

Benjamin Goislard de Monsabert

Lecturer in Biomechanics / Aix-Marseille University

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Young lecturer in Biomechanics at Aix-Marseille University recruited in September 2018 after occupying two research positions abroad (Imperial College London et TU Delft). More than 400 hours taught for BSc and MSc in Human Movement Sciences. Actively involved in a university-industry collaboration with a sports company (Décathlon) since November 2016. Co-supervising a PhD candidate since September 2018. Over 10 publications in international peer-reviewed journals.

EDUCATION

- 2016 **Qualifications to Senior lecturer / Associate professor positions**
 - Sciences of Sport and Physical Activities (CNU section 74)
 - Mechanical and Civil Engineering (CNU section 60)
- 2014 **PhD in Biomechanics**
 Institute of Movement Sciences EJ Marey (UMR CNRS 7287)
 Aix-Marseille University
Thesis title: « *Individualization of muscle parameters for musculoskeletal modelling of the hand: application to the understanding of osteoarthritis* »
Supervisors: Éric Berton (Pr.) & Laurent Vigouroux (Dr.)
- 2011 **MSc in Human Movement Sciences**
 Faculty of Sport Sciences
 Aix-Marseille University
Thesis title: « *Using biomechanical modelling to evaluate risk factors of finger joint osteoarthritis* »
Supervisors: Éric Berton (Pr.) & Laurent Vigouroux (Dr.)
- 2011 **Magister in Mechatronics**
 Ecole Normale Supérieure de Rennes
- 2010 **Agrégation in Mechanical Engineering** (national rank: 7th)
(Competitive exams to recruit teachers for the public education system)
 Prepared at Ecole Normale Supérieure de Rennes
- 2008 **BSc in Mechanical Engineering**
BSc in Electronics
 Ecole Normale Supérieure de Rennes

RESEARCH POSITIONS

Positions in countries outside of France are highlighted with a grey shading

2018-présent **Lecturer in Biomechanics**

Institute of Movement Sciences EJ Marey (UMR CNRS 7287)
Faculty of Sport Sciences, Aix-Marseille University, FR

2016-2018 **Post-doctoral researcher**

(21 months)

Institute of Movement Sciences EJ Marey (UMR CNRS 7287)

Supervisor: Laurent Vigouroux (Dr.)

Funded by a collaboration between Decathlon and Aix-Marseille. Works included the development of motion capture protocols and biomechanical modelling guided by electromyography to assess muscle forces during tennis playing. Three articles published, two as first author.

2014-2016 **Research Associate**

(24 months)

Department of Bioengineering, Imperial College London, UK

Supervision: Angela Kedgley (Dr.). **Funding:** ARtrhtis UK (ARUK)

Works included the design of a dissection protocol to elaborate a anatomical database for musculoskeletal modelling of the hand and the development of geometric models of tendon trajectories about the wrist. Five articles published as co-author.

2011-2014 **Doctoral candidate**

(39 months)

Institute of Movement Sciences (UMR 7287), Aix-Marseille University, FR

Supervisors: Éric Berton (Pr.) & Laurent Vigouroux (MCF)

Conducted studies on biomechanical loadings and muscle capacities about the hand among sportsmen and osteoarthritic patients. Designed maximal voluntary contraction protocols and optimization algorithms to scale hand musculoskeletal models using dynamometric and electromyographic measurements. Three articles published as first author.

2011-2012 **Guest researcher**

(10 months)

Department of Biomechanical engineering, Delft University of Technology, NL

Supervisors: Frans van der Helm (Pr.) et Dirkjan HEJ Veeger (Pr.)

Works included the development of motion capture protocols to assess the kinematics of the entire hand as well as participating to anatomical measurements on cadaveric specimens.

2010-2011 **Research assistant (MSc)**

(6 months)

Institute of Movement Sciences (UMR 7287), Aix-Marseille University, FR

Supervisor: Éric Berton (Pr.) & Laurent Vigouroux (Dr.)

Developed a motion capture protocol and musculoskeletal of the hand to estimate the 42 muscle forces and 15 joint forces during grasping tasks to study risk factors of osteoarthritis

RESEARCH PROJECTS

2016-présent **Industrial collaboration between Aix-Marseille Univ & Decathlon**

« Du Corps Au Sport » / Prehension

Principal investigator: Laurent Vigouroux (Dr.)

2016-présent **« Hand » research group - Institute of Movement Sciences**

Principal investigator: Laurent Vigouroux (Dr.)

