Damien Bachasson

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Summary

I am a transdisciplinary scientist working at the cross-road between skeletal muscle (respiratory and locomotor) physiology, exercise physiology, bioengineering, and rehabilitation sciences. My main research topics are: relationship between skeletal muscle (respiratory (diaphragm) & locomotor muscles) structure and function, skeletal muscle plasticity and adaptability, neuromuscular fatigue, neuromuscular disorders, secondary muscle impairment induced by chronic disorders (respiratory diseases, critically hill). The development of technologies and methods for the characterization of neuromuscular structure and function is an important part of my work e.g. multiparametric ultrasound imaging, neurostimulation, bioelectrial measurements, inertial measurement units. I have also interests in R-based data science, reproducible research, and teaching.

Education

2014-2015 | **University of California, San Diego**
Post doctoral training - Muscle physiology
Topic: contribution of neural alterations to muscle impairments induced by tendon failure

2012 | **Grenoble-Alpes University**
PhD – Exercise physiology
Dissertation: Neuromuscular function in chronic diseases: assessment, clinical impact, and training

2009 | **Grenoble-Alpes University**
MSc – Exercise physiology
Dissertation: Effect of acute hypoxia and hyperoxia on respiratory muscle fatigue

2008 | **Haute Ecole de la Province de Liège**
Master – Physical therapy
Dissertation: Assessing respiratory muscle endurance using an incremental isocapnic hyperpnoea test

Professional appointments

2015-present | **Research project leader**
Neuromuscular Physiology Laboratory, Institute of Myology, Paris, France
Research associate in the Myology Centre for Research (UMRS 974), Paris, France

- Developing methods based on multiparametric ultrasound imaging (ultrafast plane wave imaging, shear wave elastography, strain imaging) for the assessment of muscle (diaphragm and locomotor muscles) structure and function (spontaneous, volitional, and artificially evoked contractions) in healthy subjects and patients (neuromuscular diseases, critically hill)
- Investigating acute and chronic (structured training, daily physical activity) responses of the diseased muscle to exercise
- Investigating relationships between viscoelastic/bioelectrical muscle properties and muscle content/function in healthy subjects (sedentary, trained, aged), patients, and murine models (injury-induced fibrosis)
- Developing technologies based on serial bioelectrical measurements for estimating lean regional muscle volume (skin-electrode interface, prototype, numerical models, validation against quantitative MRI)
- Investigating the effects of augmentation devices in patients with neuromuscular disorders (short and long term effects)

2014-2015 | **Postdoctoral researcher**
Muscle Physiology Laboratory, Departments of Orthopaedic Surgery, Bioengineering and the Biomedical Sciences Group at the University of California, San Diego, La Jolla, CA, USA; Advisor: Samuel R. Ward

- Investigated structural and functional skeletal muscle impairments induced by chronic tendon failure with and without concomitant nerve injury: injury induced in rodent models (tenotomy and/or neurotomy) and human tissue gathered from cadaver or surgery

- Extended my research capacities through the use of animal model and wet-lab techniques for cellular/molecular biology

2014 | **Postdoctoral researcher**
Hypoxia Pathophysiology Laboratory, INSERM U1042, Grenoble-Alpes University, Grenoble, France; Advisor: Samuel Verges

- Investigated exercise-induced changes in corticomotoneuronal excitability and inhibition and uncovered methodological concerns regarding the selection of transcranial magnetic stimulation intensity.

2009-2012 | **Predoctoral fellow**
Hypoxia Pathophysiology Laboratory, INSERM U1042, Grenoble-Alpes University, Grenoble, France; Supervisors: Samuel Verges and Bernard Wuyam

- Investigated pathophysiological mechanisms underlying impaired exercise capacity in patients with COPD, neuromuscular disorders, and chronic fatigue syndrome
- Developed and applied standardized procedures for neuromuscular function (respiratory and locomotor) assessment in clinical populations for multicentric studies
- Conducted clinical trials investigating exercise-based and non-pharmacological interventions in patients with respiratory and neuromuscular disorders

2008-2009 | **Research assistant**
Hypoxia Pathophysiology Laboratory, INSERM U1042, Grenoble-Alpes University, Grenoble, France; Advisors: Samuel Verges

- Investigated the effect of hypoxia on respiratory muscle fatigue
- Developed new methods for the assessment of respiratory muscle endurance under isocapnic hyperpnea

2008-2010 | **Physical therapist**

- Rehabilitation and Therapeutic Patient Education (Respiratory diseases, chronic lumbar pain syndrome, chronic painful syndrome) - Grenoble Alpes University Hospital, France
- Private practice

External funding

Current

2018-2021 | **Research Grant (Project leader)**; Fondation EDF; Multiparametric ultrasound imaging of the diaphragm – **500 000 €**

