

Nathanael Jarrassé

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Situation

- **Tenured Researcher (CRCN) CNRS**, affiliated to both Section 7 (*Sciences de l'information*) & CID 53 (*Sciences en société : production, circulation et usages des savoirs et des technologies*). Team AGATHE (ERL INSERM U1150), ISIR, Sorbonne Université
- **Visiting Researcher**, Human Robotics Group, Department of Bioengineering, Imperial College London.

Highlights

N. Jarrassé, (*CNRS bronze medalist in 2020*) is a recognized expert in the development of interactive robotic devices for assistance and neuromotor rehabilitation. He authored over 40 journal articles (*Nature Scientific Reports, IEEE Transactions, Frontiers, PLOS*, etc.), 7 book chapters, 35 conference papers and gave more than 50 invited conferences. His H-Factor is equal to 20 with over 2000 citations (Google Scholar) and has obtained over 1.9M of fundings over the last 5 years.

Research interests

- Physical Human-Robot interaction (pHRi). Rehabilitation and assistive robotics. AI. Prosthetics. Exoskeletons. Human sensorimotor control. Neurosciences. Body appropriation.
- Technology and handicap. Ethical, Legal and Societal (ELS) issues in Robotics. Science, Technology and Society (STS).

Educational background

- Jan. 2011 **Ph.D. in Mechanical Engineering and Robotics**, Univ. Pierre et Marie Curie (Paris VI), Paris, France.
Ph.D. thesis title : *Contributions to the use of active exoskeletons for neuromotor rehabilitation*
Supervisor : Prof. Guillaume Morel
- June 2006 **M. Sc. in Robotics and Industrial Automation**, Univ. Pierre et Marie Curie (Paris VI), Paris, France.
Specialty : Mobile robotic, design optimization
- June 2006 **M. Eng. in Mechanical Engineering**, École Nationale Supérieure d'Arts et Métiers, ENSAM ParisTech, Paris, France.
Specialty : Industrial Systems Engineering

Academic experience

- 2015 – now **Tenured research scientist, (1st grade CR1 CNRS)**, ISIR (UMR 7222 CNRS / University Pierre et Marie Curie, Paris), Group Assistance to Gesture with Application to THERapy (AGATHE)..
- 2012 – 2015 **Tenured research scientist, (2nd grade CR2 CNRS)**, ISIR (UMR 7222 CNRS / University Pierre et Marie Curie, Paris), Group Assistance to Gesture with Application to THERapy (AGATHE)..

- 2012 – now **Visiting researcher**, *Imperial College London, Dept. of Bioengineering, London, UK*, Human Robotics Group.
- 2011 – 2012 **Post-doc fellow**, *Department of Bioengineering, Imperial College, London, UK*, Human Robotics Group.
- 2006 – 2010 **Research Assistant**, *ISIR (UMR 7222 CNRS / University Pierre et Marie Curie)*.

Scientific productions

Journal articles (40)

- O. Rossel, M. Chateaux, N. Jarrassé, F. Vêrité, A. Touillet, C. Nicol, J. Paysant, and J. B. D. Graaf. Phantom movement training without classifier performance feedback improves mobilization ability while maintaining emg pattern classification. *IEEE Transactions on Medical Robotics and Bionics*, pages 1–1, 2023
- The Ethics of Supernumerary Robotic Limbs. An Enactivist Approach. *Science and Engineering Ethics*, 2022
- M. Khoramshahi, A. Roby-Brami, R. Parry, and N. Jarrassé. Identification of inverse kinematic parameters in redundant systems : Towards quantification of inter-joint coordination in the human upper extremity. *PLOS One*, 2022
- M. Legrand-Lestoille, . Marchand, F. Richer, A. Touillet, N. Martinet, J. Paysant, G. Morel, and N. Jarrassé. Simultaneous control of 2DOF upper-limb prosthesis with body compensations-based control : a multiple cases study. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 2022
- A. Poignant, N. Jarrassé, and G. Morel. Virtually turning robotic manipulators into worn devices : opening new horizons for wearable assistive robotics. *arXiv preprint arXiv 2211.08483*, 2022
- A. Touillet, A. Gouzien, B. M., H. p, N. Martinet, N. Jarrassé, and A. Roby-Brami. Kinematic analysis of impairments and compensatory motor behavior during prosthetic grasping in below-elbow amputees. *PLOS One*, 2022
- C. Marchand, J. B. De Graaf, and N. Jarrassé. Measuring mental workload in assistive wearable devices : a review. *Journal of NeuroEngineering and Rehabilitation*, 18(1), Nov. 2021
- R. Parry, F. R. Sarlegna, N. Jarrassé, and A. Roby-Brami. Anticipation and compensation for somatosensory deficits in object handling : evidence from a patient with large fibre sensory neuropathy. *Journal of Neurophysiology*, 0(0), 2021
- A. Roby-Brami, N. Jarrassé, and R. Parry. Impairment and compensation in dexterous upper-limb function after stroke. from the direct consequences of pyramidal tract lesions to behavioral involvement of both upper-limbs in daily activities. *Frontiers in Human Neuroscience*, 15 :336, 2021
- M. Legrand, N. Jarrassé, E. de Montalivet, F. Richer, and G. Morel. Closing the loop between body compensations and upper-limb prosthetic movements : a feasibility study. *IEEE Transactions on Medical Robotics and Bionics*, 3 :230–240, Jan. 2021
- E. de Montalivet, K. Bailly, A. Touillet, N. Martinet, J. Paysant, and N. Jarrassé. Guiding the training of users with a pattern similarity biofeedback to improve the performance of myoelectric pattern recognition. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 28(8) :1731 – 1741, 2020
- M. Merad, E. Montalivet, M. Legrand, E. Mastinu, M. Ortiz-Catalan, A. Touillet, N. Martinet, J. Paysant, A. Roby-Brami, and N. Jarrassé. Assessment of an automatic prosthetic elbow control strategy using residual limb motion for transhumeral amputated individuals with socket or osseointegrated prostheses. *IEEE Transactions on Medical Robotics and Bionics*, 1 :1–12, 2020
- O. Mounir Alaoui, F. Expert, G. Morel, and N. Jarrassé. Using generic upper-body movement strategies in a free walking setting to detect gait initiation intention in a lower-limb exoskeleton. *IEEE Transactions on Medical Robotics and Bionics*, 2(2) :236 – 247, 2020
- R. Parry, S. Macias S, P. Pradat-Diehl, V. Marchand-Pauvert, N. Jarrassé, and A. Roby-Brami. Effects of hand configuration on the grasping, holding and placement of an instrumented object

- in patients with hemiparesis. *Frontiers in Neurology*, 10 :240, 2019
- E. Guigon, O. Chafik, N. Jarrassé, and A. Roby-Brami. Experimental and theoretical study of velocity fluctuations during slow movements in humans. *Journal of neurophysiology*, 2 :715–727, 2019
 - R. Parry, S. Macias S, P. Pradat-Diehl, V. Marchand-Pauvert, N. Jarrassé, and A. Roby-Brami. Effects of hand configuration on the grasping, holding and placement of an instrumented object in patients with hemiparesis. *Frontiers in Neurology*, 10 :240, 2019
 - N. Jarrassé, E. de Montalivet, F. Richer, C. Nicol, A. Touillet, N. Martinet, J. Paysant, and J. B. De Graaf. Phantom-mobility-based prosthesis control in transhumeral amputees without surgical reinnervation : a preliminary study. *Frontiers in Bioengineering and Biotechnology*, 6 :164, 2018
 - A. Touillet, L. Peultier-Celli, C. Nicol, N. Jarrassé, I. Loiret, N. Martinet, J. Paysant, and J. B. De Graaf. Characteristics of phantom upper limb mobility encourage phantom-mobility-based prosthesis control. *Nature Scientific Reports*, 8 :15459, 2018
 - M. Legrand, E. de Montalivet, M. Merad, A. Roby-Brami, and N. Jarrassé. Movement-based control for upper-limb prosthetics : is the regression technique the key to a robust and accurate control? *Frontiers in Neurorobotics*, 12 :41, 2018
 - Y. Li, G. Gowrishankar, N. Jarrassé, S. Haddadin, A. Albu-Schaffer, and E. Burdet. Force, impedance and trajectory learning for contact tooling and haptic identification. *IEEE Transactions on Robotics*, 35(5) :1170–1182, 2018
 - M. Merad, E. de Montalivet, A. Touillet, A. Roby-Brami, and N. Jarrassé. Can we achieve intuitive prosthetic elbow control based on healthy upper limb motor? *Frontiers in Neurorobotics*, 12 :1, 2018
 - A. Hussain, S. Balasubramanian, N. Roach, J. Klein, N. Jarrassé, M. Mace, A. David, S. Guy, and E. Burdet. Sitar : a system for independent task-oriented assessment and rehabilitation. *Journal of Rehabilitation and Assistive Technologies Engineering*, 4 :2055668317729637, 2017
 - A. Gouzien, F. de Vignemont, A. Touillet, N. Martinet, J. De Graaf, N. Jarrassé, and A. Roby-Brami. Reachability and the sense of embodiment in amputees using prostheses. *Nature Scientific Reports*, 7, 2017
 - T. Proietti, E. Guigon, A. Roby-Brami, and N. Jarrassé. Modifying upper-limb inter-joint coordination in healthy subjects by training with a robotic exoskeleton. *Journal of NeuroEngineering and Rehabilitation*, 14(1) :55, 2017
 - S. Martin-Brevet, N. Jarrassé, E. Burdet, and A. Roby-Brami. Taxonomy based analysis of force exchanges during multi-digital object grasping and manipulation. *Plos One*, 12(5) :e0178185, may 2017
 - V. N. Bobić, M. Djurić-Jovičić, N. Jarrassé, J.-L. M., I. Petrović, S. M. Radovanović, N. Dražašević, and K. V.S. Spectral parameters for finger tapping quantification. *Facta Universitatis, Series : Electronics and Energetics*, 30(4) :585–597, 2017
 - N. Jarrassé. Robotic prostheses : what do they actually mean for the patient? *Human Body In Motion Journal*, 1 :10–16, 2017
 - T. Proietti, V. Crocher, A. Roby-Brami, and N. Jarrassé. Upper-limb robotic exoskeletons for neurorehabilitation : A review on control strategies. *IEEE Reviews in Biomedical Engineering*, 9 :4–14, 2016
 - N. Jarrassé, C. Nicol, A. Touillet, F. Richer, N. Martinet, J. Paysant, and J. De Graaf. Classification of phantom finger, hand, wrist and elbow voluntary gestures in transhumeral amputees with semg. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 25(1) :68–77, jan 2017
 - J. De Graaf, N. Jarrassé, C. Nicol, A. Touillet, T. Coyle, L. Maynard, N. Martinet, and J. Paysant. Phantom hand and wrist movements in upper limb amputees are slow but naturally controlled movements. *Neuroscience*, 312 :48–57, 2016
 - N. Jarrassé, M. Maestrutti, G. Morel, and A. Roby-Brami. Robotic prosthetics : Moving beyond technical performance. (a study of socio-anthropological and cultural phenomena influencing the appropriation of technical objects interacting with the body). *IEEE Technology and Society*

