CURRICULUM VITAE

Saulo Martelli
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Employment history

2020 - **Associate Professor** in biomechanics (School of Mechanical, Medical and Process Engineering, ***Queensland University of Technology***).

2019 – 2023 **ARC Future Fellow** (School of Mechanical, Medical and Process Engineering, ***Queensland University of Technology)*** on human femur micro-mechanics (annexes).

2019 – 2020 **Senior Lecturer** (College of Science and Engineering, ***Flinders University***). Role: musculoskeletal mechanics, orthopaedic devices, physical exercise.

2015 – 2018 **Lecturer** (College of Science and Engineering, ***Flinders University***).

2014 – 2017 **ARC-DECRA fellow** (Medical Device Research Institute, ***Flinders University***). Role: human femur mechanics (annexes).

2011 – 2013 **Post-doc research fellow** (Dep. of Mechanical Engineering, ***University of Melbourne***, head Prof. Pandy). Research: musculoskeletal mechanics during physical exercise (annexes)

2004 – 2011 **Post-doc research fellow** (Medical Technology Lab., ***Rizzoli Orthopaedic Institute***, head: Prof. Viceconti)**.** Role: personalized modelling, orthopaedics, clinical software (annexes).

2003 – 2004 **Research assistant (**Medical Technology Lab., ***Rizzoli Orthopaedic Institute***, Italy)**.** Role: personalized modelling, orthopaedics, clinical software (annexes).

1997 – 2004 **Interruption** (mechanical engineering studies)

1991 – 1997 **Draughtsman**. (***I.M.A. S.p.a.****, Italy).* Packaging industry.

Academic history

2005 – 2008 **Ph.D. in Biomechanical Engineering**, University of Bologna, Italy**.** Dissertation: *"[…]design and the pre-clinical validation of hip resurfacing prosthesis*".

2006 – 2007 **TUDelft, Visiting student (**Biomechanical lab., head: Prof. Van der Helm). Subject: "*Scaling techniques to register upper-limb shoulder models to patient data"* (annexes).

2007 **Bone Cell and Tissue Mechanics**, by Stephen C. Cowin (Univ. of NY, US). (1 week)

2005 **Annual Bioengineering School,** Bressanone, Italy. Bioengineering school (1 week).

2001 **Composite Materials Design and Manufacturing**, Univ. of Bologna & Boeing Inc. (1 week).

1997 – 2003 **M.S. in Mechanical Engineering (*Summa cum laude).*** University of Bologna, Italy**.** "*Sensitivity of the femoral bone strains to the variability of muscle forces during level walking*".

Research funding

2020 – **CI.** Bone Health Foundation ($25k, Intrinsically Stable Total Knee Arthroplasty)

2019 – **CI.** SPARC, India. Ferromagnetic coating for hip stems.

2020 – 2024 **CI.** ARC Training Centre for Joint Biomechanics ($4M)

2019 – 2020 **CI.** ARC Training Centre for Medical Implant Technology ($4M)

2019 – 2023 **PI.** ARC Future Fellow ($1.3M, Hip micromechanics)

2018 **PI.** Flinders' seed grant. ($35k, Personalized exercise therapy)

2018 – 2022 **PI.** ARC Discovery Project ($450k, Knee ligament function)

2018 **PI.** Austofix Australia PTY LTD ($10k, Hip nail system)

2018 **CI.** Int. Society for Prosthetic and Orthotics ($20k)

2016 – 2019 **PI.** Flinders' Establishment grant (Value: $30k)

2013 – 2017 **PI.** ARC-DECRA Fellow ($450k, Modelling hip fracture)

2012 – 2013 **PI.** Early Career Research grant, The University of Melbourne ($20k)

2009 – 2011 **Co-I.** NMS Physiome. EC funding: €929k

2008 – 2012 **Co-I.** Virtual Physiological Human. EC funding: € 9M

2006 – 2009 **Co-I.** Living Human Digital Library. EC funding: € 2.2M

Current projects

1. Gender- and age-related variations of femoral micromechanics.
2. The relationship between anatomy, laxity, and knee function in healthy adults.
3. In vitro real-time load replication of physiological activity.
4. Computer-aided personalized design of external prosthesis in amputees
5. Computer-aided personalized design of massive pelvic reconstruction in cancer
6. Virtual clinical trials of joint replacement stability
7. In vitro replication of impact loads resulting from a fall
8. 3D assessment of locomotor changes following botulin toxin injection in spasticity.
9. Personalized exercise therapy for bone health.

Visitors (since 2020)

2020 - Kieran Bennett, University of Adelaide
2021 - Stuart Callary, University of Adelaide (ASMR Research Award)
2021 - Ferdinando Simoncelli, University of Bologna (travel grant).

Invited/Keynote Talks (since 2014)

2021	Invited lecturer: Department of Physics and Astronomy, The Univ. of Bologna, July 7th.
2021	Invites speaker: Italian Research Day in Queensland, Brisbane, April 15, 2021
2021	Perspective talk. European Society of Biomechanics, Milano (Italy), 12 – 15 July 2020
2019	Keynote speaker. 23rd Int. Conference Information Visualisation, Adelaide, 16 – 19 July 2019
2019	Invited speaker. Australian & NewZealand Bone and Mineral Society, Darwin, Oct. 27–30, 2019
2019	Invited speaker. Depuy strategic meeting on knee repl. @ORS2019, Feb. 2–5, Austin (TX).
2018	Invited speaker. Royal Adelaide Hospital, Orthopaedic and Trauma, Dec. 5th, 2018, Adelaide
2018	Keynote speaker. 8th World Congress of Biomechanics, 8-12, July, Dublin
2018	Invited speaker. 8th World Congress of Biomechanics, 8-12, July, Dublin
2017	Invited speaker. XXVI International Society of Biomechanics, 23-7 July, Brisbane, Australia
2016	Invited speaker. Italian Research Down Under, 17-18 Nov 2016, Adelaide, SA, Australia
2016	Invited speaker. 10th Australian Biomechanics Conference, Melbourne, Australia, Dec 4-6.
2016	Invited speaker. 9th Clare Valley Bone Meeting, Clare, South Australia, April 1-4.
2015	Invited speaker. Insigneo institute for in silico medicine, The University of Sheffield, July 5-8.
2015	Invited speaker. European Society of Biomechanics, July 10-13, Lyon, France.
2015	Invited speaker. Musculoskel. Research Program, Griffith Health Inst., June 5th, Brisbane, AU
2015	Invited speaker. European Society of Biomechanics, Prague (Czech Republic), July 5-8.
2014	Invited speaker. WCO IOF-ESCEO14, Seville, Spain, April 2-5.
2014	Invited speaker. Orthopaedic & Trauma Service, Royal Adelaide Hospital, March 19th.