2018-2021 | **Research Grant (Project co-leader)**; King Baudouin Foundation United State; Assistive device for neuromuscular disorders – **400 000 €**

Completed

2009 | **PhD fellowship**; French muscular dystrophy association (AFM) – **100 000** €

Current scientific collaborations

- **Dr Jean-Luc Gennisson** – Imagerie par Résonance Magnétique Médicale et Multi-Modalités (IR4M), CNRS UMR8081, Université Paris-Saclay, Orsay, France – (Co-supervion of a PhD student)
- **Pr Thomas Similowski, Dr Martin Dres, Pr Alexandre Demoule and al.** – Sorbonne Université, INSERM, UMRS1158 Neurophysiologie Respiratoire Expérimentale et Clinique ; AP-HP, Groupe Hospitalier Pitié-Salpêtrière Charles Foix, Service de Pneumologie et Réanimation Médicale du Département R3S, Paris, France
- **Dr Jonne Dorduin** – Department of Neurology, Donders Institute for Brain, Cognition and Behaviour, Radboud University Medical Center, Nijmegen, The Netherlands
- **Pr Guillaume Millet and Pr Léonard Féasson** – Laboratoire Interuniversitaire de Biologie de la Motricité, St Etienne, France
- **Pr Pierre Carlier, Dr Benjamin Marty, Dr Harmen Regnoudt** – NMR Laboratory, Institute of Myology, Paris, France
- **Dr Nathanael Jarassé** - Institut des Systèmes Intelligents et de Robotique, Paris, France
- **Dr Juliana Antero** - IRMES, Paris, France
- **Pr Olivier Benveniste, Dr Yves Allenbach** – Département de Medecine Interne et Immunologie Clinique, Groupe hospitalier Pitié-Salpêtrière, Paris, France
- **Myology Centre for Research**, Institute of Myology, Paris, France

Awards, honors and fellowships

2012 | **Best poster award**; Congrès Alvéole (Société de Pneumologie de Langue Française), Lyon, France: Assessment of inspiratory, expiratory and locomotor muscle fatigue in COPD – **1000 €**

2010 | **Research prize**; Société Française d'Etude et de Traitement de la Douleur (SFETD)-Janssen Cilag: Repetitive transcranial magnetic stimulation in patients with chronic painful syndrome undergoing exercise-based rehabilitation – **20 000 €**

Publications

** indicates an equal contribution of authors (co-lead or co-senior authorship)* | *Supervised students are indicated in* ***bold***

Peer-reviewed journal articles

1. Martins Bach A, **Bachasson D**, Caldas Almeida Araujo E, Le Louër J, Boisserie JM, Soustelle L, Loureiro de Sousa P, Fromes Y, Carlier PG. Non-invasive assessment of skeletal muscle fibrosis by Nuclear Magnetic Resonance and Shear Wave Elastography. Accepted in *Scientific report*. [IF = 4.0]

2. **Bachasson D**, **Carras Ayaz A**, **Mosso J**, Marty B, Benveniste B, Carlier PG, Hogrel J-Y. Lean regional muscle volume estimates using explanatory bioelectrical models in healthy subjects and patients with muscle wasting. Accepted in *Journal of Cachexia, Sarcopenia and Muscle*. [IF = 9.8]

3. **Relationship between change in physical activity and in clinical status in patients with idiopathic inflammatory myopathy: A prospective cohort study.** O. Landon-Cardinal, D. Bachasson, P. Guillaume-Jugnot, M. Vautier, N. Champtiaux, B. Hervier, A. Rigolet, R. Aggarwal, O. Benveniste, J. Y. Hogrel and Y. Allenbach (2020). Seminars in Arthritis and Rheumatism https://doi.org/10.1016/j.semarthrit.2020.06.014

4. Fossé Q, Poulard T, Niérat M-C, Virolle S, Morawiec E, Hogrel J-Y, Similowski T, Demoule A, Gennisson J-L, Bachasson D, and Dres M. (2020) (2020) Ultrasound shear wave elastography for assessing diaphragm function in mechanically ventilated patients: a breath-by-breath analysis. *Critical Care*. [IF = 6.4]

5. **Poulard T**, Dres M, Nierat MC, Rivals I, Hogrel JY, Similowski T, Gennisson JL, and **Bachasson D*** (2020) Ultrafast ultrasound coupled with cervical magnetic stimulation for non-invasive and non-volitional assessment of diaphragm contractility. *The Journal of physiology*. [IF = 4.6]