Magazine, 34(3) :69–77, june 2015

- N. Jarrassé, T. Proietti, V. Crocher, J. Robertson, A. Sahbani, G. Morel, and A. Roby-Brami. Robotic exoskeletons : a perspective for the rehabilitation of arm coordination in stroke patients. *Frontiers in Human Neuroscience*, 8 :947 :1, december 2014
- M. Esmaeili, N. Jarrassé, W. Dailey, E. Burdet, and D. Campolo. Ergonomic design of a wrist robot : the influence of hyperstaticity on reaction connecting forces and motor strategies. *International Journal of Intelligent Computing and Cybernetics*, 7(3) :289–306, 2014
- N. Jarrassé, A. Ribeiro, A. Sahbani, W. Bachta, and A. Roby-Brami. Analysis of hand synergies in healthy subjects during bimanual manipulation of various objects. *Journal of NeuroEngineering and Rehabilitation*, 11 :113, 2014
- N. Jarrassé, V. Sanguinetti, and E. Burdet. Slaves no longer : review on role assignment for human-robot joint motor action. *Adaptive Behavior (SAGE)*, 2014
- N. Jarrassé and G. Morel. Connecting a human limb to an exoskeleton. *IEEE Transactions on Robotics*, 28(3) :697–710, 2012
- N. Jarrassé, T. Charalambous, and B. E. A framework to describe, analyze and generate interactive motor behaviors. *PLoS ONE*, 7(11) :e49945, 11 2013
- N. Jarrassé, M. Tagliabue, J. Robertson, A. Maiza, V. Crocher, A. Roby-Brami, and G. Morel. A methodology to quantify alterations in human upper limb movement during co-manipulation with an exoskeleton. *IEEE in Transactions on Neural Systems and Rehabilitation Engineering*, 18(4) :389 – 397, juillet-aout 2010
- J. Robertson, A. Roby-Brami, N. Jarrassé, V. Pasqui, and G. Morel. La conception d’un robot de reéducation au membre superieur. *Kinesithérapie, la revue*, 9 :62–63, Jan-Feb 2009
- J. Robertson, N. Jarrassé, V. Pasqui, and A. Roby-Brami. De l’utilisation des robots pour la rééducation : intérêt et perspectives. *La Lettre de Médecine Physique et de Réadaptation*, 23 :139–147, mars 2007

Book (1)

- V. Gourinat, P.-F. Groud, and N. Jarrassé. *Corps et prothèses*. Presses Universitaire Grenoble, 2020

Book chapter (9)

- N. Jarrassé. Cyborg et corps artificiel. In C. Editions, editor, *Vers le cyber-monde : Humain et numérique en interaction*. Cnrs editions edition, 2021
- V. Gourinat, P. Groud, and N. Jarrassé. L’ambivalence de l’enchantement prothétique contemporain. In *Corps et Prothèses*, pages 199–219. Presses Universitaires de Grenoble, 2020
- N. Jarrassé. Les exosquelettes. In *Techniques de l’ingénieur*, pages 1–32. 2019
- A. Roby-Brami and N. Jarrassé. Wearable robotic systems and their application for neurorehabilitation. In C. R. and S. V., editors, *Rehabilitation robotics, technology and application.*, volume ISBN : 978-0-12-811995-2, pages 241–252. Elsevier, academic press edition, 2018
- Y. Li, N. Jarrassé, and E. Burdet. Versatile interaction control and haptic identification in humans and robots. In Springer, editor, *Geometric and Numerical Foundations of Movements*, volume 117, pages 187–206. Tracts in advanced robotics edition, may 2017
- N. Jarrassé. Prothèses robotiques : vers un nouveau dualisme ? In E. CNRS, editor, *L’humain et ses prothèses : Savoirs et pratiques du corps transformé*. 2017. 978-2-271-11416-7
- N. Jarrassé. Membres et organes artificiels : le mythe et la fabrique des surhommes. In Dalloz, editor, *"Vers de nouvelles humanités ? L’humanisme juridique face aux nouvelles technologies"*, volume 59. Archives de philosophie du droit edition, 2017
- A. Roby-Brami, S. Martin, and N. Jarrassé. La rééducation fonctionnelle, une question de techniques corporelles. In PUF, editor, *L’apprentissage des techniques corporelles*, pages 143–156. Collection "Apprendre" Presses Universitaires de France, marc durand, denis hauw, germain poizat edition, 2015
- J. Robertson, N. Jarrassé, and A. Roby-Brami. Rehabilitation robots : a compliment to virtual reality. volume 1, pages 77–93. Schedae, 2010

Peer-reviewed conferences articles (35)

- O. Alaoui, F. Expert, G. Morel, and N. Jarrassé. Using arm swing movements to maintain the walking state in a self-balanced lower-limb exoskeleton. In *2022 International Conference on Robotics and Automation (ICRA)*, pages 6444–6450, Philadelphia, USA, May 2022. IEEE
- A. Poignant, M. Legrand, N. Jarrassé, and G. Morel. Computing the positioning error of an upper-arm robotic prosthesis from the observation of its wearer’s posture. In *2021 IEEE International Conference on Robotics and Automation (ICRA)*, page xx, Xi’an, China, May 2021
- M. Khoramshahi, G. Morel, and N. Jarrassé. Intent-aware control in kinematically redundant systems : Towards collaborative wearable robots. In *2021 IEEE International Conference on Robotics and Automation (ICRA)*, page xx, Xi’an, China, May 2021
- M. Legrand, N. Jarrassé, F. Richer, and G. Morel. A closed-loop and ergonomic control for prosthetic wrist rotation. In *IEEE International Conference on Robotics and Automation*, page xx, 2020
- M. Merad, E. de Montalivet, M. Legrand, A. Touillet, M. N, J. Paysant, A. Roby-Brami, and N. Jarrassé. Improving the control of prostheses in arm amputees with approaches based on motor coordination. In *Computer Methods in Biomechanics and Biomedical Engineering : Supplement for the International French Society of Biomechanics Conference*, page xx, 2019
- M. Legrand, E. de Montalivet, F. Richer, N. Jarrassé, and G. Morel. Reciprocal kinematic control : Using human-robot dual adaptation to control upper limb assistive devices. In *Proceedings of the Hamlyn Symposium on Medical Robotics*, page xx, 2019
- N. Jarrassé, C. Nicol, F. Richer, A. Touillet, N. Martinet, J. Paysant, and J. De Graaf. Voluntary phantom hand and finger movements in transhumeral amputees could be used to naturally control polydigital prostheses. In *Proceedings of the 2017 IEEE-RAS-EMBS International Conference on Rehabilitation Robotics (ICORR)*, pages 1239–1245, London, 2017
- T. Proietti, G. Morel, A. Roby-Brami, and N. Jarrassé. Comparison of different error signals driving the adaptation in assist-as-needed controllers for neurorehabilitation with an upper-limb robotic exoskeleton. In *in proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages –, 2017
- N. Jarrassé, C. Nicol, A. Touillet, F. Richer, N. Martinet, J. Paysant, and J. De Graaf. Control of prosthetics through emg patterns associated to phantom limb voluntary gestures is possible in transhumeral amputees without surgical reinnervation. In *16th World Congress of the International Society of Prosthetics and Orthotics (ISPO)*, page xx, Cape Town, South Africa, may 2017
- J. De Graaf, J. Rossato, C. Nicol, N. Jarrassé, and A. Touillet. Motor commands send to residual upper-arm muscles during phantom hand movements are send from the cortical hand area : an eeg study on cortico-muscular coherence. In *Annual World Congress of Neurotalk (NT)*, Barcelona, Spain, 2017. invited conference
- M. Merad, E. Masson Bachasson de Montalivet, A. Roby-Brami, and N. Jarrassé. Intuitive control of a prosthetic elbow. In *Proceedings of the International Conference on Neurorehabilitation (ICNR)*, page to appear, 2016
- M. Merad, A. Roby-Brami, and N. Jarrassé. Towards the implementation of natural prosthetic elbow motion using upper limb joint coordination. In *Proc. of the 6th IEEE RAS/EMBS Int. Conf. on Biomedical Robotics and Biomechatronics (BioRob)*, pages 829–834, 2016
- M. Merad, E. Masson Bachasson de Montalivet, A. Roby-Brami, and N. Jarrassé. Intuitive prosthetic control using upper limb inter-joint coordinations and imu-based shoulder angles measurement : a pilot study. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, page to appear, 2016
- T. Proietti, A. Roby-Brami, and N. Jarrassé. Learning motor coordination under resistive viscous force fields at the joint level with an upper-limb robotic exoskeleton. In *Converging Clinical and Engineering Research on Neurorehabilitation II*, pages 1175–1179, 2016
- T. Proietti, N. Jarrassé, A. Roby-Brami, and G. Morel. Adaptive control of a robotic exoske-