RESEARCH AND TEACHING INTERESTS

- * Biomechanics
- * Musculoskeletal modelling
- * Motion capture
- * Muscle force-generating capacities
- * Neuromuscular control
- * Musculoskeletal disorder

SCIENTIFIC SKILLS

Motion capture	Optoelectronic systems (VICON, Qualisys, Optotrack) Dynamometry (force platforms, grip force sensor, ergometer) Surface electromyography (Delsys, Biopac)
Modeling	Development of musculoskeletal models (coded in MATLAB) Design of optimisation algorithms using experimental data
Anatomy	Dissection of cadaveric specimens Muscle architecture measurements Analysis of muscle fibre samples using digital microscopy
Data processing	Kinematic, electromyographic and dynamometric data Medical imaging analysis (microscopy, computerized tomography, magnetic resonance imaging)

LANGUAGES

- * **French:** Mother tongue
- * **English:** Written and spoken fluently
- * **Spanish:** Professional working proficiency

ACADEMIC AWARDS

- 2019 **Installation grant for researchers from the City of Marseille,**
Awarded by the Department of Economic Development, City of Marseille
- 2015 **PhD thesis award of Aix-Marseille University,**
Awarded by the Research and Valorisation Directorate of Aix-Marseille University
- 2015 **Hand and Wrist Biomechanics International Scholarship Award,**
Awarded during the 2015 HWBI Symposium
Sponsored by the International Society of Biomechanics (ISB)

REVIEWER ACTIVITY

Table summarizing journals, impact factors (IF) and the numbers of manuscripts.

	Journal name	IF	Number
14	Medical Engineering and Physics	1.8	6
13	Journal of Biomechanics	2.6	6
12	Ergonomics	2.2	2
11	Journal of Orthopaedic Research	3.0	2
10	IEEE Journal of Biomedical and Health Informatics	4.2	1
9	Applied Ergonomics	2.6	1
8	Journal of Mechanics in Medicine and Biology	0.8	1
7	Sports Medecine International Open	N.C	1
6	PeerJ	2.3	1
5	MDPI Sensors	3.0	1
4	MDPI Applied Sciences	2.2	1
3	Journal of Biomechanical Engineering	2.2	1
2	MDPI Healthcare	1.9	1
1	Scientific Reports	4.6	1
	Total		26

ACADEMICAL AND ADMINISTRATIVE RESPONSIBILITIES

2019-2020 **Member of selection committees for CMI stream**

5-year Engineering Master Cursus (CMI), Faculty of Sport Sciences, Marseille, FR

2018-2020 **Reviewer and member of committee for thesis defences**

2nd years MSc Engineering and Ergonomics of Physical Activities

1st years MSc Engineering and Ergonomics of Physical Activities

Chairman: Laurent Vigouroux (Dr.)

2018-2020 **Member of selection committees for MSc interviews**

MSc, Engineering and Ergonomics of Physical Activities

Faculty of Sport Sciences, Aix-Marseille University, FR

Chairman: Laurent Vigouroux (Dr.)

2018-2019 **Chairman of committees for the “baccalauréat”** (*Equivalent to A Levels*)

Lycée Dominique Villars, Gap

2015-2016 **Member of selection committee for Research Associate interviews**

Department of Bioengineering, Imperial College London, UK

Chairwoman: Angela Kedgley (Dr.)

2012-2014 **Member of the laboratory council**

Representative of temporary researchers

Institute of Movement Sciences (UMR 7287), Aix-Marseille University, FR

2012-2013 **Member of conference organisation,**

2013 Colloquium of the Doctoral school of Human Movement Sciences (ED 463)

Institute of Movement Sciences (UMR 7287), Aix-Marseille University, FR

2008-2009 **President of Student Union.**

Ecole Normale Supérieure de Rennes

RESEARCH SUPERVISION

PhD candidate and research assistant

- 2018-2021 **Co-supervisor of PhD candidate (50%),** Mathieu Caumes
Institute of Movement Sciences (UMR 7287), Aix-Marseille University, FR
Temporary title: “A study on the links between the length of hand muscles and wrist posture for the control of prehension”
Co-supervisor: Eric BERTON (Pr.)
Funding: Doctoral contract / Doctoral school of Human Movement Sciences (ED 463)
- 2018-2019 **Co-supervisor of research assistant,** Théo Cartier
Institute of Movement Sciences (UMR 7287), Aix-Marseille University, FR
Co-supervisor: Laurent VIGOUROUX (PhD)
Funding: Collaboration between Décathlon and Aix-Marseille University