6. Benveniste O, Hogrel J-Y, Belin L, Annoussamy M, **Bachasson D**, Rigolet A, Laforet P, Dzangué-Tchoupou G, Salem J-E, Nguyen LS, Stojkovic T, Zahr N, Hervier B, Landon-Cardinal O, Behin A, Guilloux E, Reyngoudt H, Amelin D, Uruha A, Mariampillai K, Marty B, Eymard B, Hulot J-S, Greenberg SA, Carlier PG, and Allenbach Y. (2020) Sirolimus for treatment of patients with inclusion body myositis: a randomised, double-blind, placebo-controlled, proof-of-concept, phase 2b trial. *The Lancet Rheumatology*. [IF = NA]

7. Landon O*, **Bachasson D***, Guillaume-Jugnot P, Vautier M, Champtiaux N, Hervier B, Rigolet A, Aggarwal R, Benveniste O, Hogrel J-Y, and Allenbach Y. (2020) Relationship between change in physical activity and in clinical status in patients with idiopathic inflammatory myopathy: a prospective cohort study. *Seminars in Arthritis and Rheumatism* [IF = 5.0]

8. Hogrel JY, Benveniste O, and **Bachasson D**. (2020) Routine monitoring of isometric knee extension strength in patients with muscle impairments using a new portable device: cross-validation against a standard isokinetic dynamometer. *Physiological measurement* [IF = 2.3]

9. Guinot M, Maindet C, Hodaj H, Hodaj E, **Bachasson D**, Baillieul S, Cracowski J-L, and Launois S. (2019) Effects of repetitive transcranial magnetic stimulation and multicomponent therapy in patients with fibromyalgia: a randomized controlled trial. *Arthritis care & research* [IF = 4.1]

10. **Bachasson D***, Dres M*, Nierat MC, Gennisson JL, Hogrel JY, Doorduin J, Similowski T (2019) Diaphragm shear modulus reflects transdiaphragmatic pressure during isovolumetric inspiratory efforts and ventilation against inspiratory loading. *J Appl Physiol* [IF = 3.1]

11. Dubois G JR*, **Bachasson D***, Lacourpaille L, Benveniste O, Hogrel JY (2018) Local Texture Anisotropy as an Estimate of Muscle Quality in Ultrasound Imaging. *Ultrasound Med Biol* [IF = 2.5]

12. **Bachasson D**, Dubois G J-R, Allenbach Y, Benveniste O, and Hogrel J-Y (2018) Muscle Shear Wave Elastography in Inclusion Body Myositis: feasibility, reliability and relationships with muscle impairments. *Ultrasound Med Biol* [IF = 2.5]

13. **Bachasson D**, Benveniste O, Hogrel J-Y, Allenbach Y (2017) Daily physical activity monitoring: a promising outcome measure in idiopathic inflammatory myopathies. *Neurology*. Accompanying Editorial. [IF = 8.1]

14. Bankole LC, Millet GY, Temesi J, **Bachasson D**, Ravelojaona M, Wuyam B, . . . Feasson L (2016) Safety and efficacy of a 6-month home-based exercise program in patients with facioscapulohumeral muscular dystrophy: A randomized controlled trial. *Medicine (Baltimore)* [IF = 2.1]

15. **Bachasson D**, Moraux A, Ollivier G, Decostre V, Ledoux I, Gidaro T, . . . Hogrel J-Y (2016) Relationship between muscle impairments, postural stability, and gait parameters assessed with lower-trunk accelerometry in myotonic dystrophy type 1. *Neuromuscul Disord* [IF = 2.6]

16. Gibbons M C, Sato E J, **Bachasson D**, Cheng T, Azimi H, Schenk S, . . . Ward S R (2016) Muscle architectural changes after massive human rotator cuff tear. *J Orthop Res* [IF = 3.1]

17. **Bachasson D**, Singh A, Shah S B, Lane J G, and Ward S R (2015) The role of the peripheral and central nervous systems in rotator cuff disease. *J Shoulder Elbow Surg* [IF = 3.2]

18. **Bachasson D**, Temesi J, Gruet M, **Yokoyama K**, Rupp T, Millet G Y, and Verges S (2016) Transcranial magnetic stimulation intensity affects exercise-induced changes in corticomotoneuronal excitability and inhibition and voluntary activation. *Neuroscience* [IF = 3.2]

19. **Bachasson D**, Decorte N, Wuyam B, Millet G Y, and Verges S (2016) Original Research: Central and peripheral quadriceps fatigue in young and middle-aged untrained and endurance-trained men: A comparative study. *Exp Biol Med (Maywood)* [IF = 2.7]

20. **Bachasson D**, Villiot-Danger E, Verges S, Hayot M, Perez T, Chambellan A, and Wuyam B (2014) Maximal isometric voluntary quadriceps strength assessment in COPD. *Rev Mal Respir* [IF = 0.6]