- leton for neurorehabilitation. In *2015 7th International IEEE/EMBS Conference on Neural Engineering (NER)*, volume 1, pages 803–806. IEEE, 2015
- A. Hussain, W. Dailey, S. Balasubramanian, N. Jarrassé, S. Kamalesh Kumar, S. Devasahayam, and E. Burdet. Quantitative assessment of motor deficit with an intelligent key object : A pilot study. In *Proceedings of the IEEE/RAS-EMBS International Conference on Rehabilitation Robotics (ICORR 2015)*, pages xx–xx, 2015
 - V. Gourinat and N. Jarrassé. La personne amputée dans les médias : quand l’ambiguïté des images bouleverse la compréhension du handicap et des technologies de compensation/restauration. In *4ème Conférence annuelle ALTER (European Society for Disability Research)*, pages xx–xx, Paris, France, juillet 2015 2015
 - J. De Graaf, N. Jarrassé, C. Nicol, A. Touillet, and J. Paysant. Neuromuscular reorganisation after arm amputation revealed by stump emg evoked by different phantom movements. In *19th European Congress of Physical and Rehabilitation Medicine - SOFMER*, Marseille, mai 2014. invited conference
 - A. Roby-Brami., A. Van Zandt-Escobar, N. Jarrassé, J. Robertson, N. Schnell, N. Rasamimanana, E. Boyer, S. Hanneton, and F. Bevilacqua. Toward the use of augmented auditory feedback for the rehabilitation of arm movements in stroke patients. In *European Journal of physical and rehabilitation medicine. Vol 50, Supl 1-3.*, page 72. 19th Eur. congress of physical rehabilitation medicine., 2014
 - N. Jarrassé, S. Martin, and A. Roby-Brami. Instrumented objects for the study and quantitative evaluation of grasping and manipulation strategies. In *European Journal of physical and rehabilitation medicine. Vol 50, Supl 1-3, p 64.*, page 64. 19th European congress of physical rehabilitation medicine., 2014
 - S. Martin, N. Jarrassé, S. Balasubramanian, and A. Roby-Brami. Effect of visual, tactile and proprioceptive sensory perturbations on grasp to lift tasks in healthy subjects. In *Neural Control of Movement NCM*, Amsterdam, 2014. Annual Meeting of the Society for the Neural Control of Movement
 - M. Esmacili, N. Jarrassé, W. Dailey, E. Burdet, and D. Campolo. Hyperstaticity for ergonomic design of a wrist exoskeleton. In *Proceedings of the 13th International Conference on Rehabilitation Robotics (ICORR)*, pages 1–6, 2013
 - N. Jarrassé, M. Kuhne, N. Roach, A. Hussain, S. Balasubramanian, E. Burdet, and A. Roby-Brami. Analysis of grasping strategies and function in hemiparetic patients using an instrumented object. In *Proceedings of the 13th International Conference on Rehabilitation Robotics (ICORR)*, pages 1–8, 2013
 - A. Roby-Brami, J. Robertson, V. Crocher, A. Sahbani, N. Jarrassé, and G. Morel. Rééducation robotisée : bases conceptuelles et neurophysiologiques. In *Revue Neurologique Vol 169S*, pages A221–A223. Journées de Neurologie de langue française., 2013
 - G. Ganesh, N. Jarrassé, S. Haddadin, A. Albu-Schaeffer, and E. Burdet. A versatile biomimetic controller for contact tooling and tactile exploration. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA’12)*, pages 3329 – 3334, 2012
 - N. Jarrassé, V. Crocher, and G. Morel. A method for measuring the upper limb motion and computing a compatible exoskeleton trajectory. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS’12)*, pages 3461 – 346, 2012
 - V. Crocher, N. Jarrassé, A. Sahbani, A. Roby-Brami, and G. Morel. Changing human upper-limb synergies with an exoskeleton using viscous fields. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA’11)*, pages 4657–4663, Shanghai, China, 2011
 - N. Jarrassé and G. Morel. Formal methodology for avoiding hyperstaticity when connecting an exoskeleton to a human member. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA’10)*, pages 1188 – 1195, Anchorage, Alaska, 2010
 - N. Jarrassé and G. Morel. On the kinematic design of exoskeletons and their fixations with a human member. In *Proceedings of Robotics : Science and Systems (RSS’10)*, pages 1–8, Zaragoza, Spain, June 2010
 - N. Jarrassé and G. Morel. A methodology to design kinematics of fixations between an orthosis

- and a human member. In *IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, pages 1958 – 1963, Singapore, Jul. 2009
- N. Jarrassé, J. Paik, V. Pasqui, and G. Morel. Experimental evaluation of several strategies for human motion based transparency control. In *Proceedings of the International Symposium on Experimental Robotics (ISER'09)*, pages 557–565, Athenes, Grece, 2009
 - N. Jarrassé, J. Robertson, P. Garrec, J. Paik, V. Pasqui, Y. Perrot, A. Roby-Brami, D. Wang, and G. Morel. Design and acceptability assessment of a new reversible orthosis. In *Intelligent Robots and Systems, 2008. IROS 2008. IEEE/RSJ International Conference on*, pages 1933–1939, Nice, France, Sept. 2008
 - N. Jarrassé, J. Paik, V. Pasqui, and G. Morel. How can human motion prediction increase transparency? In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA '08)*, pages 2134–2139, Pasadena, California, US, May 2008
 - C. Grand, N. Jarrassé, and P. Bidaud. Innovative concept of unfoldable wheel with an active contact adaptation mechanism. In *Proceedings of the 12th IFToMM World Congress in Mechanism and Machine Science*, Besancon - France, June 2007
 - C. Grand, N. Jarrassé, and P. Bidaud. Design of an innovative unfoldable wheel with contact surface adaptation mechanism for planetary rovers. In *Proceedings of ASTRA'06 : 9th ESA Workshop on Advanced Space Technologies for Robotics and Automation*, Noordwijk, The Netherlands, 2006

Presentations and posters in conferences/workshops (28)

- N. Jarrassé, A. Poignant, M. Legrand, M. Khoramshahi, and G. Morel. An intuitive control for a wearable supernumerary robotic limb. In *International IEEE EMBS Conference on Neural Engineering*, 2021
- N. Jarrassé. La prothèse : entre réparation du corps et du soi? In *Séminaire PHITECO “Le soi façonné : Techniques et technologies du soi”*, Université Technologique de Compiègne, 2020. invited conference
- N. Jarrassé. Prothèses de membre : innovation et challenges. In *Certificat Universitaire*, Université Catholique de Lille, 2020. invited conference
- N. Jarrassé. The use of motor coordinations for rehabilitation and assistive robotics. In *Symposium JeCCo*, Paris, France, 2019. invited conference
- E. de Montalivet, K. Bailly, A. Touillet, N. Martinet, J. Paysant, and N. Jarrassé. An optimized visual biofeedback to train users in using prosthesis with pattern recognition myoelectric control. In *34th annual congress of the French Society of Physical Medicine and Rehabilitation (SOFMER)*, page xx, Bordeaux, 2019
- N. Jarrassé. Movement-based control of upper limb prostheses : Towards the decoding of body language. In *Workshop on Human-Computer Collaboration in Embodied Interaction (HAMAC)*, IRCAM, Paris, 2018
- R. Parry, N. Jarrassé, F. Sarlegna, and A. Roby-Brami. Adaptation to the absence of tactile and proprioceptive feedback in object handling. In *12th World Congress of the International Society of Physical and Rehabilitation Medicine (ISPRM 2018)*, Paris, France, 2018
- N. Jarrassé, D. Muller, E. De Montalivet, F. Richer, M. Merad, A. Touillet, N. Martinet, and J. Paysant. A simple movement based control approach to ease the control of a myoelectric elbow prosthetics in transhumeral amputees. In *12th World Congress of the International Society of Physical and Rehabilitation Medicine (ISPRM 2018)*, Paris, France, 2018
- T. Proietti, R. Parry, F. Lejeune, A. Roby-Brami, and N. Jarrassé. Adaptation of upper limb movement using exoskeleton-based training and transfer of kinematic patterns to unconstrained movement : a preliminary study. In *12th World Congress of the International Society of Physical and Rehabilitation Medicine (ISPRM 2018)*, Paris, France, 2018
- N. Jarrassé. Modifying upper-limb inter-joint coordination by training with a robotic exoskeleton. In *12th World Congress of the International Society of Physical and Rehabilitation Medicine (ISPRM 2018)*, Paris, France, 2018
- M. Merad, E. de Montalivet, M. Lestoille, A. Touillet, N. Martinet, J. Paysant, A. Roby-Brami,