Prizes and Honours

2018	Finalist best ECR presentation, ANZORS conf., Oct. 5-7, Perth
2018	Finalist best PhD presentation, ANZORS conf., Oct. 5-7, Perth
2014	Honorary member of the North West Academic Centre of the University of Melbourne.
2014	Prime minister prizes for science (Invited), Oct 29th, Parliament House, Canberra, Australia
2013	Early Career Researcher Award (1st prize), ANZORS conf., Sept. 4-5, Sydney
2012	Early Career Researcher Award (2nd prize), ANZORS conf., Aug 30-Sept 1, Perth

Teaching

2021	Topic coordinator and lecturer: Dynamics (EGB211)
2018	Topic coordinator and lecturer: 1. Advanced Biomech.; 2. Finite-element; 3. Sports Biomech.
2017	Topic coordinator and lecturer: 1. Advanced Biomech.; 2. Finite-element methods
2015 – 16	Lecturer: Advanced Biomechanics.
2013 – 14	Guest lecturer. Advanced biomechanics.
2007 – 10	Guest lecturer & training in Computational Biomechanics, University of Bologna, Italy.

PhD supervision

2021 –	Supervisor: Francesca Bucci; Marco Giuseppe Branni. Xiaolong Fan, Natali Uribe Costa; Arun Jolly. Co-supervisor: Kieran James Bennett; Max Lavill; Michael Lennon
2020 –	Supervisor: Francesca Bucci; Marco Giuseppe Branni. Xiaolong Fan; Co-supervisor: Kieran James Bennett; Max Lavill; Michael Lennon
2019 –	Supervisor: Francesca Bucci; Marco Giuseppe Branni; Co-supervisor: Kieran James Bennett; Michael Russo; Tirad Sulaiman Alsharari
2016 – 19	Hamed Ziaei Poor (Co-sup). Surrogate modelling of implant mechanics. Flinders University.
2016 – 19	Ashwin Dhanasekaran (Co-sup). Modelling bone graft impaction. Flinders University.
2014 – 17	Giuliano Lamberto (Co-sup). Knee mechanics. The University of Sheffield (UK).
2015 – 18	Bart van Veen (Co-sup). Muscle recruitment. The University of Sheffield (UK)
2007 – 11	Giordano Valente (Co-sup). Musculoskeletal modelling. The University of Bologna (IT)

Undergraduates supervision

2021	Capstone project on reverse shoulder arthroplasty (2)
2021	Honours students (Ferdinando Simoncelli)
2020	Two international Honours students (Daniela, Anna Maria)
2019	Two Honours students
2018	One Honours students, one master student
2017	Two Honours students
2016 – 8	Advanced studies (1 medical student, Clare Baxter)
2016	Three (3) master students.
2015	Two (2) master students.
2014	Three (3) honours students (B. Trentin, D. Bass, M. Williams).
2013	Eight (8) summer students.
2007 – 11	Six (6) final year students (Hon.), one (1) summer student.

Postgraduate supervision

2019 - 2020	2 post-doc (Virtual Human Knee: ARC-DP)
2018	1 post-doc (Femoral micromechanics)
2016	2 research assistants (knee mechanics).
2015	1 research assistant (femoral mechanics).

Work Integrated learning (WIL/capstone)

2021	two capstone projects
2018	9 student projects (academic supervisor)
2017	9 student projects (academic supervisor)
2016	1 student (academic supervisor).

Internships

2020	1 undergraduate students (ISFIC, Besancon, France)
2019	1 undergraduate students (ISFIC, Besancon, France), 1 post-doc (Univ. of Southampton)
2018	2 undergraduate students (ISFIC, Besancon, France)
2018	1 visiting post-doc (Dynamic tests of hip fracture. The University of Bologna, Italy)
2017	2 undergraduate students (NYP, Singapore)
2017	1 undergraduate student (Hip response to exercise, ISFIC, Besancon, France)
2017	1 visiting (post-doc) student (Femoral fracture during side-fall. The University of Bologna, Italy)
2017	1 PhD student. (Modelling muscle recruitment, The University of Sheffield, UK).
2016	1 undergraduate student (Knee ligament testing, ISFIC, Besancon, France)
2016	1 PhD student. (Measuring knee stability. The University of Sheffield, UK).
2015	2 undergraduate students (ISFIC, Besancon, France)

Referring (peer-review journals)

1. Journal of Biomechanics; 2. Annals of Biomedical Engineering; 3. Journal of Biomechanical Engineering; 4. Medical Engineering and Physics; 5. Philosophical Transactions of the Royal Society; 6. Clinical Biomechanics; 7. Human Movement Science; 8. Journal of the Mechanical Behavior of Biomedical Materials; 9. Multibody System Dynamics;10. Journal of Engineering in Medicine Part H; 11. Computer Methods in Biomechanics and Biomedical Engineering; 12. Bone;13. Biomechanics and Modeling in Mechanobiology; 14 Journal of Bone and Mineral Research; 15 Science Report

Assessor (research grants)

1. Australian Research Council (AU); 2. National Health and Medical Research Council (AU); 3. Engineering and Physical Sciences Research Council (UK); 4. Eidgenössische Technische Hochschule Zürich (ETHzürich, CH); 5. Natural Sciences and Engineering Research Council (Canada).