21. Pépin J-L, **Bachasson D**, Borel J-C, Vivodtzev I, Verges S, Tamisier R, and Wuyam B (2014) Atteinte musculaire au cours des insuffisances respiratoires chroniques - Explorations, implications thérapeutiques. *Rev Mal Respir* [IF = 0.6]

22. **Bachasson D**, Temesi J, Bankole C, Lagrange E, Boutte C, Millet G Y, . . . Wuyam B (2014) Assessement of quadriceps strength, endurance and fatigue in FSHD and CMT: benefits and limits of femoral nerve magnetic stimulation. *Clin Neurophysiol* [IF = 3.2]

23. Nespoulet H, Rupp T, **Bachasson D**, Tamisier R, Wuyam B, Levy P, and Verges S (2013) Positive expiratory pressure improves oxygenation in healthy subjects exposed to hypoxia. *PLoS One* [IF = 4.5]

24. Decorte N, **Bachasson D**, Guinot M, Flore P, Levy P, Verges S, and Wuyam B. (2013) Effect of salbutamol on neuromuscular function in endurance athletes. *Med Sci Sports Exerc* [IF = 4.8]

25. **Bachasson D**, Wuyam B, Pepin J L, Tamisier R, Levy P, and Verges S (2013) Quadriceps and respiratory muscle fatigue following high-intensity cycling in COPD patients. *PLoS One* [IF = 4.5]

26. **Bachasson D**, Millet G Y, Decorte N, Wuyam B, Levy P, and Verges S (2013) Quadriceps function assessment using an incremental test and magnetic neurostimulation: a reliability study. *J Electromyogr Kinesiol* [IF = 1.7]

27. **Bachasson D**, Guinot M, Wuyam B, Favre-Juvin A, Millet G Y, Levy P, and Verges S (2013) Neuromuscular fatigue and exercise capacity in fibromyalgia syndrome. *Arthritis Care Res (Hoboken)* [IF = 4.1]

28. Millet G Y, **Bachasson D**, Temesi J, Wuyam B, Feasson L, Verges S, and Levy P (2012) Potential interests and limits of magnetic and electrical stimulation techniques to assess neuromuscular fatigue. *Neuromuscul Disord* [IF = 2.6]

29. Verges S*, **Bachasson D***, and Wuyam B (2010) Effect of acute hypoxia on respiratory muscle fatigue in healthy humans. *Respir Res* [IF = 3.8]

Editorial and commissioned articles regarding published work

- Smith BK. (2020) Ultrafast ultrasound responses to twitch stimulation: Bridging the gap between non-volitional and non-invasive tests of diaphragm contractility. *The Journal of physiology*.
- Dimachkie MM, and Paganoni S. (2017) Outcome measures in the idiopathic inflammatory myopathies: On the search for the holy grail. *Neurology*.

Patents

1. **Bachasson D**, Hogrel J-Y. Method, device and apparatus for measuring segmental muscle volume. Submitted on August 14 2019. Pending.

2. **Bachasson D**, Dres M, Gennisson J-L, Hogrel J-Y, and Similowski T. Method, Device and apparatus for measuring diaphragmatic functional parameters. Submitted on September 14 2018. Pending.

Comments

- Verges S, **Bachasson D** (2012) Comments on crossTalk opposing view Respiratory muscle training does improve exercise tolerance Respiratory muscle training: How and who ? *Journal of Physiology (London)*