- and N. Jarrassé. Using the body kinematics to assess the utilization of transhumeral prostheses. In *12th World Congress of the International Society of Physical and Rehabilitation Medicine (ISPRM 2018)*, Paris, France, 2018
- N. Jarrassé. Ethics of communication in healthcare robotics. In *SMART Ethics Workshop* :, Sorbonne Université, Paris, France, July 2018. Labex SMART
 - N. Jarrassé, E. Montalivet, C. Nicol, A. Touillet, N. Martinet, J. Paysant, and J. De Graaf. Using phantom limb voluntary gestures in transhumeral amputees to control prostheses. In *32th annual congress of the French Society of Physical Medicine and Rehabilitation (SOFMER)*, page xx, Nancy, oct. 2017
 - M. Merad, E. Montalivet, A. Touillet, N. Martinet, A. Roby-brami, and N. Jarrassé. Pre-clinical evaluation of a natural prosthetic elbow control strategy using residual limb motion and a model of healthy inter-joint coordinations. In *32th annual congress of the French Society of Physical Medicine and Rehabilitation (SOFMER)*, page xx, Nancy, oct. 2017
 - M. Merad, E. Montalivet, A. Touillet, N. Martinet, A. Roby-brami, and N. Jarrassé. Pre-clinical assessment of an intuitive prosthetic elbow control strategy using residual limb motion with osseointegrated patients. In *Annals of Physical and Rehabilitation Medicine*, volume 60, pages e100–e101. Elsevier, 2017
 - A. Touillet, N. Jarrassé, C. Nicol, M. Maestrutti, I. Loiret, L. Celli-Peultier, N. Martinet, J. Paysant, and J. De Graaf. Reconsidering phantom limb : potential applications for prosthesis control after above-elbow amputation. In *32th annual congress of the French Society of Physical Medicine and Rehabilitation (SOFMER)*, page xx, Nancy, oct. 2017
 - J. De Graaf, A. Touillet, N. Jarrassé, C. Nicol, N. Martinet, T. Roberts, and J. Paysant. Phantom upper limb mobility : characteristics and evolution. In *32th annual congress of the French Society of Physical Medicine and Rehabilitation (SOFMER)*, page xx, Nancy, oct. 2017
 - M. Badin, A. Touillet, A. Gouzien, A. Roby-Brami, N. Jarrassé, N. Martinet, and J. Paysant. Grasping after trans-radial amputation : comparison of kinematics between amputated limb equipped with myo-electric prosthesis and healthy limb. In *32th annual congress of the French Society of Physical Medicine and Rehabilitation (SOFMER)*, page xx, Nancy, oct. 2017
 - J. De Graaf, J. Rossato, C. Nicol, N. Jarrassé, and A. Touillet. Motor commands send to residual upper-arm muscles during phantom hand movements are send from the cortical hand area : an eeg study on cortico-muscular coherence. In *Annual World Congress of Neurotalk (NT)*, Barcelona, Spain, 2017. invited conference
 - N. Jarrassé. Robotic exoskeletons for neurorehabilitation. In *France-Taiwan ICEIRA Workshop*, Inria Lyon, january 2016
 - A. Touillet, J. De Graaf, C. Nicol, N. Jarrassé, and J. Paysant. Activité emg au niveau du membre résiduel lors de mouvements du membre fantome chez des patients amputés de membre supérieur. In *19èmes Journées Francophones d’ElectroNeuroMyoGraphie*, page (poster), 2014
 - A. Touillet, J. De Graaf, C. Nicol, N. Jarrassé, S. Loiret, N. Martinet, and J. Paysant. Douleur et membre fantome. In *21ème Forum Du Val, Douleur et Appareillage*, Paris, janvier 2014
 - S. Martin, N. Jarrassé, and A. Roby-Brami. Towards a quantitative assessment of alternative grasping strategies for manual dexterity. In *PACE Approach (perception action cognition environment) : New tools for an integrative and developmental approach to cerebral palsy and other neurodevelopmental disorders.*, Paris., 2013
 - E. Burdet and N. Jarrassé. From human to robot to humans. In *Workshop on Robotics for Neurology and Rehabilitation, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS’11)*, San Franscisco, USA., 2011
 - R. J., N. Jarrassé, M. Tagliabue, M. A., V. Crocher, G. Morel, and A. Roby-Brami. A methodology to quantify alterations in human upper-limb movement during co-manipulation with an exoskeleton. In *Proceedings of the 6th World Congress of Neurorehabilitation*, Vienna, Austria., 2010
 - N. Jarrassé. Exploitation d’un exosquelette en rééducation du membre supérieur : le problème de la transparence. In *Journée du Groupe de Recherche (GDR) Robotique, GT1 "Assistance à la personne"*, Paris, 2009

- G. Morel and N. Jarrassé. On the connection of exoskeleton with human limbs. In *Workshop on Interfacing the Human and the Robot (IHR), ICRA '09*, Japan, 2009
- G. Morel and N. Jarrassé. Interfacing a human member with a robotic exoskeleton. In *10th Dutch-Belgian Haptics Meeting*, Bruxelles, 2009

Invited conferences (52)

- N. Jarrassé. On the use of sensorimotor coordinations for intuitive and ecological robotic assistance to gesture. In *60ème congrès annuel du Club EEA*, Université Polytechnique Hauts-De-France, France, juin 2021. invited conference
- N. Jarrassé. On the use of sensorimotor coordinations for intuitive and ecological robotic assistance to gesture. In *séminaire LAMIH - axe transversal "Mobilité Humaine et Handicap"*, Valenciennes, 2021. invited conference
- N. Jarrassé. On the use of sensorimotor coordinations for intuitive and ecological robotic assistance to gesture. In *ICRA Workshop Integrating Multidisciplinary Approaches to Advance Physical Human-Robot Interaction*, Paris, France, may 2020. invited conference
- N. Jarrassé. Technologies robotiques d'assistance : états des lieux et enjeux éthiques. In *Artificial Intelligence Geneva Summit (AIGS) 2019*, Geneve, Suisse, 2020. invited conference
- N. Jarrassé. Homme réparé, homme augmenté? In *Le corps réparé. Séminaire Médecine-Humanités de l'Ecole Normale Supérieure*, Paris, France, 2020. invited conference
- N. Jarrassé. Exploitation des réorganisations neurophysiologiques pour le contrôle de prothèses du membre supérieur. In *Congress of Swiss Society of Physical Medicine and Rehabilitation*, Sion, Swiss, 2019. invited conference
- N. Jarrassé. Ethical issues in healthcare robotics technology. In *Procès fictifs, Cour Administrative d'Appel de Lyon*, Lyon, France, 2019. invited conference
- N. Jarrassé. L'homme augmenté. In *Forum Européen de bioéthique*, Strasbourg, France, 2019. invited conference
- N. Jarrassé. Exosquelettes et prothèses : homme réparé/homme augmenté. In *Association Rayonnement du CNRS*, Paris, France, 2019. invited conference
- N. Jarrassé. The use of motor coordinations for rehabilitation and assistive robotics. In *LASA research seminar, EPFL*, Lausanne, Switzerland, 2019. invited conference
- N. Jarrassé. The use of motor coordinations for rehabilitation and assistive robotics. In *Doctoral research seminar, UNED*, Madrid, Spain, 2019. invited conference
- N. Jarrassé, E. Montalivet, F. Richer, C. Nicol, A. Touillet, N. Martinet, J. Paysant, and D. G. JB. Using neurophysiological reorganizations to improve the control of upper-limb prostheses. In *Reha schweiz kongress*, Sion, Switzerland, 2019. invited conference
- N. Jarrassé. Éthique et technologies robotiques d'assistance. In *Ecole de printemps en e-Santé, ESIEE*, Paris, France, 2019. invited conference
- G. Morel and N. Jarrassé. Interface cerveau-machine : décrypter et utiliser le code neuronal. In *Académie des technologies*, Paris, France, 2019. invited conference
- N. Jarrassé. Le mythe de l'homme augmenté. In *Séminaire "Intelligence artificielle, robotique et santé", Chaire de Philosophie à l'hôpital*, Paris, 2018. invited conference
- N. Jarrassé. Rééducation neuromotrice du membre supérieur avec un exosquelette de bras. In *18èmes Assises de la kinésithérapie*, Orleans, France, 2018. invited conference
- N. Jarrassé. Nouvelles approches de contrôle de prothèses pour les amputés transhuméraux. In *25ème Forum du Val de Grâce*, Paris, France, 2018. invited conference
- N. Jarrassé. The mind-body problem in technology. In *Human Body in Motion Congress*, Bruxelles, Belgium, 2018
- N. Jarrassé. Les exosquelettes robotisés : réalités et perspectives. In *Séminaire Equipe (MHAPS)*, Université Paris Sud, june 2017. invited conference
- N. Jarrassé. "des robots et des hommes". In *"Innovation et Handicap : quelles perspectives ?" Symposium CRAMIF*, Paris, december 2017. invited conference
- N. Jarrassé. "le mythe de l'homme augmenté". In *Colloque "Le corps : quelles limites ?"*, Paris, december 2017. Cité des Sciences et de l'Industrie. invited conference