Editorial board

Journal of Orthopaedic Surgery and Research; Frontiers in Bioengineering and Biotechnology

Community engagement

- 2020 - MMPE Scientific Review Panel (QUT)
- 2017 – 2020. Member of the Finders University's Self-Assessment Team (ATHENA-SWAN).
- *Conference chair (since 2015):*
    - European Society of Biomechanics, 2019, Vienna, Austria;
    - International Society of Biomechanics, 2017, Brisbane, Australia;
    - Australian Biomechanics Conference (ABC10), 2016, Melbourne, VIC, Australia;
    - Australian and New Zealand Orth. Research Society (ANZORS), 2016, Melbourne, Australia;
    - European Society of Biomechanics, 2016, Lyon, France;
    - European Society of Biomechanics, 2015, Prague, Czech Republic;
- *Conference committee for Early Carer Award (since 2015):*
    - Australian Biomechanics Conference (ABC10), 2016, Melbourne, VIC, Australia;
    - Australian and New Zealand Orth. Research Society (ANZORS), 2016, Melbourne, Australia;
    - European Society of Biomechanics, 2016, Lyon, France;
    - European Society of Biomechanics, 2015, Prague, Czech Republic;
- *Conference co-organizer:*
    - Australian Society of Biomechanics, Adelaide, 2020
    - Instructional course (NMSBuilder), 23th Cong. Int. Society of Biomechanics, July 3-7, 2011, Belgium.
    - Instructional course, IV Int. Congr. on Comp. Bioengineering, Sept 16-18th, 2009, Bertinoro, Italy
    - Biomechanics session, Forum Bone Mineral Research, Napoli, Italy, October 22-24, 2008.

Memberships (current)

Australasian Biomechanics Conference (from 2016).
Australian & New Zealand Orthopaedic Research Society (ANZORS) (from 2012).
European Society of Biomechanics (ESB) (from 2009).

Academic collaborations (current)

2019 –	Dieter Pahr, Institute of Lightweight Design and Structural Biomech., TU Wien, Austria
2017 –	Ritchie School of Engineering and Computer Science, University of Denver CO, USA
2013 –	University of Sheffield, UK (Prof. M Viceconti, Dr. Dallara, Dr. Mazza')
2012 –	Queensland University of Technology (Prof. Peter Pivonka; Bone adaptation).
2012 –	The University of Melbourne (Prof. Marcus Pandy. Human motion).

Professional roles and industry engagement

2021 –	Zimmer – smart reverse shoulder implants

2017 – Austofix Australia PTY LTD (South Australia) – performance analysis of femoral neck nails
2016 – Medacta International (Switzerland) - performance analysis of implantable devices.
2006 – 9 Stryker Orthop.-Benoist Girard, Hérouville Saint Clair, Fr, Design of SAFER stem (annexes)

Skills

- **Languages:** Italian (mother tongue), English.
- **Organizational skills**: leadership; organizational and project management.
- **Technical skills**: computer simulation, multibody dynamics, imaging, solid mechanics, machine learning, mechanics of biological tissues, 6DOF dynamic testing, time-lapsed synchrotron-light imaging and concomitant mechanical testing, strain gauging, Digital Images/Volume correlation
- **Social skills**: team spirit, adaptability, communication.
- **Hobbies**: Skiing, Cycling, Scuba diving, Fishing, Soccer.

Annex 1

(i) Data sets;

2. Lamberto G.; Amin D.; Solomon L.B.; Ding B.; Reynolds K.R.; Mazza C., **Martelli S.**, 2019, Data for "Personalised 3D knee compliance from clinically viable knee laxity measurements: A proof of concept ex vivo experiment" https://doi.org/10.1016/j.medengphy.2018.12.003

1. **Martelli**, S., Perilli, E., 2016. Time-lapsed microstructural images of femoral neck fractures in elderly Caucasian women (doi:dx.doi.org/10.5072/86/57BFD2029A263)

(i) Scholarly book chapters.

4. **Martelli**, Al-Dirini, Van Sint Jan, Medicine and the virtual physiological human in Digital Human Modelling (DHM) and Posturography. 2019. Medicine and Virtual Physiological Human, in: DHM and Posturography. pp. 577–589.
3. **Martelli S.**, Perilli E., Ruthenbeck G.S., Bala Y., Taylor M., Reynolds K.J. 2015. A new software pipeline for the micro-structure finite-element analysis of the proximal femur. 4th International Conference on Computational and Mathematical Biomedical Engineering – CMBE2015, 29 June - 1 July 2015, Paris. ISSN 2227-9385. ISBN: 978-0-9562914-3-1.
2. **Martelli S.**, Pivonka P., Ebeling P.R. (2014) Investigation of Determinants of Atypical Femoral Fractures Using Multiscale Computational Modeling. In: Goh J. (eds) The 15th International Conference on Biomedical Engineering. IFMBE Proceedings, vol 43. Springer, Cham, ISBN 978-3-319-02912-2 (DOI: doi.org/10.1007/978-3-319-02913-9_82)
1. Cristofolini, L., Pallini, F., Schileo, E., Juszczyk, M., Varini, E., **Martelli**, S. & Taddei, F. 2006 Biomechanical testing of the proximal femoral epiphysis: intact and implanted condition. In ASME 8th Biennial Conference on Engineering Systems Design and Analysis Volume 2: Automotive Systems, Bioengineering and Biomedical Technology, Fluids Engineering, Maintenance Engineering and Non-Destructive Evaluation, and Nanotechnology, Torino, Italy, July 4–7, 2006, ISBN: 0-7918-4249-5.

(ii) Refereed journal articles.