Conference activity

Supervised students are indicated in bold

- **Bachasson D**, **Ayaz AC**, Canal A, Boisserie J, **Mosso J**, **Jean-Amans**, Carlier P, Caldas E, Reyngoudt H, Marty B, Benveniste O, and Hogrel J. (2020) Estimating lean thigh muscle volume using multifrequency serial bioelectrical impedance in patients with muscle atrophy and fatty degeneration. *Neuromuscular Disorders*.
- Birnbaum S, **Bachasson D**, Sharshar T, Porcher R, Hogrel J, and Portero P. (2020) P.39 Free-living physical activity and sedentary behaviour in auto-immune myasthenia gravis: a cross-sectional study. *Neuromuscular Disorders*.
- **Poulard T**, Fossé Q, Gennisson J-L, Niérat M-C, Hogrel J-Y, Similowski T, Demoule A, **Bachasson D**, and Dres M. (2020) Diaphragm thickening fraction versus transdiaphragmatic pressure in healthy subjects and ventilated patients: a breath-by-breath analysis. *ERJ Open Research*.
- Fossé Q, **Poulard T**, Hogrel JY, Gennisson JL, Similowski T, Demoule A, Niérat MC, **Bachasson D**, and Dres M. (2020) Ultrasound shear wave elastography for non-invasive assessment of diaphragm activity in mechanically ventilated patients. *ERJ Open Research*.
- Short communications (2020) Proceedings of Reanimation 2020, the French Intensive Care Society International Congress. *Annals of intensive care*.
- Landon-Cardinal O, **Bachasson D**, Guillaume-Jugnot P, Vautier M, Champtiaux N, Hervier B, Rigolet A, Benveniste O, Hogrel J, and Allenbach Y. (2019) P.195Physical activity monitoring using wrist-worn accelerometer in the assessment of patients with myositis. *Neuromuscular Disorders*.
- **Poulard T**, Fosse Q, Hogrel J, Niérat M, Similowski T, Dres M, **Bachasson D**, and Gennisson J-L. Ultrasound shear wave elastography for assessing diaphragm function within the intensive care unit. In: 2019 IEEE International Ultrasonics Symposium (IUS) 2019, Glasgow, Scotland.
- **Bachasson D**, Dres M, Nierat M-C, Doorduin J, Gennisson J-L, Hogrel J-Y, and Similowski T. (2018) Changes in diaphragm stiffness assessed with ultrasound shear wave elastography reflect changes in transdiaphragmatic pressure. *European Respiratory Journal*, 52(suppl 62). Presentation at poster session at the ERS 2018, Versailles, France.
- **Bachasson D**, **Mosso J**, Marty B, Benveniste B, Carlier PG, Hogrel JY. (2018) Estimating thigh muscle volume using bioelectrical impedance analysis with reference to contractile muscle volume assessed by nuclear magnetic resonance imaging. Poster session at 23rd International Annual Congress of the World Muscle Society (WMS), Mendoza, Argentina.
- **Bachasson D**, Dres M, Nierat M-C, Doorduin J, Gennisson J-L, Hogrel J-Y, and Similowski T. (2018) Ultrafast ultrasound imaging grants alternate methods for assessing diaphragm function. IEEE International Ultrasonic Symposium, Kobe, Japan.
- Landon-Cardinal, O, **Bachasson, D**, Guillaume P, Vautier M, Champtiaux N, Hervier B, Rigolet A, Benveniste O, Hogrel J-Y, Allenbach Y. (2018) Physical activity monitoring using wrist-worn accelerometer in the assessment and follow-up of patients with myositis. *Arthritis Rheumatol*. 70 (suppl 10). 2018 ACR/ARHP Annual Meeting in Chicago, USA.
- Carlier PG, Lopez Kolkovsky A, Reyngoudt H, Marty B, Giacomini E, **Bachasson D** and Hogrel J-Y. (2018) Interleaved multiparametric multinuclear dynamic NMR imaging and spectroscopy: a non-invasive setup to further investigate the skeletal muscle functional alterations associated with sarcopenia. 11th International Conference on Cachexia, Sarcopenia and Muscle Wasting, Maastricht, The Netherlands.
- **Bachasson D**, Reyngoudt H, Turk S, Benveniste O, Hogrel J-Y, Carlier PG (2017) Muscle alterations in sporadic inclusion body myositis assessed using quantitative nuclear magnetic resonance imaging and spectroscopy, ultrafast shear-wave elastography, and relationships with muscle function. *Neuromuscul Disord*, 27: S123-S123; P86. Poster session at the World Muscle Society congress, St. Malo, France.
- Benveniste, O, **Bachasson D**, Landon O, Champtiaux N, Gilardin L, Hervier B, Hogrel J-Y. (2017) Une solution nouvelle pour l'évaluation des myosites: la mesure de l'activité physique quotidienne par accéléromètrie. *La Revue de Médecine Interne*, 38 (suppl 1): A79. Oral communication at the 75èmes congrès français de médecine interne, Brest, France.
- **Bachasson D**, Dubois G J-R, Benveniste O, Hogrel J-Y. (2016) Lower muscle stiffness assessed with supersonic shear imaging is associated with more severe muscle impairments in patients with sporadic inclusion body myositis. *Neuromuscul Disord*, 26, S99. Poster session at the World Muscle Society congress, Granada, Spain.
- **Bachasson D**, Moraux A, Ollivier G, Decostre V, Ledoux I, Gidaro, T Servais, L Behin, Stojkovic T, Hébert L J, Puymirat J, Eymard B, Bassez G, Hogrel J-Y. (2016) Muscle Weakness, Postural Instability, and Gait Abnormalities in Patients with Myotonic Dystrophy Type I. Poster session at Myology 2016, Lyon, France.
- Gibbons MC, Sato E J, **Bachasson D**, Cheng T T, Azimi H, Schenk S, . . . Ward SR. (2016) Human Muscle Architectural Adaptations after Rotator Cuff Tendon Tears and Repairs. Paper presented at the Orthopedic