MSc Students

- 2020-2021 **Co-supervisor of MSc student,** Thomas Valerio
MSc in Engineering and Ergonomics of Human Movement, Aix-Marseille University, FR
Thesis title: “Evaluating joint mechanical loading before and after index finger arthrodesis using biomechanical modelling”.
Co-supervisor: Laurent VIGOUROUX (PhD) and Jean-Louis MILAN (PhD)
- 2020-2021 **Co-supervisor of MSc student,** Clément Bonnaud
Engineering Degree in Engineering and Health, EPF Sceaux, FR
Thesis title: “Evaluation of the muscle coordination and visuomotor performance of a new motorcycle handle”
Co-supervisor: Laure FERNANDEZ (PhD)
- 2017-2018 **Co-supervisor of MSc student,** Mathieu Caumes
MSc in Human Movement Sciences, Aix-Marseille University, FR
Thesis title: “Influence of wrist posture on force capacities during grasping tasks”
Co-supervisor: Laurent VIGOUROUX (PhD)
- 2014-2015 **Co-supervisor of MSc student,** Doruk Kara
MSc in Biomedical Engineering, Imperial College London, UK
Thesis title: “A Biomechanical Model of Index Finger Muscle Force Capacity”
Co-supervisor: Angela KEDGLEY (PhD)

Other students

- 2019-2020 **Supervision of 1st year MSc internship,** Thibault Rozalen
1st year MSc, Engineering and ergonomics of physical activities, Aix-Marseille University, FR
Thesis title: « Characterisation of end-effector movement and muscle coordination after perturbation of the visuomotor gain »
Department: Institute of Movement Sciences / **Co-supervisor:** Laure Fernandez (PhD)
- 2019-2020 **Academic tutor,** Thomas Mousques
2nd year MSc, Engineering and ergonomics of physical activities, Aix-Marseille University, FR
Thesis title: « Scaling equipment to enhance learning for tennis beginners »
Company: Décathlon / **Supervisor :** Alexis Herbaut (PhD)

- 2019-2020 **Academic tutor**, Louis Alliou
1st year MSc, Engineering and ergonomics of physical activities, Aix-Marseille University, FR
Thesis title: « Kinematic analysis of hand movements during bronchoscopy »
Organization: Clinique St Joseph / **Supervisor:** Bruno Escarguel (MD)
- 2018-2019 **Academic tutor**, Simon Ozan
1st year MSc, Engineering and ergonomics of physical activities, Aix-Marseille University, FR
Thesis title: “Influence of tennis racket characteristics on muscle loading during the forehand drive”
Company: Décathlon, **Supervision:** Alexis Herbaut (PhD)
- 2013-2014 **Supervision of 1st year MSc internship**, Bastien Baud
1st year MSc, Engineering and ergonomics of human movement, Aix-Marseille University, FR
Thesis title: “Characterization of force-generating capacities of finger muscles”
Department: Institute of Movement Sciences, **Co-supervisor:** Laurent Vigouroux (PhD)

TEACHING POSITIONS

- 2018-présent **Lecturer**, total of 268h in class
Faculty of Sport Sciences, Aix-Marseille University, FR
- 2017-2018 **Temporary teacher**, total of 12h in class
Faculty of Sport Sciences, Aix-Marseille University, FR
- 2011-2014 **Temporary teacher**, total of 186h in class
Faculty of Sport Sciences, Aix-Marseille University, FR

Summaries of lectures and tutorials

Years	Level	Stream	Name of lecture or tutorial	Nr of Hrs
2018-20	1st yr. (UG)	Common	Anatomical levers and muscle moments	30
2018-20	2nd yr. (UG)	ESPM	Introduction to sports engineering	16
2018-20	4th yr. (PG)	IEMH	Pluri-disciplinary and transversal project	90
2018-20	4th yr. (PG)	IEMH	MATLAB coding	80
2018-20	5th yr. (PG)	IEMH	Engineering project	52
2012-17	1st yr. (UG)	Common	Mathematics for human movement	36
2012-14	1st yr. (UG)	Common	Kinematics of human movements	60
2012-14	1st yr. (UG)	Common	Lower limb anatomy	40
2012-14	1st yr. (UG)	Common	Trunk anatomy	32
2012-14	1st yr. (UG)	CMI	Mathematics	30
Total				466