42. **S. Martelli**, JJ Costi. 2021 Real-time replication of three-dimensional and time-varying physiological loading cycles for bone and implant testing: A novel protocol demonstrated for the proximal human femur while walking. J. Mech. Behav. Biomed. Mater. , 104817. (doi:10.1016/J.JMBBM.2021.104817)
41. C.J. Miller, S. Trichilo, E. Pickering, **S. Martelli**, P. Delisser, L. B. Meakin, P. Pivonka. 2021 Cortical Thickness Adaptive Response to Mechanical Loading Depends on Periosteal Position and Varies Linearly With Loading Magnitude. Front. Bioeng. Biotechnol. 9. (doi:10.3389/FBIOE.2021.671606/FULL)
40. D. O'Rourke, B. R. .Beck, A. T. Harding, S. L.Watson, P. Pivonka, **S. Martelli**. Assessment of femoral neck strength and bone mineral density changes following exercise using 3D-DXA images. Journal of Biomechanics119. (2021). doi.org/10.1016/j.jbiomech.2021.110315
39. **S. Martelli**, M. Giorgi, E. Dall' Ara, E. Perilli, Damage tolerance and toughness of elderly human femora, Acta Biomater. (2021). doi.org/10.1016/j.actbio.2021.01.011.
38. M Palanca, E Perilli, **S Martelli**, Body anthropometry and bone strength conjointly determine the risk of hip fracture in a sideways fall, Annals of biomedical engineering (2020). doi.org/10.1007/s10439-020-02682-y
37. **S. Martelli**, N. Sancisi, M. Conconi, M.G. Pandy, M.E. Kersh, V. Parenti-Castelli, K. Reynolds. The relationship between tibiofemoral geometry and musculoskeletal function during normal activity. Gait & Posture. (2020), 80:374-382. doi.org/10.1016/j.gaitpost.2020.06.022

36. **S. Martelli**, B. Beck, D. Saxby, D. Lloyd, P. Pivonka, M. Taylor, Modelling Human Locomotion to Inform Exercise Prescription for Osteoporosis, Curr. Osteoporos. Rep. (2020). doi:10.1007/s11914-020-00592-5.

35. H. Ziaeipoor, M. Taylor, **S. Martelli**, Population-based bone strain during physical activity: A novel procedure demonstrated for the human femur, Ann. Biomed. Eng. (2020) 1–8. doi:10.1007/s10439-020-02483-3.

35. Al-Dirini, R.M.A., **Martelli, S.**, Taylor, M., 2019. Computational efficient method for assessing the influence of surgical variability on primary stability of a contemporary femoral stem in a cohort of subjects. Biomech. Model. Mechanobiol. doi:10.1007/s10237-019-01235-0

34. Ziaei Poor H., Taylor M., Pandy M.G., **Martelli S.**, 2019, A Novel Training-free Method for Real-time Prediction of Femoral Strain, Journal of Biomechanics, 86:110-116. doi: 10.1016/j.jbiomech.2019.01.057

33. Ziaei Poor H., **Martelli S.**, Pandy M.G., Taylor M., 2019, Efficacy and Efficiency of Multivariate Linear Regression for Rapid Prediction of Femoral Strain Fields during Activity, Medical Engineering and Physics, 63:88-92, doi: 10.1016/j.medengphy.2018.12.001.

32. Lamberto G.; Amin D.; Solomon L.B.; Ding B.; Reynolds K.R.; Mazza C., **Martelli S.,** 2019, Personalised 3D knee compliance from clinically viable knee laxity measurements: a proof of concept ex vivo experiment. Medical Engineering and Physics 64:80-85, doi: 10.1016/j.medengphy.2018.12.003

31. Al-Dirini, R.M.A., **Martelli S.**, O'Rurke D., Huff D., Zang J., Clement J.G., Taylor M., 2019, Virtual Trial to Evaluate the Robustness of Cementless Femoral Stems to Patient and Surgical Variation. Journal of Biomechanics 82, 346-356 (2019) doi: 10.1016/j.jbiomech.2018.11.013.

30. Al-Dirini, R.M.A., **Martelli S.**, Huff D., Zang J., Clement J.C., Besier T., Taylor M., 2018, Evaluating the primary stability of standard vs lateralised cementless femoral stems – A finite element study using a diverse patient cohort. Clin. Biomech. 36(4):1185-1195. doi:10.1016/J.CLINBIOMECH.2018.09.002

29. Kersh M.E., **Martelli S.**, Zebaze R., Seeman E., Pandy M.G., 2018, Mechanical loading of the femoral neck in human locomotion. Journal of Bone and Mineral Research, 33(11):1999-2006. doi: 10.1002/jbmr.3529

28. **Martelli**, S. & Perilli, E., 2018, Time-elapsed synchrotron-light microstructural imaging of femoral neck fracture. J. Mech. Behav. Biomed. Mater. 84, 265–272 doi: 10.1016/j.jmbbm.2018.05.016

27. Al-Dirini, R.M.A., O'Rurke, D., Huff, D., **Martelli, S**., Taylor, M., 2018. Biomechanical Robustness of a Contemporary Cementless Stem to Surgical Variation in Stem Size and Position. J. Biomech. Eng. 2018, 140(9). doi: 10.1115/1.4039824.

26. Taylor, M., Perilli, E., **Martelli**, S., 2017. Development of a surrogate model based on patient weight, bone mass and geometry to predict femoral neck strains and fracture loads. J. Biomech., 55:121–127. doi:http://dx.doi.org/10.1016/j.jbiomech.2017.02.022

25. **Martelli**, S., 2017. Femoral Neck Strain during Maximal Contraction of Isolated Hip-Spanning Muscle Groups. Comput. Math. Methods Med. 2017, 1–10. doi.org/10.1155/2017/287378924.

24. **Martelli** S., Mokhtarzadeh H., Pivonka P., Ebeling PR. 2017 The femoral neck mechanoresponse to hip extensor exercise: a case study. The Journal of Osteoporosis. Article ID 5219541, 1-9. doi:10.1155/2017/5219541.

23. O'Rourke D., **Martelli** S., Bottema M., Taylor M. 2016 A Computational Efficient Method to Assess the Sensitivity of Finite-Element Models: An Illustration with the Hemipelvis. Journal of Biomechanical Engineering., 1;138(12). doi: 10.1115/1.4034831.