Research Society 2016 Annual Meeting, Orlando, Florida, USA.
- Gruet M, Temesi J, **Bachasson D**, Rupp T, Millet G Y, Verges S (2015) Adaptations corticospinales à la fatigue et stimulation magnétique transcranienne : aspects méthodologiques. Paper presented at the ACAPS (Association of researchers in physical activities and sport) congress, Nantes, France.
- **Bachasson D** (2014) Methodological advances in neuromuscular phenotyping: implications for chronic diseases. Poster session at the Alternative Muscle Conference, San Diego, USA.
- Bankolé C, Millet GY, Temesi J, Wuyam B, **Bachasson D**, Kadi F, Antoine J-C, Carlier PG, Féasson L. (2012) Exercice et FSHD : Résultats préliminaires des effets d'un programme d'entraînement de 6 mois : Etude contrôlée randomisée. Paper presented at the 10èmes Journées Annuelles de la Société Française de Myologie, Grenoble, France.
- Millet GY, **Bachasson D**, Temesi J, Wuyam B, Féasson L, Verges S, Lévy P. (2012) Measuring fatigue in the context of neuromuscular diseases. Neuromuscul Disord, 22: S181-S186. Paper presented at the World Muscle Society.
- **Bachasson D**, Millet, G.Y, Decorte, N, Wuyam, B, Levy P, Verges S (2012, March) Evaluation de la fatigue neuromusculaire des muscles inspiratoires, expiratoires et locomoteurs chez le patient BPCO. Poster session at the Congrès Alvéole (Société de Pneumologie de Langue Française), Lyon, France.
- **Bachasson D**, Millet GY, Decorte N, Wuyam B, Levy P, Verges S (2012) Validation d'un nouveau test pour l'évaluation non invasive de la fonction neuromusculaire. Poster session at the Congrès Alvéole (Société de Pneumologie de Langue Française), Lyon, France.
- Verges S, **Bachasson D**, Wuyam B. (2010) Effect of hypoxia on respiratory muscle fatigue in human. Paper presented at the Congress of the European Respiratory Society, Amsterdam, Netherlands.

Invited Talks
- **Bachasson D** (2018) Assessing diaphragm function: potential of multimodal ultrasound imaging. 12e congrès Alvéoles, Nantes, France.
- **Bachasson D** (2017) Fonction neuromusculaire: indicateurs physiologiques, fatigue et impact clinique. Journées Francophones de Kinésithérapie, Paris, France.
- **Bachasson D** (2017) Quantitative ultrasound and shear wave elastography in muscle and nerve disorders. Paris meets Nijmegen, Paris, France.
- **Bachasson D** (2012) Evaluation ambulatoire de la force maximale isométrique du quadriceps chez le patient BPCO. Société de Pneumologie de Langue Française, Paris, France.
- **Bachasson D** (2011) Stimulation magnétique transcrannienne repetitive et réentrainement dans le syndrome fibromyalgique: Resultats préliminaires. Invited talk at the Congrès de la Société française d'étude et du traitement de la douleur (SFTED), Paris, France.
- **Bachasson D** (2011) Activité physique dans les maladies chroniques : outils pour évaluation préliminaire. Invited talk at the 6èmes journée de la société Dauphiné Savoie de médecine du sport, Grenoble, France.
- **Bachasson D** (2011) Stimulation magnétique transcrannienne repetitive et réentrainement dans le syndrome fibromyalgique. Invited talk at presented at the Congrès de la Société française d'étude et du traitement de la douleur (SFTED), Marseille, France.

Awards, honors and fellowships
2012 | **Best poster award**; Congrès Alvéole (Société de Pneumologie de Langue Française), Lyon, France: Assessment of inspiratory, expiratory and locomotor muscle fatigue in COPD – **1000 €**

2010 | **Research prize**; Société Française d'Etude et de Traitement de la Douleur (SFETD)-Janssen Cilag: Repetitive transcranial magnetic stimulation in patients with chronic painful syndrome undergoing exercise-based rehabilitation – **20 000 €**

2009 | **PhD fellowship**; French muscular dystrophy association (AFM) – **100 000** €

Research methods and scientific techniques
Human Experiments
- Peripheral nerve and transcranial/spinal magnetic/electrical stimulation (respiratory/locomotor muscles)
- Multiparametric ultrasound imaging (texture, strain, shear wave elastography, ultrafast plane-wave imaging)
- Electroneuromyography
- Muscle strength, voluntary activation, endurance, fatigue
- Gastro-esophageal manometry (transdiaphragmatic pressure measurements)
- Bioelectrical analysis for the estimation of muscle volume
- Standard cardiopulmonary exercise testing
- Ventilatory mechanics
- Estimates of physical activity energy expenditure from accelerometers raw signal analysis