UG: undergraduate; PG: postgraduate; ESPM: Sport Ergonomics and Motor Performance; IEMH: Engineering and Ergonomics of Human Movement; CMI: Specific Engineer/Master cursus

PUBLICATIONS

Peer reviewed international journals

15. Faudot B, Ballerini J, Ross M, Bellemère P, **Goislard de Monsabert B**, Vigouroux L, Milan JL (accepted). "*Mechanical Performance Comparison of Two Types of Wrist Four-Corner Fusion Plate*". *Clinical Biomechanics* (IF : 1.6 – Q3 : Biomedical Engineering)
14. **Goislard de Monsabert B**, Herbaut A, Berton E , Vigouroux L (2020). "*Modelling Force-Length-Activation relationships of wrist and finger extensor muscles*". *Medical & Biological Engineering & Computing* (IF : 2.0 - Q2 : Mathematical & Computational Biology)
13. Faudot B, Milan JL, **Goislard de Monsabert B**, Le Corroller T, Vigouroux L (2020). "*Estimation of joint contact pressure in the index finger using a hybrid finite element musculoskeletal approach*". *Computer Methods in Biomechanics and Biomedical Engineering* (IF : 1.5 – Q3 : Engineering, Biomedical)
12. Caumes M, **Goislard de Monsabert B**, Hauraix H, Vigouroux L, Berton E (2019). "*Complex couplings between joint, muscles and performance : the role of the wrist in grasping*". *Scientific Reports* (IF : 4,5 - Q1 : Multidisciplinary Sciences)
11. Hauraix H, **Goislard de Monsabert B**, Herbaut A , Berton E , Vigouroux L (2018). "*Force-length relationship modelling of wrist and finger flexor muscles*". *Medicine and Science in Sports and Exercise* (IF : 4,5 - Q1 : Sport Sciences)
10. **Goislard de Monsabert B**, Edwards T, Shah D, Kedgley A. (2017). "*Importance of Consistent Datasets in Musculoskeletal Modelling: A Study of the Hand and Wrist*". *Annals of Biomedical Engineering* (IF : 3.5 – Q1 : Engineering, Biomedical)
9. **Goislard de Monsabert B**, Rao G, Gay A, Berton E, Vigouroux L. (2017). "*A scaling method to individualise muscle force capacities in musculoskeletal models of the hand and wrist using isometric strength measurements*". *Medical & Biological Engineering & Computing* (IF : 2.0 - Q2 : Mathematical & Computational Biology)
8. Mirakhorlo M, Visser J, **Goislard de Monsabert B**, Van der Helm F., Maas H, & Veeger, HEJ. (2016). "*Anatomical parameters for musculoskeletal modeling of the hand and wrist*". *International Biomechanics* (IF : N.C.)
7. Vigouroux L, **Goislard de Monsabert B**, Hayot C, Androuet P, and Berton E. (2016). "*Assessment of the risk and biomechanical consequences of lateral epicondylalgia by estimating wrist and finger muscle capacities in tennis players*". *Sports Biomechanics*. (IF : 1.7 – Q3 : Sport Sciences)
6. Rossi J, **Goislard De Monsabert B**, Berton E and Vigouroux L. (2015). "*Handle shape affects the grip force distribution and the muscle loadings during power grip tasks*". *Journal of Applied Biomechanics* (IF 1,0 – Q3 : Sports Sciences)
5. Pothrat C, **Goislard De Monsabert B**, Vigouroux L, Viehweger E, Berton E and Rao G. (2015). "*Quantifying foot deformation using finite helical angle*". *Journal of Biomechanics*. (IF : 2.6 - Q2 : Engineering, Biomedical)

4. Vigouroux L, **Goislard de Monsabert B**, Berton E. (2014) “*Estimation of hand and wrist muscle capacities in rock climbers*”. *European Journal of Applied Physiology*. (IF : 3.0 - Q1 : Sport Sciences)
3. **Goislard de Monsabert B**, Visser JMA, Vigouroux L, Van der Helm FCT, & Veeger HEJ. (2014) “*Comparison of three local frame definitions for the kinematic analysis of the fingers and the wrist*”. *Journal of Biomechanics*. (IF : 2.6 - Q2 : Engineering, Biomedical)
2. **Goislard de Monsabert B**, Vigouroux L, Bendahan D, Berton E. (2014). “*Quantification of finger joint loadings using musculoskeletal modelling clarifies mechanical risk factors of hand osteoarthritis*”. *Medical Engineering & Physics* (IF : 1.8 - Q3 : Engineering, Biomedical)
1. **Goislard de Monsabert B**, Rossi J, Berton E, Vigouroux L. (2012). “*Quantification of hand and forearm muscle forces during a maximal power grip task*”. *Medicine and Science in Sports and Exercise* (IF : 4.5 - Q1 : Sport Sciences)