- N. Jarrassé. "penser la prothèse à partir de l'expérience du membre fantôme" (table ronde). In *Festival International de la Sociologie 2017*, Epinal, october 2017. invited conference
- N. Jarrassé. Potentialités, limites et enjeux éthiques de l'augmentation prothétique. In *Séminaire Transhumanisme du département ETHICS de l' Université Catholique de lille*, Lille, France, september 2017. invited conference
- N. Jarrassé. "l'invention du corps" (table ronde). In *Festival Rendez-vous de l'histoire de Blois*, Blois, september 2017. invited conference
- N. Jarrassé. Artificial limbs (and organs) : the myths and the making of superhumans. In *4rd STS Italia Summer School*, Catania, Italy, september 2017. invited conference
- N. Jarrassé. Control of prosthetics through emg patterns associated to phantom limb voluntary gestures in transhumeral amputees. In *3rd Symposium on Bionic Limbs & Neurorehabilitation*, Chalmers University of Technology, Goteborg, Sweden, may 2017. invited conference
- N. Jarrassé. Homme réparé, homme augmenté? corps et technique. In *La Science se livre : De la santé connectée à l'homme augmenté*, Neuilly Sur Seine, jan 2017. invited conference
- N. Jarrassé. "les exosquelettes robotisés - réalités et perspectives". In *Séminaire Aristote*, Ecole Polytechnique, Palaiseau, april 2017. invited conference
- N. Jarrassé. "membres et organes artificiels : le mythe et la fabrique des surhommes". In *Colloque "Vers de Nouvelles Humanités", Cité des Sciences et de l'Industrie*, Cité des Sciences et de l'industrie, april 2017. invited conference
- N. Jarrassé. "Éthique et technologies robotiques d'assistance". In *Rencontres d'éthique de l'Institut de Myologie*, Hopital de la Pitié Salpêtrière, Paris, march 2017. invited conference
- N. Jarrassé. "homme réparé, homme augmenté?". In *Forum des savoirs*, Chaville, march 2017. invited conference
- N. Jarrassé. Transhumanisme, homme augmenté, cyborg... In *Ecole éthique du numérique CERNA*, Arcachon, 2016. invited conference
- N. Jarrassé. "frankenstein peut-il nous aider à comprendre le transhumanisme ? ". In *Les Mardis des Bernardins*, Paris, december 2016. invited conference
- N. Jarrassé. Le transhumanisme est il l'avenir de l'homme? In *Patronage laïque Jules Vallès*, Paris, November 2016. invited conference
- N. Jarrassé. Control approaches for upper-limb prosthetics. In *SMART School on Computational Social and Behavioral Sciences*, Paris, september 2016. invited conference
- N. Jarrassé. Homme réparé, homme augmenté? In *Ecole de Berder*, Paris, juin 2016. invited conference
- N. Jarrassé. Robotique et réparation du corps : état des lieux. In *Université de la e-santé*, Castres, juillet 2016. invited conference
- N. Jarrassé. Corps liminaires, identités hybrides. In *Colloque international - Corps beaux, meurtris et subversifs*, Strasbourg, France, 2016. invited conference
- N. Jarrassé. Homme réparé, homme augmenté? In *CNAM Centre - CSTI - cycle de conférences "Nanotechnologies, biotechnologies, intelligence artificielle, sciences cognitives : L'Homme en question"*, CNAM Orleans, mars 2016. invited conference
- N. Jarrassé. Sommes nous à la veille d'une victoire sur le handicap? In *Journée MGEN éthique, société, solidarité. Transhumanisme, Homme augmenté. Quelles limites, thérapeutiques, techniques, éthiques ?*, MGEN, Paris, 2016. invited conference
- N. Jarrassé. Robotic exoskeletons for neurorehabilitation. In *European Computational Motor Control Summer School*, Montpellier, France, 2015. invited conference
- N. Jarrassé. Homme réparé, homme augmenté? In *Académie des Technologies*, Paris, France, november 2015. invited conference
- N. Jarrassé. Interagir avec un exosquelette. In *Commission paritaire pour l'emploi et la formation professionnelle de l'hospitalisation privée (CNPE)*, Lorient, France, octobre 2015. invited conference
- N. Jarrassé. Prothèses robotiques : un nouveau dualisme? In *Colloque international - L'humain et ses prothèses*, Université Paris Diderot, december 2015. invited conference
- N. Jarrassé. Membre supérieur et robotique. In *Séminaire Recherche, Université Catholique de*

Louvain, Louvain, Belgique, 2014. invited conference

- J. De Graaf, A. Touillet, C. Nicol, N. Jarrassé, and J. Paysant. Phantom movements in the brain. an eeg study in arm amputees. In *ANT Burgundy Neurometing*, Beaune, janvier 2014. invited conference
- J. De Graaf, A. Touillet, N. Jarrassé, and C. Nicol. Activités musculaires au niveau du moignon associées aux mouvements fantomes chez l'amputé du bras. In *Entretiens de médecine physique et réadaptation : Actualités sur les amputés et les prothèses du membre supérieur.*, Montpellier, Mars 2014. invited conference
- J. De Graaf, C. Nicol, N. Jarrassé, A. Touillet, and J. Paysant. Cortical control of phantom movements. In *SFPS 5th International Congress of Sport Psychology*, Nice, mai 2014. invited conference
- N. Jarrassé. Technosciences, robotique et temps. In *Semaines Sociales de France 2014. L'homme et les technosciences, le défi.*, Université Catholique de Lille, novembre 2014. invited conference
- N. Jarrassé. Corps et technique : la prothèse robotique. In *Journées Nationales de la Recherche en Robotique (JNRR)*, Annecy, octobre 2013. invited conference
- N. Jarrassé. Interagir avec un exosquelette. In *2ème Colloque du CENRob (Centre d'Expertise Nationaux sur les aides techniques)*, Université Evry - Val D'Essonne, 5 avril 2013 2013. invited conference

Vulgarization articles (5)

- N. Jarrassé. Robotic prostheses : what do they actually mean for the patient? *Human Body In Motion Journal*, 1 :10–16, 2017
- A. Roby-Brami, W. Bachta, S. Page, F. Bevilacqua, V. Marchand-Pauvert, L. Saint-Bauzel, C. Kemlin, P. Pradat-Diehl, V. Pasqui, and N. Jarrassé. Interfaces interactives et vie quotidienne. *Dossier Actualités en MPR*, 1 :1–4, 2017
- N. Jarrassé, L. Saint-Bauzel, A. Roby-Brami, and G. Morel. Les exosquelettes robotisés : réalités et perspectives. *Académie de Chirurgie Magazine*, 13 :6–9, mars 2014
- N. Jarrassé. *Le mythe de l'humain augmenté*. Libération / Journal du CNRS, december 2014

Patents (2)

- FR 1903103, filed on 2019/03/25 under the title "Dispositif de commande d'un système robotique d'assistance à la mobilité d'un utilisateur".
- FR 21XXXX, filed on 2021/08/29 under the title "Procédé de mise en mouvement d'un exosquelette".

Research grants

Ongoing grants :

- 2021–2024 **NIMA**, (*Non-Invasive Interface for Movement Augmentation*), Funding from the EU H20202 FET-Open 2020 (PI : C. Mehring, Univ. Freiburg), (*Funding allocated : 600k€*).
- 2020–2023 **APADIP**, (*Amélioration du parcours d'appropriation des dispositifs prothétiques : usages des personnes amputées appareillées, pratiques des soignants et savoirs expérimentiels.*), Funding from the ANR-IRESP (Programme "Handicap et perte d'autonomie") (PI : L. Dalibert, Univ. Lyon 1), (*Funding allocated : 10k€*).
- 2020–2024 **EXOMAN**, (*Towards exoskeleton-human symbiosis : investigating how humans interact with an upper-limb robotic exoskeleton*), Funding from the ANR AAPG2019 (PI : B. Beret, Univ. Paris-Sud), (*Funding allocated : 160k€*).
- 2019–2022 **CNRS Excellency Grant**, (*Development of simple lightweight exoskeletons for patients with muscle weakness*), Ph.D. funding from the INS2I institute, (*Funding allocated : 130k€*).

- 2019–2023 **BYCEPS**, (*BodY-ControllEd robotic ProSthetic for arm amputees*), "Young researcher" funding from the ANR JCJC 2018, Function : PI (*Funding allocated : 270k€*).
- 2017–2018 **PROCOSY**, (*Prothèse de bras à commande synergique*), Funding from IDEX Sorbonne Université SUPER, programme Emergence, Function : PI (*Funding allocated : 78k€*).
- 2016–2018 **SUBILMA**, (*Substitution sensorielle et restauration de l'habileté pour une meilleure autonomie*), Funding from the Défi AUTON, Mission for interdisciplinarity of the CNRS, Function : PI (9 research laboratories involved) (*Funding allocated : 18k€ / Total : 100k€*).
- 2016–2019 **PhantomovControl**, (*"Going beyond the limits of myoelectric upper arm prostheses : phantom hand movements for natural control"*), Funding of the ANR PRCE 2015, Function : WorkPackage leader (*Funding allocated : 140 k€ / Total : 530k€*).
- 2013–2019 **ISMES-ISMES2**, (*Interfaces SensoriMotrices Embarquées pour la rééducation et la Suppléance*), Funding from the Labex-SMART (ANR-11-LABX-65 / programme Investissements d'Avenir ANR-11-IDEX-0004-02)., Function : WorkPackage leader (*Funding allocated : 267k€ / Total : 900k€*).