22. Lamberto G., **Martelli** S., Cappozzo A., Mazzà C. 2017. Are joint and muscle mechanics predicted by musculoskeletal models sensitive to soft tissue artefact uncertainties? Journal of Biomechanics 62:68-76. doi: 10.1016/j.jbiomech.2016.07.042.

21. **Martelli** S., Kersh M., Pandy M.G. 2015. Sensitivity of femoral strain calculations to anatomical scaling errors in musculoskeletal models of movement. Journal of Biomechanics, 48(13), 3615–24 (doi:10.1016/j.jbiomech.2015.08.001).

20. **Martelli** S., Calvetti D., Somersalo E., Viceconti M. 2015 Stochastic modelling of the human motor control. Journal of the Royal Society Interface Focus. 5(2):1-14 (doi: 10.1098/rsfs.2014.0094).

19. **Martelli** S., Valente G., Viceconti M., Taddei F. 2015. Sensitivity of a subject-specific musculoskeletal model to the uncertainties on the joint axes location" Computer Methods in Biomechanics and Biomedical Engineering 18(4):1555-63 (doi: 10.1080/10255842.2014.930134).

18. **Martelli** S., Pivonka P., Ebeling P.R. 2014. Femoral shaft strains during daily activities: Implications for atypical femoral fractures. Clinical Biomechanics. 29(8):869-76 (doi: 10.1016/j.clinbiomech.2014.08.001).

17. **Martelli** S., Kersh MK., Schache AG., Pandy MG. 2014 Strain energy in the femoral neck during exercise. Journal of Biomechanics 47(8):1784-91 (doi: 10.1016/j.jbiomech.2014.03.036).

16. **Martelli**, S., Calvetti, D., Somersalo, E., Viceconti, M. & Taddei, F. 2013 Computational tools for calculating alternative muscle force patterns during motion: A comparison of possible solutions. Journal of Biomechanics 46, 2097–2100. (doi:10.1016/j.jbiomech.2013.05.023).

15. **Martelli**, S., Taddei, F., Schileo, E., Cristofolini, L., Rushton, N. & Viceconti, M. 2012 Biomechanical robustness of a new proximal epiphyseal hip replacement to patient variability and surgical uncertainties : A FE study. Medical Engineering and Physics 34, 161–171. (doi:10.1016/j.medengphy.2011.07.006).

14. Valente, G., **Martelli**, S., Taddei, F., Farinella, G. & Viceconti, M. 2012 Muscle discretization affects the loading transferred to bones in lowerlimb musculoskeletal models. Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine 226, 161–9. (doi:10.1177/0954411911425863).

13. Viceconti, M., Taddei, F., Cristofolini, L., **Martelli**, S., Falcinelli, C. & Schileo, E. 2012 Are spontaneous fractures possible? An example of clinical application for personalised, multiscale neuro-musculo-skeletal modelling. Journal of Biomechanics 45, 421–426. (doi:10.1016/j.jbiomech.2011.11.048).

12. Taddei, F., **Martelli**, S., Valente, G., Leardini, A., Benedetti, M. G., Manfrini, M. & Viceconti, M. 2012 Femoral loads during gait in a patient with massive skeletal reconstruction. Clinical Biomechanics 27, 273–280. (doi:10.1016/j.clinbiomech.2011.09.006).

11. **Martelli**, S., Taddei, F., Cristofolini, L., Schileo, E., Rushton, N. & Viceconti, M. 2011 A new hip epiphyseal prosthesis: Design revision driven by a validated numerical procedure. Medical Engineering and Physics 33, 1203–11. (doi:10.1016/j.medengphy.2011.05.010)

10. **Martelli**, S., Taddei, F., Cristofolini, L., Gill, H. S. & Viceconti, M. 2011 Extensive risk analysis of mechanical failure for an epiphyseal hip prothesis: a combined numerical–experimental approach. Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine 225, 126–140. (doi:10.1243/09544119JEIM728)

9. **Martelli**, S., Taddei, F., Cappello, A., van Sint Jan, S., Leardini, A. & Viceconti, M. 2011 Effect of sub-optimal neuromotor control on the hip joint load during level walking. Journal of Biomechanics 44, 1716–1721 (doi:10.1016/j.jbiomech.2011.03.039)

8. Cristofolini, L., Schileo, E., Juszczyk, M., Taddei, F., **Martelli**, S. & Viceconti, M. 2010 Mechanical testing of bones: the positive synergy of finite-element models and in vitro experiments. Philosophical Transactions of The Royal Society A Mathematical Physical and Engineering Sciences 368, 2725–63. (doi:10.1098/rsta.2010.0046).

7. Viceconti, M., Schileo, E., Taddei, F., **Martelli**, S. & Testi, D. 2010 Personalised multiscale models for risk fracture prediction. Fourth Meeting on Bone Quality, France, June 2009: mechanical constraints and bone quality--from organ to cell. Osteoporosis International 21, 1067–75. (doi:10.1007/s00198-010-1175-8).

6. Taddei, F., **Martelli**, S., Gill, H. S., Cristofolini, L. & Viceconti, M. 2010 Finite Element Modeling of Resurfacing Hip Prosthesis: Estimation of Accuracy Through Experimental Validation. Journal of Biomechanical Engineering 132, 21002–21011. (doi:10.1115/1.4000065)
5. Juszczyk, M., Schileo, E., **Martelli**, S., Cristofolini, L. & Viceconti, M. 2008 A Method to Improve Experimental Validation of Finite-Element Models of Long Bones. Strain 46, 242–251. (doi:10.1111/j.1475-1305.2008.00500.x)
4. Cristofolini, L., Juszczyk, M., **Martelli**, S., Taddei, F. & Viceconti, M. 2007 In vitro replication of spontaneous fractures of the proximal human femur. J. Biomech. 40, 2837–45. (doi:10.1016/j.jbiomech.2007.03.015).
3. Taddei, F., **Martelli**, S., Reggiani, B., Cristofolini, L. & Viceconti, M. 2006 Finite-element modeling of bones from CT data: sensitivity to geometry and material uncertainties. IEEE Transactions on Biomedical Engineering 53, 2194–200. (doi:10.1109/TBME.2006.879473).
2. Taddei, F., Cristofolini, L., **Martelli**, S., Gill, H. S. & Viceconti, M. 2006 Subject-specific finite element models of long bones: An in vitro evaluation of the overall accuracy. Journal of Biomechanics 39, 2457–2467. (doi:10.1016/j.jbiomech.2005.07.018).
1. Viceconti, M., Testi, D., Taddei, F., **Martelli**, S., Clapworthy, G. J. J., Van Sint Jan, S. & Jan, S. V. S. 2006 Biomechanics Modeling of the Musculoskeletal Apparatus: Status and Key Issues. Proceedings of the IEEE 94, 725–739. (doi:10.1109/JPROC.2006.871769).