- Inertial measurement unit motion-capture systems
- Anatomy, dissection

Animal experiments

- Project designer (French certification: *Niveau concepteur de projet en expérimentation animale* (2017))
- Mouse, rat, rabbit
- Anaesthesia, small surgeries (tenotomy, neurotomy), euthanasia, dissection, nerve/muscle tissue processing
- Passive and active muscle mechanics (*in situ*, *in vivo*, *in vitro*).
- Muscle architecture

Wet lab techniques

- Tissue processing: cryosectioning, staining, immunohistochemistry/fluorescence (muscle/nerve)
- Experience with western blotting analysis, qPCR (*e.g.* myogenic, atrophic, adipogenic, fibrotic, and inflammatory responses)

Computer skills

Programing Languages | R (data science and reproducible research); MATLAB; Shiny (Interactive web apps *e.g.* Interactive apps for computing predicted muscle strength)

Scientific Softwares | Rstudio, Labchart; Statistica; ImageJ

Technical Writing and web | rMarkdown; knitr; pandoc; Hugo websites

Teaching and mentoring experience

Teaching

Since 2020 | **Speaker**, IFMK, APHP-SU: Musculoskeletal ultrasound, France. [8 h].

Since 2019 | **Speaker**, Master 2 PAPSN, Activité Physique et Maladies Chroniques: Pathologies Respiratoires & Pathologies Neuromusculaires, Paris Descartes University, Paris, France. [4 h].

Since 2015 | **Speaker**, Master 2 Analysis of the electromyographic signal and research applications. Master Neuromoteur, UE Recueil et Analyse des Signaux Neurophysiologiques Neurophysiologie Centrale, Paris-Est Creteil Val de Marne University, Paris, France. [4 h].

2009-2013 | **Instructor** for health professionals' ongoing training: Neuromuscular function assessment in patients. Grenoble-Alpes University Hospital Centre, Grenoble, France. [20 h].

2009-2013 | Therapeutic education. Grenoble-Alpes University Hospital Centre, Grenoble, France.

Students supervision

PhD students

1. **2019- to date** | **Thomas Poulard**, Electrical, Optical, Bio: Physics and Engineering (EOBE), Université Paris-Saclay: Multiparametric ultrasound imaging of the diaphragm – Co-supervisor with Dr J-L Gennisson

MSc students

1. **2019-2020** | **Claire de Belenet**, IFMK-APHP-SU & Master Sciences de la réadaptation: Ultrafast ultrasound for the assessment of maximal tissue velocity during artificially evoked contractions – Principal supervisor
2. **2019-2020** | **Cléa Langouet**, IFMK-APHP-SU & Master Sciences de la réadaptation: Powered lower-limb exoskeleton in patients with neuromuscular disorders – Principal supervisor
3. **2019-2020** | **Mohammad Mohajery**, Institut Polytechnique de Paris (l'X): Development of a portable ultrasound device for the assessment of diaphragm structure and function – Principal supervisor
4. **2019-to date** | **Kevin Gramage**, Technical University of Munich: Powered lower-limb exoskeleton in patients with neuromuscular disorders – Principal supervisor
5. **2018-to date** | **Alper Carras Ayaz**, Institut Supérieur de BioSciences de Paris: Multiparametric ultrasound for estimating muscle content – Co-supervisor
6. **2019** | **Karla Mirallès**, Mines Saint-Etienne: Powered lower-limb exoskeleton in patients with neuromuscular disorders – Principal supervisor
7. **2018** | **Nicolas Jean-Amans**, École Supérieure de Physique et de Chimie Industrielles de la ville de Paris: Bioelectrical muscle properties for the assessment of muscle volume and muscle activation: development of skin-electrode interfaces, prototyping, and validation studies – Principal supervisor