Past grants :

- 2014–2017 **"Agénésies : des corps incomplets"**, Funding PICRI (Partenariats institutions-citoyens pour la recherche, région Ile-de-France), Function : Partner (*Funding allocated : 10k€ Total : 153k€*).
- 2015-2016 **MOFACO**, (*MOuvements FANTômes pour la COmmande de prothèse chez l'amputé de bras*), Funding CNRS PEPS JCJC INS2I, Function : PI (*Funding allocated : 10k€*).
- 2014-2015 **"Intégration Corporelle des Prothèses"**, (*Study of peripersonal space in amputated patients wearing or not a prosthesis*, Funding of the Institut Universitaire d'Ingénierie pour la Santé (IUIS), Funding : Partner (*Funding allocated : 27k€*).
- 2013–2014 **ReorgAMP**, (*Réorganisation corticale et neuromusculaire chez l'amputé du bras. Vers un contrôle intuitif de la prothèse myoélectrique*), Funding of the Mission pour l'interdisciplinarité CNRS / DéfiSENS, Function : Partner (*Funding allocated : 35k€ Total : 80k€*).

Teaching activities

Recurrent teachings (73h) :

- 2013 - *present* : **School of Engineering "Polytech'Paris" / Sorbonne Université**, "Robotics" Speciality, (M. Eng. degree / M1). Course unit : "Industrial projects and prototype design". Volume : 40h (tutorials) /year.
- 2017 - *present* : **Sorbonne Université**, "Engineering for Health (MIS)", (M.Sc. degree, M2). Course unit : "Introduction to the control of prosthetics with machine learning". Volume : 20h (8h of lecture + 12h tutorials)/ year.
- 2019 : **School of Engineering "Centrale Supélec"**, "Medical Robotics" program, (M. Eng. degree / M1). Course unit : "Rehabilitation and assistive robotics". Volume : 3h (lecture).
- 2017 - *present* : **Ecole Polytechnique - HEC**, PhD undergraduate program on "Innovative Technology for Health" (TIS), (M.Sc degree / M2). Course Unit : "Advances in rehabilitation and assistance technologies". Volume : 4h (lecture) /year.
- 2016 - *present* : **Ecole du Val de Grâce** (University Degree for clinicians), DU d'Appareillage de Paris. Course unit : "Introduction to robotic technology for prosthetics". Volume : 2h (lecture)/year.
- 2018 - *present* : **Sorbonne Université**, "Sciences, Technologies & Santé", (B.Sc. degree), Course Unit UE ARE "Démarche scientifique et Esprit critique". Course unit : "Transhumanismes et enjeux éthiques". Volume : 4h (lecture)/year.

Others :

- 2019 : **Université Aix Marseille**, "STAPS" program, (M. Sc. degree / M2). Course unit : "Medical Robotics". Volume : 3h (lecture).
- 2019 : **ESIEE**, "Medical Robotics" program, (M. Eng. degree / M1). Course unit : "Ethics of assistive robotics". Volume : 3h (lecture).
- 2019 : **Sorbonne Université**, "Formation continue" program, (training seminars for industry). Course unit : "Force and position control for robotics". Volume : 4h (lecture).
- 2019 : **Sorbonne Université**, "International educational scholar exchange" program. Course unit : "State of the art in exoskeletons and prosthetics". Volume : 8h (lecture).
- 2017 : **University Pierre et Marie Curie**, Engineering in Medical Robotics. (B.Sc. degree / L2). Course unit : "Ethics of assistive robotics". Volume : 4h (lecture).

Supervision of students, researchers and engineers

PhD students (5) :

- 2021 - present : **Océane Dubois**, ANR EXOMAN funding. Topic : *"Characterizing the variability of movement coordination under force constraints applied by an upper limb exoskeleton"*.
- 2021 - present : **Alexis Poignant**, MNRT scholarship - NIMA project, co-supervised with G. Morel. Topic : *"Development of a smart control approach for supernumerary robotic limbs"*.
- 2019 - present : **Clemence Drouot**, CNRS interdisciplinary scholarship industry (collaboration with Institute of Myology). Topic : *"Development of simple lightweight exoskeletons for patients with muscle weakness."*.
- 2017 - present : **Omar Mounir Alaoui**, PhD in industry (CIFRE contract with the company Wandercraft), co-supervised with G. Morel. Topic : *"Development of a "Body-Machine-Interface" for the control of a gravity balancing lower limb exoskeleton."*.
- 2017 - 2021 : **Mathilde Lestoille**, Scholarship AMX from Ecole Polytechnique, co-supervised with G. Morel. Topic : *"Intuitive control of prosthetics for upper-arm amputees"*.
- 2014 - 2017 : **Manelle Merad**, MNRT scholarship, co-supervised with A. Roby-Brami. Topic : *"Investigations on upper limb prosthesis control with an active elbow"*.
- 2014 - 2017 : **Tommaso Proietti**, Scholarship from région Ile de France, co-supervised by A. Roby-Brami. Topic : *"Characterizing the reciprocal adaptation in pHRI to address the inter-joint coordination in neurorehabilitation"*.

Post-Doctoral researchers (3) :

- 2019 - present : **Mahdi Khoramshahi**, funded by the Fonds national suisse de la recherche scientifique (SNFNS) and the ANR BYCEPS project. Topic : Characterizing Human-Human collaboration to develop improved prosthetic control approaches. Supervision rate : 100%.
- 2017 - 2018 : **Ross Parry**, funded by the ISMES project of the Labex Smart, co-supervised with A. Roby-Brami. Topic : Analyzing grasping and manipulation with instrumented objects. Supervision rate : 40%.
- 2016 - 2017 : **Gabriel Arnold**, funded by a scholarship from the Labex Smart, co-supervised with M. Auvray. Topic : Development of artificial proprioceptive feedbacks. Supervision rate : 20%.

Engineers (5) :

- 2020 - present : **Alexis Poignant**. Topic : *Control of supernumerary limbs.*
- 2019 - present : **Charlotte Marchand**. Topic : *Development of embedded control architectures for prosthetics & Cybathlon 2020 management.*
- 2017 - 2019 : **Alexandre Peudpiece**. Topic : *Development of an innovative arm prosthetics.*
- 2017 - 2018 : **François Lejeune**. Topic : *Management of the Upper limb exoskeleton platform.*
- 2015 - 2018 : **Etienne de Montalivet**. Topic : *Development of embedded control architectures for prosthetics.*

Undergraduate students (18) :

- **A. Isac** (2021), ESME-Sudria. Topic : *"Développement d'un setup expérimental pour l'appren-*

tissage et l'entraînement au contrôle myoélectrique".

- **C. Michallet** (2019), École Telecom Strasbourg. Topic : *"Development of a smart knee orthosis"*.
- **B. Supiot** (2019), École Telecom Strasbourg. Topic : *"Development of a smart knee orthosis"*.
- **J. Mesure** (2019), École Polytech'Marseille. Topic : *"Development of instrumented suspenders"*.
- **L. Lavenir** (2018), École des Mines de Saint-Etienne / Mines de Paris. Topic : *"Development of a synergical control of a humeral rotation prosthesis"*.
- **A. Peron Magnan** (2017), Ecole Centrale d'Electronique, Paris. Topic : *"Artificial sensory feedbacks for a climbing prosthesis"*.
- **M. Lestoille** (2017), Ecole Polytechnique / Ecole Polytechnique Fédérale de Lausanne. Topic : *"Movement-based control approaches for upper-limb prosthetics : a comparison of interjoint coordination models"*.
- **D. Muller** (2017), Master 1 Neurosciences, Université Aix Marseille. Topic : *"Movement-based control of a commercial prosthetic elbow"*.
- **A. Damour** (2014-2015), Master 2 d'Ingénierie et Ergonomie du Mouvement Humain, de l'université Aix-Marseille. Topic : *"Classification of EMG signals for prosthesis control"*.
- **L. Sanchez** (2014-2015), Master 2 Sciences et Technologies mention Santé de l'UPMC, co-supervised with A. Roby-Brami. Topic : *"Characterization of the effects of mechanical perturbation of the elbow joint on the coordination schemes during pointing tasks"*.
- **W. Tounsi**, (2013-2014), Master 2 Systèmes Avancés et Robotique de l'UPMC. Topic : *"Artificial sensory feedback for prosthesis control"*
- **S. Martin** (2013-2014), Master in Cognitive Sciences (Cogmaster). Co-supervision with A. Roby-Brami. Topic : *"Development of a taxonomy of grasping and manipulation"*
- **L. Gomez** (2014), Master 1 Biomedical Engineering Univ. Paris Descartes. Topic : *Human-robot physical interactions with robotic limbs"*.
- **A. Von Mach** (2012-2013), Master Microtechnique de l'Ecole Polytechnique Federale de Lausanne. Topic : *"Bi-manual object for stroke rehabilitation"*.
- **A. T. Ribeiro** (2012-2013), Master ENSTA robotique et systèmes avancés. Co-supervision with A. Roby-Brami, A. Sahbani et W. Bachta. Topic : *"Characterizing the human hand synergies"*.
- **M. Imperiale** (2013), M1 Informatique Industrielle, Image, Signal et Robotique. Topic : *"Development of a 1-DoF passive compliant joint for rehabilitation with non-serious games."*
- **C. Trembleau** (2013), ESIGELEC Rouen. Topic : *"SYnergic control of a robotic arm manipulator"*.
- **M. Kuhne** (2012-2013), Master ENSTA robotique et systèmes avancés / Imperial College London. Topic : *"Development of a kit of intelligent objects"*.