(iii) Refereed conference participations.

100. M. Howes, M. Bajger, G. Lee, F Bucci, S. **Martelli**, Texture enhanced Statistical Region Merging with application to automatic knee bones segmentation from CT. Conference on Digital Image Computing: Techniques and Applications (DICTA), 29 Nov. – 1 Dec., Gold Coast, Australia.
99. Bennett K.J., Rapagna S., Wearne L., **Martelli S.**, Atkins G.J., Solomon L.B., Perilli, E., Thewlis D., Preliminary Micro-CT Imaging of the Human Tibial Plateau Under Load, International Society of Biomechanics, Digital Congress, Stockholm, 25-29 July, 2021
98. Bennett K.J., Pizzolato C., **Martelli S.**, Bahl J.S., Sivakumar A., Atkins G.J., Solomon L.B., Thewlis D., Estimations of Knee Joint Loading Using Generalized Methods and Muscle Recruitment Strategies, International Society of Biomechanics, Digital Congress, Stockholm, 25-29 July, 2021
97. **Martelli S.**, Modelling human locomotion for personalized exercise prescription for osteoporosis, Perspective talk, European Society of Biomechanics, Milano, July 2021
96. Branni M., Perilli E., Taylor M., **Martelli S.**, Determining human femur bone mechanical anisotropy: image-processing method vs micro-finite-elements modes. European Society of Biomechanics, Milano, July 2021
95. Bucci F., Al-Dirini R., Taylor M., **Martelli S.**, Gender differences of passive knee kinematics, European Society of Biomechanics, Milano, July 2021
94. Lavaill M., **Martelli S.**, Gupta A., Kerr G., Pivonka P., Kinematic comparison between scaled-generic and MRI-based skeletal models of the shoulder, European Society of Biomechanics, Milano, July 2021
93. **Martelli**, Time-lapsed imaging of the microstructural fracture behaviour in the human femur. Keynote talk, 23rd Int. Information Visualisation Conference, July 16 – 19, Adelaide, Australia
92. Bennett KJ, Millar S, Fraysse F, Arnold J, Solomon LB, **Martelli** S, Thewlis D, Longitudinal Postoperative Joint Kinematics of Tibial Plateau Fracture Patients, International Society of Biomechanics, Calgary, July 31 – August 4, 2019
91. **Martelli**, VPH-inspired personalized exercise intervention for promoting hip strength, Keynote talk, Australian and New Zealand Bone and Mineral Society, Darwin, 27 – 30 October 2019

90. O'Rourke, D.; Beck, B.; **Martelli**, S., Repeatability of bone mineral density mapping in finite element models reconstructed from 3D DXA images. 25th Congress of the European Society of Biomechanics, July 7-10, 2019, Vienna (Austria).

89. Dhanasekaran, A.J.; **Martelli**, S.; Taylor, M. Comparing the behaviour of 5 mm bone grafts between experimental and computational analysis. 25th Congress of the European Society of Biomechanics, July 7-10, 2019, Vienna (Austria).

88. Ziaeipoor, H.; Taylor, M.; **Martelli**, S., Time-effective population-based modelling of femoral mechanics during physical activity. 25th Congress of the European Society of Biomechanics, July 7-10, 2019, Vienna (Austria).

87. Palanca M.; Perilli, E.; Cristofolini, L.; **Martelli**, S., Body anthropometry and bone microarchitecture improves hip fracture prediction while falling on a side. 25th Congress of the European Society of Biomechanics, July 7-10, 2019, Vienna (Austria).

86. Perilli E., **Martelli S.**, Time-elapsed micro-CT imaging of human femoral neck fracture at the synchrotron: scan me bigger if you can. International Conference on Tomography of Materials & Structures, 22nd - 26th July 2019

85. **Martelli S.**, Giorgi M., Dall'Ara E., Perilli E., Digital Volume Correlation analysis of deformation and fracture in the human femur. Orthopaedic Research Society, annual meeting, Feb. 2-5, Austin TX, USA.

84. Ziaei Poor H., Taylor M., **Martelli S.**, Rapid Prediction of Femoral Strain using a Novel Computational Model. Australian and New Zealand Orthopaedic Research Society (ANZORS) 5 – 7 Oct 2018, Perth, Australia.

83. Palanca M., Cristofolini L., Perilli E., **Martelli S.**, Failure mechanism of the femur during sideways fall. Australian and New Zealand Orthopaedic Research Society (ANZORS) 5 – 7 Oct 2018, Perth, Australia.

82. **Martelli S.**, Giorgi M., Dall'Ara E., Perilli E., Bone tissue deformation and fracture in the human femur under physiological loading configuration. Australian and New Zealand Orthopaedic Research Society (ANZORS) 5 – 7 Oct 2018, Perth, Australia.

