep Learning libraries: Keras, Pytorch
- Version control software: SVN and Git, including Github and BitBucket

## BIOMECHANICAL SOFTWARE

- Modelling software: OpenSim, NMSBuilder
- Motion Capture Software: Biomechanical Toolkit (BTK), MOKKA, Vicon Nexus
- Segmentation software: Materialise Mimics and 3-Matic, ITK-Snap
- Mesh manipulation: Autodesk NetFabb, Meshlab
- Finite Element Software: FEBio

## BIOMECHANICAL EQUIPMENT

- Motion capture systems (Vicon, BTS SMART)
- Force Plates (Kistler, AMTI)
- Inertial Measurement Units (Cometa, XSense)
- Electromyography (EMG) recording (BTS Pocket EMG, Myon 320)