Scientific collaborations

France :

- ISIR - CNRS / University Pierre et Marie Curie - Paris 6, France, (*Agnès Roby-Brami (INSERM), Malika Auvray, Guillaume Morel, Raja Chatila*).
- CETCOPRA, Centre d'Etudes des Techniques, des Connaissances et des Pratiques (interdisciplinary research center dedicated to socio-anthropological and philosophical research on contemporary and emerging technologies), Université Paris I, (*M. Maestrutti*).
- Institut des Sciences du Mouvement UMR7287, Université Aix-Marseille, France (*J. de Graaf, C. Nicol*).
- Centre d'appareillage prothétique Louis Pierquin (Dr. N. Martinet) de l'Institut Régional de Médecine Physique et de Réadaptation, Nancy, France (*J. Paysant, N. Martinet, A. Touillet*).
- Institut de Recherche et Coordination Acoustique/Musique, équipe STMS (Sciences et technologies de la musique et du son) (*F. Bevilacqua*).
- Service de gynécologie du Pr. Jacky Nizard (APHP Pitié Salpêtrière) et Service de guidance périnatale et parentale des personnes en situation de handicap (SAPPH) de E. Toueille.
- CEA-List (*P. Garrec, C. Bidard, Y. Perrot*).
- Laboratoire CIAMS, UFR STAPS, Université Paris-Sud (*B. Berret*)

- Service de Médecine Physique et de Réadaptation de l'Hôpital Pitié-Salpêtrière (Unité partenaire Er6).

Abroad :

- Department of Bioengineering, Imperial College London, (*E. Burdet, Y.Li*).
- Biomechanics and Neurorehabilitation Laboratory, University of Chalmers, Goteborg, Sweden, (*M. Ortiz Catalan*).
- Christian Medical College/ Dept.of Bioengineering, Vellore, India, (*S. Balasubramanian*).
- School of Electrical Engineering, University of Belgrade, Serbia, (*M. Popovic, M. Djuric-Jovicic*).
- Department of Mechanical Engineering (DEMec), Sao Carlos Federal University (*Leonardo Marquez Pedro*).
- School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapour, (*D. Campolo*).
- Robotics and Mechatronics Center, German Aerospace Center (DLR), (*A. Albu-Schaffer*).

Scientific events organization

- Creation of the first french team, Team Smart ArM (SAM), to participate to the "Powered Arm Race" of Cybathlon 2020 Global (october 2020), sponsored by MAXON France.
- Co-manager of the "Medical Robotics" Workgroup (GT1) of the GdR Robotique (Groupement de Recherche Robotique) since 2017.
- Co-founder and organizer of the national transdisciplinary seminars "*Corps et Prothèses : usages, vécus et pratiques*" (www.corps-protheses.org), since 2016 (4/5 seminars a year).
- "Exoskeleton Day" (November 2017) at UPMC, Paris, France, funded by the GT1 "Robotique et Santé" of the GDR-Robotique.
- European Computational Motor Control Summer School (2014, 2015, 2016) :Organization and supervision of workshops (20h) for 30 students on motor control illustrating lectures given during the summerschool by known speakers (E. Burdet, S. Schaal, K. Doya, F. Mussa-Ivaldi, etc.).
- "Prothetics Day" (June 2015), at UPMC, Paris, France, funded by the GT1 "Robotique et Santé" of the GDR-Robotique et GDR STIC-Santé.
- Winter School on Computational Methods for Neurorehabilitation (January 2014), Obertauern, Austria. Member of the organization team, organizer and supervisor of hands-on for students
- National Science Days at ISIR, Sorbonne Université : organizer (with K. Bailly) of the 2012th edition. Participation since 2013 to visits of the laboratory, practical workshops for childrens, movie presentation, platform demonstration.
- Transdisciplinary workshop "Intégration Corporelle de la Technique" (November 2012), Paris, France. Co-organizer with M. Maestrutti and A. Roby-Brami of a 2 days multidisciplinary workshop .

Vulgarization, wide-audience presentations and media coverage

Events organization :

- Organization of the Paris HUB for the Cybathlon 2022 Challenge (Arm prosthetic races).
- Organization of the Paris HUB for the Cybathlon 2020 Global (exoskeleton and prosthetic races).

Presentations and panel discussions :

- Participation Table Ronde "Rapport entre l'homme et la machine.", Nuit des idées au musée des Arts et Métiers, janvier 2020.
- Audition sur le Transhumanisme pour la commission MGEN-UNESCO, novembre 2019.
- Conférence TedX Sorbonne-U "The price of becoming a cyborg", octobre 2019.
- Présentation projet PhantomovControl stand CNRS salon Vivatech mai 2019.
- Conférence invitée "De la fusion du corps et de la machine", cycle de conférences "13 minutes", thème "la Fusion", Université Paris VII, mai 2019.

- Participation Exospotion "une manip, un chercheur", Palais de la découverte, janvier 2019.
- Participation/Interview Marion Montaigne pour sa bande dessinée "Tu mourras moins bête", janvier 2019.
- Interview "Corps augmenté : jusqu'où peut-on aller ?" TV channel Arte, (January 2019)
- Interventions Les Utopiales - Festival International de Science-Fiction, Nantes (October 2018)
- Participation table ronde "Docteur Robot", festival "Corps réparé / corps augmenté ?", Ivry sur Seine (May 2018)
- Conférence "Corps réparé : humain augmenté?", E=MJC, L'ACTU SCIENCES DÉCRYPTÉE, MJC – Théâtre des 3 Vallées, Palaiseau (May 2018)
- Conférence "corps et technique : la prothèse robotique", séminaire URMIS Frontières de l'humain : problématiques contemporaines, Université Paris Diderot (April 2018)
- Invité Table ronde sur le transhumanisme de l'association AEIP6 (Association des Etudiants en Informatique de Paris 6). (March 2018)
- Invité Table ronde " Santé du futur : entre soif d'innovation et régulations " Université Paris-Dauphine, (February 2018)
- Conférence invité "Des robots et des hommes", symposium « Innovation et Handicap, quelles perspectives?", CRAMIF – Escavie 75 (December 2017)
- Conférence invitée, Collège International de Philosophie "Le corps : quelles limites?", Cité des sciences et de l'industrie. (December 2017)
- BNP Paribas, semaines de la Diversité et de l'Inclusion 2017. Participation à la table-ronde autour de "L'Humain augmenté au service du handicap", (October 2017).
- Conférence grand public "L'homme augmenté", dans le cadre du congrès annuel de la Société Française de Médecine Physique et de réadaptation, (October 2017).
- Conférence grand public "Homme réparé, homme augmenté?", Forum des savoirs, médiathèque de Chaville, (March 2017).
- Participation au café des sciences de Meudon "La robotique : entre réel et utopie" (co-animation avec A. Grinbaum), (February 2017)
- Conférence grand public "Homme réparé, homme augmenté?", La Science se livre, médiathèque de Neuilly sur Seine. Festival "De la santé connectée à l'homme augmenté", (January 2017).
- Mardis des Bernardins / France Culture conférences, Participation à la table ronde "Frankenstein peut il nous aider à comprendre le transhumanisme?", (December 2016).
- Interview par des étudiants du CELSA pour un rapport sur "Transhumanisme : L'immortalité, utopie ou réalité?", (May 2016).
- Participation à un évènement sur la robotique (Kimeo Smart village) à la Cité des Sciences et Industrie, (April 2016).
- Interview par le site internet Konbini sur les prothèses, article "L'humain augmenté : allons nous devenir des surhommes?", (March 2016).
- Participation tournage reportage sur la robotique pour France Télévision, (February 2016).
- Intervention EU Robotics Week, Conférence : Les robots au quotidien. Univ. Pierre et Marie Curie, Paris. (November 2015).
- Participation à la fête de la science avec un workshop sur les prothèses, (October 2015).
- Interview "Prothèses robotisées : quelle réalité pour le patient ?", pour l'association « Human Body In motion », O. Van Hove, Clinique Universitaire de Bruxelles, (October 2015).
- Participation to the Pariscience 2015 Festival. Debates with the audience after the presentation of the movie "Ma nouvelle main bionique" de F. Barès, (October 2015), Museum d'Histoire Naturelle, Paris.
- Participation aux Semaines Sociales de France 2014 (21-23 November 2014) à l'Université Catholique de Lille sur le thème "L'HOMME ET LES TECHNOLOGIES : LE DEFI". Participation aux "Conversations avec" dans le cadre du "Festival du rapport au temps", (November 2014).
- Entretiens avec étudiants dans le cadre d'un TPE sur "prothèses, augmentation et éthique", lycée Gérard de Nerval de Luzarches, (February 2014).
- Participation à une séance de photo de dispositifs robotique pour agence, (November 2013).