81. Dhanasekaran A.J., Taylor M., Ziaei Poor H., Awadalla M., **Martelli S.**, Comparing the behaviour of 5mm bone grafts between experimental analysis and computational analysis, Podium, 8th World Congress of Biomechanics, 8-12 July 2018, Dublin, Ireland

80. Al-Dirini R., **Martelli S.**, O'Rourke D., Huff D., Taylor M., Virtual Preclinical Evaluation of Cementless Femoral Stems for Robustness to Patient and Surgical Variation, Podium, 8th World Congress of Biomechanics, 8-12 July 2018, Dublin, Ireland

79. Ziaei Poor H., **Martelli S.**, Taylor M., Comparison of different computational methods for real-time prediction of femoral strain during activity, Podium, 8th World Congress of Biomechanics, 8-12 July 2018, Dublin, Ireland

78. **Martelli S.**, Sancisi N., Conconi M., Parenti-Castelli V., Reynolds K., Sensitivity of musculoskeletal models to planar simplification of tibiofemoral motion, Invited talk, 8th World Congress of Biomechanics, 8-12 July 2018, Dublin, Ireland

77. **Martelli S.**, Giorgi M., Dall'Ara E., Perilli E., Internal strain in the proximal human femur: a digital volume correlation analysis of time-lapsed synchrotron-light images of femoral fracture, Podium, 8th World Congress of Biomechanics, 8-12 July 2018, Dublin, Ireland

76. **Martelli S.**, Perilli E., Pivonka P., Reynolds K., Multiscale biomechanics of the proximal femur, keynote, 8th World Congress of Biomechanics, 8-12 July 2018, Dublin, Ireland

75. Giorgi M., **Martelli S.**, Perilli E., Dall'Ara E., DVC to measure internal strain distribution of the proximal human femur under compressive loading. International Society of Biomechanics, 2017, July 23-27, Brisbane, Australia

74. Lamberto G., **Martelli S.**, Mazzà C., Validation of a force-based personalized knee joint model obtained from human cadaveric experiments. International Society of Biomechanics, 2017, July 23-27, Brisbane, Australia

73. Perilli E., **Martelli S.**, Roberts B., Thewlis D., Reynolds KJ., Linking bone microarchitecture and bone mechanics: biopsy yesterday, whole organ today? International Society of Biomechanics, 2017, July 23-27, Brisbane, Australia

72. **Martelli S.**, Amin D. and Ding B., Real-time in vitro measurement of femoral mechanics during normal activity. International Society of Biomechanics, 2017, July 23-27, Brisbane, Australia

71. **Martelli S.**, Mokhtarzadeh H. Pivonka P., Ebeling PR., The femoral neck mechanoresponse to hip extensors exercise: a case study. International Society of Biomechanics, 2017, July 23-27, Brisbane, Australia

70. **Martelli S.**, Perilli E., Synchrotron-light time-lapsed imaging of human femoral neck fracture. International Society of Biomechanics, 2017, July 23-27, Brisbane, Australia

69. Ding B., Amin D., **Martelli S.**, Cazzolato B. and Costi JJ, The impact of 6DOF loading speed on the viscoelastic behaviour of the femur. International Conference on Mechanics in Medicine & Biology, 2017, May 24-25, Melbourne, Australia

68. Menichetti A., **Martelli S.**, Helgason B., Cristofolini L., Sensitivity of dynamic models of femoral fracture during sideways falls. 23nd Congress of the European Society of Biomechanics, July 2-5, Sevilla, Spain.

67. Trichilo S., Blanchard R., **Martelli S.**, Delisser P., Meakin L., Price J., Lanyon L., Pivonka P., Image-based method to assess local changes in cortical thickness in the mouse tibia loading model. 23nd Congress of the European Society of Biomechanics, July 2-5, Sevilla, Spain.

66. Perilli E., **Martelli S.**, Time-lapsed imaging of the human femur microstructure under load. Australian and New Zealand Bone Mineral Society(ANZBMS). 21-24 August 2016, Gold Coast, QLD, Australia

65. **Martelli S.**, Perilli E., Time-lapsed microstructural imaging of the human femur under load. Australian and New Zealand Orthopaedic Research Society (ANZORS) 13 - 15 Oct 2016, Melbourne, VIC, Australia.

64. **Martelli S.**, Perilli E. Synchrotron-light imaging of the human femur microstructure under load. Australian Biomechanics Conference (ABC10), 4-6 Dec 2016, Melbourne, Australia.

63. van Veen B., **Martelli S.**, Mazzà C., Somersalo E., Calvetti D., Viceconti M. 2016. Variability in neuromotor control of the musculoskeletal system dynamics: a stochastic modelling approach, XXI Int. Society of Electrophysiology and Kinesiology, July 5-8, US.

62. Lamberto G., **Martelli S.**, Cappozzo A., Mazza' C. 2016. A probabilistic analysis of the effects of soft tissue artefacts on the estimate of muscle and joint forces, 22nd Congress of the European Society of Biomechanics, July 10-13, Lyon, France.

61. **Martelli S.** 2016. Femoral neck strain during maximal contraction of isolated hip-spanning muscles, 22nd Congress of the European Society of Biomechanics, July 10-13, Lyon, France.

60. **Martelli S.**, Perilli E. 2016. Synchrotron-light time-lapsed microstructural imaging of the entire human femoral epiphysis under load, 22nd Congress of the European Society of Biomechanics, July 10-13, Lyon, France.

59. **Martelli S.**, Perilli E., Ruthenbeck G.S., Bala Y., Taylor M., Reynolds K.J. 2015. A new finite-eleent software pipeline for the micro-structural analysis of the proximal femur, Australian & New Zealand Orthopaedic Research Society, October 1-5, Auckland, NZ.

58. Lamberto G., **Martelli S.**, Cappozzo A., Mazzà C. 2015. Musculoskeletal model sensitivity to stereophotogrammetry skin artefacts. Australian & New Zealand Orthopaedic Research Society, October 1-5, Auckland, NZ.

57. Williams M., **Martelli S.**, Sancisi N., Conconi N., Castelli-Parenti V., Reynolds K.J. 2015. Sensitivity of musculoskeletal models to scaled-generic knee kinematic errors, Australian & New Zealand Orthopaedic Research Society, October 1-5, Auckland, NZ.