8. **2018** | **Jessie Mosso**, École Supérieure de Physique et de Chimie Industrielles de la ville de Paris: Estimating contractile muscle volume in thigh using bio-electrical impedance analysis: a reappraisal – Principal supervisor
9. **2016** | **Hans Bourgeois**, Université Pierre Marie Curry: Relationships between diaphragm stiffness and buccal pressure during closed-airways inspiratory maneuvers – Principal supervisor
10. **2016** | **Yassir Garoiaz**, Université de Technologie Compiègne: Methods and custom software for ultrasound imaging and elastography in skeletal muscles and nerves – Principal supervisor
11. **2015** | **Floriane Chevalier**, Université de Technologie Compiègne: Device for the regulation of probe pressure during ultrasound imaging and elastography – Co-supervisor
12. **2013-14** | **Kenji Yokoyama**, UFRAPS/CHU Grenoble, Université Grenoble-Alpes: Transcranial magnetic for investigating exercise-induced changes in corticomotoneuronal excitability and inhibition and voluntary activation: effects of stimulation intensity – Principal supervisor
13. **2013** | **Alexandre Estieux**, Institut Lorrain de Formation en Masso-kinésithérapie, Nancy, France: Assessment of quadriceps weakness in COPD: reliability and clinical impact – Principal supervisor
14. **2013** | **Julien Gauthier**, UFRAPS/CHU Grenoble, Université Grenoble-Alpes: Impact of fatigue on response to exercicse training in COPD – Principal supervisor
15. **2013** | **Manon Boglietti**, UFRAPS/CHU Grenoble, Université Grenoble-Alpes: Assessment of respiratory muscle endurance: influence of COPD stages – Principal supervisor
16. **2012** | **Clément Hussenot**, UFRAPS/CHU Grenoble, Université Grenoble-Alpes: Ambulatory assessment of respiratory muscle endurance in COPD – Co-supervisor
17. **2011** | **Grégoire Payen**, UFRAPS/CHU Grenoble, Université Grenoble-Alpes: Predictive factors of responses to exercise training in patients with fibromyalgia syndrome – Co-supervisor
18. **2011** | **Alexandre Gonzalez**, UFRAPS/CHU Grenoble, Université Grenoble-Alpes: Respiratory muscle endurance assessment using an incremental test in isocapnic hyperpnea – Co-supervisor
19. **2010** | **Anaïs Nowak**, UFRAPS/CHU Grenoble, Université Grenoble-Alpes: Neuromuscular fatigue in fibromyalgia: a control study – Co-supervisor
20. **2010** | **Yoann Barnouin**, UFRAPS, Université Grenoble-Alpes: Intermittent quadriceps function test: reliability in healthy subjects – Co-supervisor

Service to profession

Manuscripts reviewing

Journal of Physiology; Journal of Applied Physiology; European Journal of Applied Physiology; European Respiratory Journal; Neuromuscular Disorders; Arthritis Care and Research; Muscle and Nerve; Acta physiologica

See reviews on Publons (non-exhaustive)

Grant/Award reviewing

- AFM-TELETHON scientific council (since 2016)
- ECOS SUD CHILI (since 2019)
- Prix de l'Ordre des masseurs-kinésithérapeutes (CNOMK, since 2019)
- Appel à projets interdisciplinaires (2017); Université de Nantes, Nantes, France
- Fonds de Dotation Recherche en Santé Respiratoire (2015); Fondation du Souffle

University service

External examiner

2010-14 | **Examiner** MSc dissertation defense; Departments of Exercise Sciences and Physical Therapy, Grenoble-Alpes University, Grenoble, France

Scientific Events organization

2018 | **Co-organizer** of the *2èmes Journée de l'exercice musculaire* 2018. Institute of Myology, Paris, France; website of the event & associated internal press release

Community involvement and outreach

- **Organizer**, Déficyclothon de l'Institut de Myologie (2016, 2017, 2018, 2019), Paris, France
- **Speaker**, Opération 1000 chercheurs dans les écoles (AFM-Téléthon) (2015, 2016), Lycée International, Grenoble, France
- **Speaker**, Journée des Familles (2015) AFM-Téléthon, Paris, France

Professional memberships, other memberships

European Respiratory Society (Early Career Member; Main group: Clinical respiratory physiology, exercise and functional imaging) | Société française de Myologie | Treat-NMD | World Muscle Society | PhD Alumni Univ Grenoble Alpes

Vulgarization, wide-audience presentations and media

(Selected appearances)

- **Video:** RespiMyo | Fondation de myologie, presentation of our recent advances in multiparametric ultrasound imaging of the diaphragm; October 2020
- **Press release:** L'échographie ultrarapide comme technique d'évaluation non-invasive et non-volitionnelle de la contractilité du diaphragme, Life Sciences Université Paris-Saclay; October 2020
- **TV:** France 5:Le magazine de la santé: dossier spécial diaphragme; December 2019.
- **Radio:** RTL La Curiosité Est Un Vilain Défaut: Tout ce que vous ne savez pas sur vos muscles; May 2019
- **Press release:** Advance in diagnosis of respiratory disorders from AFM-presse and APHP; February 2019
- **Press article:** Interview for an article in Dr Good (French Wellness and Health Magazine); January 2019
- **Video:** Interview for the RESPIMYO project involving multiparametric ultrasound imaging; Grande Ambition AFM-TELETHON; February 2017
- **Press article:** Appearance in Science & Santé INSERM - Têtes Chercheuses; March 2012

Language skills

English: Fluent | French: Native | Spanish: Intermediate

Referees

Available on request.