- Intervention et démonstration de robots pour un groupe d'étudiants (Lycée Fenelon sainte Marie), (October 2013).

Media appearances :

- Clique TV (December 2022)
- Dr Nozman Youtube Channel (December 2022)
- Interview "Prothèses : objets techniques mais pas que", Aligre FM Radio station (May 2019)
- Interview vidéo pour l'émission "Les pouvoirs extraordinaires du corps humain" sur les prothèses et l'homme réparé, (September 2018).
- Chaîne de télévision LCP, Participation à l'émission Etat de Santé de E. Martichoux sur "L'homme augmenté", (October 2016).
- Chaîne de télévision BFM Business, Participation à l'émission "Votre santé m'intéresse", thème "Comment assister l'humain avec des dispositifs robotiques?", (July 2016).
- Chaîne de télévision LCP, Participation à l'émission "Flash Talk" thème "Voulez vous être superman?", (April 2016).
- Radio RCF, Interview sur le thème des exosquelettes pour la rééducation, (October 2015).
- Radio RFI, participation à l'émission "Autour de la question", (November 2014) sur la thématique "Quel défi pour l'humain avec les technosciences?", table ronde avec T. Gaudin prospectiviste.
- Europe 1, interview pour l'ouverture de la coupe du monde par un paraplégique en exosquelette, (June 2014).
- Participation à la réalisation d'un épisode sur les exosquelettes pour la collection de films "La Boite Noire" pour la Cité des Sciences, (January 2014).
- Journal Télévisé de M6, interview sur la rééducation neuromotrice avec exosquelettes, (April 2012).

Press appearances :

- Interview "Les mirages de l'homme augmenté", Newspaper La Réforme (May 2019).
- Portrait pour le magazine Sciences et Avenir (October 2018).
- Interview pour le magazine Le Point sur les exosquelettes (June 2018).
- Reportage (interview et photo) pour magazine Sciences et Santé de l'INSERM. (May 2018).
- Interview sur le transhumanisme en lien avec les assises de la bioéthique par l'AFP (April 2018)
- Interview sur les réparations du corps par journaliste en santé Elsa Fayner (April 2018)
- Interview pour Journal Lacroix pour article sur l'homme augmenté et les assises de la bioéthique (March 2018)
- Participation article "Recherche à Jussieu : on forme aussi les machines" pour le magazine Industrie & Technologies (February 2018)
- Interview magazine Science et Vie pour article sur l'évolution des prothèses de membres (February 2018)
- Interview journal Le Monde Hors Série "Dans la tête des robots : Intelligence artificielle et robotique" pour article "Des exosquelettes pour marcher de nouveau" (February 2018)
- Interview/Entretien revue Etudes. Publication entretiens "La robotique et le mythe de l'homme augmenté" (January 2018)
- Interview magazine Science et Avenir. Article "Bientôt des exosquelettes pour tous" (December 2017)
- Interview pour le journal 20 minutes. Article sur les interfaces cerveaux-machine, (May 2017).
- Interview sur les exosquelettes pour le magazine Forbes France, (May 2017).
- Interview pour le journal 20 minutes. Article sur les cyborgs, (April 2017).
- Interview pour le journal Lacroix sur les bypass cerebraux pour les patients paraplégiques, (April 2016).
- Interview sur la technologie robotique de rééducation, R. Baldos, journal Sciences Ouest, (October 2015).
- Le Telegramme, article "Exosquelette : entre mythe et réalité", (October 2015).
- Interview pour "Santé Magazine" sur le transhumanisme, (July 2015).

- Journal Le Temps (suisse), Interview par F. Goubet sur le thème des prothèses. Article paru dans le journal Le Temps, (January 2015).
- Magazine « Etre handicap information », interview par Laetitia Delhon, (March 2015).
- Magazine Prevention BTP, interview par C. Barruyer sur l'utilisation des exosquelettes dans l'industrie. (numéro 183 ; February 2015)
- Journal du CNRS / journal Libération : rédaction d'un article sur l'impact des représentations collectives sur l'appropriation des prothèses robotiques. Libération (5th December 2014). Journal du CNRS n279.
- Média Thinkovery, interview sur les exosquelettes, (November 2014).
- Science et Avenir, "La science à l'assaut de la paralysie", interview sur les prothèses de membre supérieur, June 2014.
- Science et Vie Junior, interview pour article sur le Cybathlon, (April 2014).
- Journal du Net, "Les dessous technologiques des exosquelettes", interview, (April 2014).
- AFP Médecine, interview pour article sur jeux paralympiques de Sotchi, (March 2014).
- Magazine La Recherche, "Des sensations retrouvées grâce à une main bionique" interview, (February 2014).
- Journal le Parisien Magazine : interview pour un article sur les exosquelettes, (January 2014).
- Magazine Libération, supplément Eco Futur : Interview pour l'article "L'homme en chair et en bionique", (November 2013).
- Magazine 01.net, "Lève toi et marche, le miracle de prothèses bioniques", interview, (March 2013).

■ Awards, honors and fellowships

- CNRS Bronze Medalist in 2020 (recognition of initial fruitful results, awarded to recognized experts of their field)
- Fellowship PEPS JCJC (Support for exploratory researches of young researchers) from the National Center for Scientific Research (CNRS). Title : "Mouvements fantômes pour la commande de prothèses/MOFACO" (2015).
- Fellowship PEPS (Support for exploratory researches) from the Institute of Communication Science of the CNRS. Title : "Cyborgs : myths and reality" (2012).
- National Qualification for university level teaching both in Mechanical Engineering (section 60) and Automation and signal processing (section 61) by the National French Universities Council (CNU) (2010).
- Laureate of the second Thesis Award, National Research Group on Robotics of the CNRS (2010).
- Finalist of the European Hopes for Innovation (Innovact), project Submezz : vocal interface to the data network, (2008).

■ Other academic professional activities

Collective commitments :

- Co-manager of the "Medical Robotics" Workgroup (GT1) of the GdR Robotique (Groupement de Recherche Robotique) since 2017.
- Member of the *International Panel for Ethics of Emerging Technology (IPEET)*, directed by F. Lamnabhi-Lagarrigue.
- Member of the ISIR scientific council.

PhD Jury

- **Mahdi Khoramshahi**, Ecole Polytechnique Federale de Lausanne (EPFL). PhD topic : "*From human-intention recognition to compliant control using dynamical systems in physical human-robot interaction*" (November 2018). Function : rapporteur.
- **Akram Riani**, Université de Versailles Saint Quentin en Yvelines. PhD Ttopic : "*Commande et observation des exosquelettes pour la rééducation fonctionnelle du membre supérieur*" (October 2018). Function : examiner.

- **Andrés Trujillo**, Université de Malaga (Espagne). PhD topic : "*Haptic Interface Based on Tactile Sensors for Assistive Devices*", (January 2018). Fonction : examiner.
- **Ahmad Tayba**, Université de Versailles Saint-Quentin-en-Yvelines (France). PhD topic : "*Amélioration de la partie supérieure du robot HYDROiD pour les tâches bi-manuelles et la manipulation*", (December 2017). Fonction : examiner.
- **Daniel Galinski**, Université Catholique de Louvain (Belgique). PhD topic : "*Conception et optimisation d'un robot de rééducation neuromotrice du membre supérieur avec compensation active de la gravité*", (November 2014). Fonction : rapporteur.

Scientific expertise :

- REUCIR
- Japet
- Univ. Laval, Canada. Evaluation emande de stage de recherche Mitacs Accélération IT33922
- Université Paris XIII, expertise of program CAPES-COFECUB 2019 (2018)
- ANRT, scientific expertise of PhD CIFRE projects (2017)
- Université de Nantes, expertise for Interdisciplinary Funding call from Université de Nantes (2017).
- Université Paris-Sud, expertise for Funding call "Recherche Mutualisée" 2018.
- Comité ECOS Nord (*Ministry of Foreign affairs and International Development*) : evaluation of projects for the program de ECOS Nord with Colombia (June 2015).
- COST (*European Cooperation in Science and Technology*) : Expert for the network COST (European Cooperation in Science and Technology) for the evaluation of robotic proposals (2012-2014).
- Audited expert for the *Commission de réflexion sur l'Éthique de la Recherche en sciences et technologies du Numérique d'Allistene* (CERNA) (December 2013).
- Fondation Leenaards : Scientific expert for rehabilitation robotics (2013).

Editorial activities :

- Associate Editors for *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*.
- Reviewer for the journals *J. Translational Engineering in Health and Medicine*, *IEEE Transaction on Robotics*, *Journal of NeuroEngineering and Rehabilitation*, *IEEE Transaction on Haptics*, *Mechanism and Machine Theory* (Elsevier), *International Journal of Robotics Research*, *Frontiers in Neurorobotics*, *IEEE Transactions on Cybernetics*, *IEEE Transactions on Mechatronics*.
- Reviewer for the conferences *IEEE International Conference on Robotics and Automation (ICRA)*, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, *IEEE International Conference on Rehabilitation Robotics (ICORR)* and *IEEE International Conference on Biomedical Robotics and Biomechatronics (BIOROB)*.