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55. **Martelli S.**, Calvetti D., Somersalo E., Viceconti M. 2015. Stochastic modelling of muscle forces during motion. 21st Congress of the European Society of Biom, July 5 - 8, Prague, Czech Republic

54. **Martelli S.**, Pivonka P., EbelingP.R. 2015. Atypical Femoral Fractures are associated with high tensile strain patterns while walking, 21st Congress of the European Society of Biomechanics, July 5 - 8, Prague, Czech Republic

53. **Martelli S.**, Mokhtarzadeh H., Pivonka P., Ebeling P.R. 2015. Hip extensor muscles increase femoral neck bone strength: a case study, 21st Congress of the European Society of Biomechanics, July 5 - 8, Prague, Czech Republic

51. **Martelli S.**, Perilli E., Rithenbeck GS., Taylor M., Reynolds K. 2014 A new software pipeline for micro-finite-element simulations of whole-bone mechanics. Aust. Newzel. Orthop. Res. Soc. Congr. September 21-23, Adelaide, Australia.

51. **Martelli S.**, Calvetti D., Somersalo E., Viceconti M.. 2014 The repertoire of possible muscle synergies during walking. Aust. Newzel. Orthop. Res. Soc. Congr. September 21-23, Adelaide (Australia)

50. Taylor M., Perilli E., **Martelli S.** 2014 Simple measures of patient mass, bone properties and geometry are predictors of femoral neck strains. Aust. Newzel. Orthop. Res. Soc. Congr. September 21-23, Adelaide (Australia)

49. **Martelli S.**, Taylor M., Reynolds K. 2014 Non-optimal muscle contractions: exemplfication for the lower-limb musculoskeletal system of a viable numerical approach. 7th World Congress of Biomechanics, Boston, 6-11 July 2014. 7th World Congress of Biomechanics (WCB 2014), ISBN: 9781634393812

48. Kersh M.E., **Martelli S.**, Zebaze R., Seeman E., Pandy M.G. 2014 Is Stair Climbing Better For Your Bones Than Walking? 7th World Congress of Biomechanics, Boston, 6-11 July 2014. 7th World Congress of Biomechanics (WCB 2014), ISBN: 9781634393812

47. **Martelli**, S., Pivonka, P., Kersh, M. E., Ebeling, P. R. & Pandy, M. G. 2014 Atypical Femoral Fractures Are Associated with High Cyclic Tensile Strain Regions During Walking. 2014 Invited at WCO-IOF-ESCEO World Congress in Osteoporosis, Osteoarthritis and Musculoskeletal Diseases, Seville, Spain, 2-5 April. In Osteoporosis International 25(Suppl. 2):S188

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45. **Martelli**, S., Pivonka, P. & Ebeling, P. R. 2013. Atypical femoral fractures are associated with physiological patterns of bone tensile deformations. Aust. New Zeal. Bone Miner. Soc. Congr. Melbourne, September 8-11

44. **Martelli**, S., Gray, H. A. & Pandy, M. G. 2013 Influence of hip muscle activity on femoral neck bone mechanics. XXIV Congress of the International Society of Biomechanics (ISB). Natal, Brazil August 4-9, 2013. https://isbweb.org/images/conferences/isb-congresses/2013/poster/ps1-25a.pdf

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42. Pivonka, P., **Martelli**, S. & Ebeling, P. R. 2013 Atypical Femoral Fractures Are Associated with High Cyclic Tensile Strain Regions During Daily Activities. APCOM ISCM. 11-14th December 2013, Singapore

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40. Kersh, M. E., **Martelli**, S., Zebaze, R. M. D., Seeman, E. & Pandy, M. 2013 Region-specific strain energy in the proximal femur during load-based activities in elderly women. Am. Soc. Biomech. , 1–2. September 4-7, Omaha (NE). Available at http://www.asbweb.org/conferences/2013/abstracts/250.pdf

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38. F Taddei, E Schileo, S **Martelli**, L Cristofolini & M Viceconti, M. B. 2012 Subject-Specific Bone Fracture Risk Prediction: Modelling a Multiscale Problem. 7 Vienna Conf. Math. Model. 14-17 February, Vienna, Austria.

37. **Martelli**, S., Kersh, M. E., Schache, A. G. & Pandy, M. 2012 A comparison of two types of exercise for promoting bone growth in the femoral neck. Aust. Newzel. Orthop. Res. Soc. Congr. 1-2 Sept, Perth, Australia.

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35. M. Viceconti, S. **Martelli**, S. Delp, F. Taddei 2011 Personalised NMS modelling: examples of clinical application. 23th Congress of the International Society of Biomechanics, July 3-7, Brusselles, Belgium, http://isbweb.org/

34. **Martelli**, S., Calvetti, D., Somersalo, E., Taddei, F. & Viceconti, M. 2011 Variability of the hip load in sub-optimal neuromotor control conditions during gait. 23th Congress of the International Society of Biomechanics, July 3-7, Brusselles, Belgium, http://isbweb.org/

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30. **Martelli**, S. & Viceconti, M. 2011 Non-optimal neuromotor control could produce significant skeletal overloading during apparently normal physiological activities. VII Eur. IAGG-ER Congr. Bologna (Italy)

29. Valente, G., **Martelli**, S., Brambilla, I., Taddei, F. & Viceconti, M. 2011 Sensitivity of the skeletal loads of the lower limbs to the uncertainties of kinematics parameters during walking. XIII Int. Symp. Comput. Simul. Biomech. , 1–2.

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25. Viceconti, M., Taddei, F., **Martelli**, S., Schileo, E., Leardini, A. & Pani, M. 2010 Multiscale personalised modelling. In IUTAM 2010: IUTAM symposium on human movement analysis and simulation, Leuven, September 13th-15th, ISBN: 978-94-6018-247-1

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21. Juszczyk, M., Schileo, E., **Martelli**, S., Cristofolini, L., Viceconti, M et al., 2010 Shape versus function: Is the human tibia an example of a "strain-optimized" structure? Proc. 17th Congr. Eur. Soc. Biomech. (ESB 2010) [CD-ROM].

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(v) Other conference participations

6. Lamberto G., **Martelli** S., Cappozzo A., Mazza C. 2016. A probabilistic analysis of the effects of soft tissue artefacts on the estimate of muscle and joint forces. Insigneo Showcase, Sheffield, UK, May 5th

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