Refereed conference proceedings

11. Caumes M, **Goislard de Monsabert B**, Hauraix H, Berton E, Vigouroux L (2019) “*Using musculoskeletal modelling to clarify the effect of wrist posture on muscle force-generating capacities and maximal grip force during a power grip task*”. 44th Congress of the Société de Biomécanique. Oct 2019.
10. **Goislard de Monsabert B**, Hauraix H, Androuet P, Berton E, Vigouroux L. (2018) “*Using isometric strength measurements, electromyography and biomechanical modelling to estimate hand and forearm muscle forces during the tennis forehand: a pilot study*”. 8th World Congress of Biomechanics (WCB). Jul 2018.
9. **Goislard de Monsabert B**, Hauraix H, Androuet P, Berton E, Vigouroux L. (2017) “*Développement d’un protocole de mesure et d’un modèle biomécanique de la main pour l’estimation des forces musculaires lors d’un coup droit au tennis*”. 17^{ème} congrès de l’Association des Chercheurs en Activités Physiques et Sportives (ACAPS). Oct 2017.
8. Hauraix H, **Goislard de Monsabert B**, Herbaut A, Berton E, Vigouroux L. (2017) “*Modélisation de la relation force-longueur des muscles fléchisseurs des doigts*”. 17^{ème} congrès de l’Association des Chercheurs en Activités Physiques et Sportives (ACAPS). Oct 2017.
7. **Goislard de Monsabert B**, Rossi J, Rao G, Berton E, Vigouroux L. (2015) “*Estimation of subject-specific muscle capacities for musculoskeletal modelling of the hand and the wrist*”. *Proceedings of the 9th Hand and Wrist Biomechanics International (HWBI) Symposium*. Jun 2015.
6. Rossi J, **Goislard de Monsabert B**, Berton E, Vigouroux L. (2015) “*Is the minimization of secondary moment during finger pressing task related to muscle force economy: Preliminary study*”. *Proceedings of the 9th Hand and Wrist Biomechanics International (HWBI) Symposium*. Jun 2015.

5. Rossi J, **Goislard de Monsabert B**, Berton E, Vigouroux L. (2014) “Does handle shape influence prehensile capabilities and muscle coordination?” Computer methods in biomechanics and biomedical engineering, 17 (sup1), 172-173. 39ième congrès de la Société de Biomécanique, Aug 2014.
4. Hayot C, Vigouroux L, Rossi J, **Goislard de Monsabert B**, Barla C, & Berton E. (2014). “Measurements of Tennis Players’ Specific Forearm Muscle Force Imbalance to Assess the Potential Risk of Lateral Epicondylitis”. Procedia Engineering, 72, 174-179. The Engineering of Sport 10, Jul 2014.
3. **Goislard de Monsabert B**, Rossi J, Berton E, Vigouroux L. (2012) “Comparison of muscle loadings between power and pinch grip tasks”. Computer methods in biomechanics and biomedical engineering, 15 (sup1), 159-161. 37ième congrès de la Société de Biomécanique, Oct 2012.
2. **Goislard de Monsabert B**, Visser JMA, Veeger HEJ, van der Helm FCT. (2012) “Comparison of three different methods for hand segment coordinate system definition”. XII International Symposium on 3D Analysis of Human Movement, Jul 2012.
1. Rossi J, **Goislard de Monsabert B**, Barla C, Berton E, Grelot L, Vigouroux L. (2011) “Effect of handle size, handle inertia and fatigue on tendons affected by lateral epicondylalgia: a simulation study”. 1st SIMBIO-M international conference, Jun 2011.

REFERENCES

- * **Dr. Laurent Vigouroux** Aix-Marseille University, FR
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Relation: PhD thesis co-supervisor.
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Relation: PhD thesis supervisor.
- * **Dr. Angela Kedgley**, Imperial College London, UK
Tel: +44 207-594-0747 Email: a.kedgley@imperial.ac.uk
Relation: Supervised my post-doctoral researches at the Imperial College London
- * **Pr. Dirkjan HEJ Veeger**, Delft University of Technology, NL
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Relation: Supervisor during research collaboration