Benoit Delhaye

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Born on August 12th, 1986
in Charleroi, Belgium
Belgian, married, two children.

Education

2009–2014 **PhD in Applied Science**, *Université catholique de Louvain*, Belgium.
Dissertation: "Skin mechanics involved in dynamic touch."
Advisors: Prof. J-L. Thonnard and Prof. P. Lefèvre

2007-2009 **M.Sc. Electro-mechanical Engineering**, *Université catholique de Louvain*, Belgium, *magna cum laude*.
Dissertation: "Master-slave servo-control of a rehabilitation exoskeleton for the upper limbs."
Advisors: Profs. J-C. Samin, B. Macq and B. Dehez.

2004-2007 **Bachelor in Engineering**, *Université catholique de Louvain*, Belgium, *cum laude*.

Experience

2015–now **Postdoctoral Scholar**, *Department of Organismal Biology and Anatomy, University of Chicago*, USA.
Advisor: S. Bensmaia, Associate Professor

2014–2015 **Postdoctoral Fellow**, *Institute of Neuroscience, Université catholique de Louvain*, Belgium.
Advisors: Prof. J-L. Thonnard and Prof. P. Lefèvre

2007–2014 **Graduate teaching assistant**, *Université catholique de Louvain*, Belgium.
Physics, Mathematics, Electricity, Mechatronics, Linear control theory, Bio-medical engineering

Grants and Awards

2017 Meritorious service awards as a reviewer for Transactions on Haptics

2017 Best work in progress award at the Worldhaptics conference 2017

2015 Postdoctoral moving grant "Fonds spéciaux de recherche" from the Université catholique de Louvain

Organized conferences and workshops

Jun 2017 "Recent advances in modeling skin mechanics and tactile afferent responses", WorldHaptics Workshop, Munich (website)

Invited talks

Nov 2017 Computational Neuroscience Seminar Series, Brain and Mind Institute,Western University, Ontario, Canada

Oct 2017 Mini-symposium "Processing of somatosensory feedback for motor control", Institute of Neuroscience, Université catholique de Louvain, Belgium

Publications

[1] A. Barrea, B. P. **Delhaye**, P. Lefevre, and J.-L. Thonnard, "Perception of partial slips under tangential loading of the fingertip," *Submitted*, 2017.

[2] B. P. **Delhaye**, K. H. Long, and S. J. Bensmaia, "Neural basis of touch and proprioception in primate cortex," *Journal of Comprehensive Physiology, re-submitted*, 2017.

[3] B. P. **Delhaye**, M. O'Donnell, and S. J. Bensmaia, "Decoding tactile speed from the spiking activity of afferent populations," *In preparation*, 2017.

[4] E. L. Graczyk*, B. P. **Delhaye***, M. A. Schiefer, S. J. Bensmaia, and D. J. Tyler, "Sensory adaptation to electrical stimulation of the somatosensory nerves," *Submitted*, 2017.

[5] H. P. Saal*, B. P. **Delhaye***, B. C. Rayhaun, and S. J. Bensmaia, "Simulating tactile signals from the whole hand with millisecond precision," *Proceedings of the National Academy of Sciences*, vol. 114, no. 28, E5693–E5702, Jul. 2017, ISSN: 0027-8424. DOI: 10.1073/pnas.1704856114.

[6] X. Xia, B. P. **Delhaye**, and S. J. Bensmaia, "Edge orientation signals conveyed by populations of tactile fibers," *In preparation*, 2017.

[7] B. P. **Delhaye**, A. Barrea, B. B. Edin, P. Lefevre, and J.-L. Thonnard, "Surface strain measurements of fingertip skin under shearing," *Journal of The Royal Society Interface*, vol. 13, no. 115, p. 20 150 874, Feb. 2016, ISSN: 1742-5689. DOI: 10.1098/rsif.2015.0874.

[8] B. P. **Delhaye**, H. P. Saal, and S. J. Bensmaia, "Key considerations in designing a somatosensory neuroprosthesis," *Journal of Physiology-Paris*, pp. 1–7, Nov. 2016, ISSN: 09284257. DOI: 10.1016/j.jphysparis.2016.11.001.

[9] B. P. **Delhaye**, E. Schluter, and S. J. Bensmaia, "Robo-Psychophysics: Extracting behaviorally relevant features from the output of sensors on a prosthetic finger," *IEEE Transactions on Haptics*, vol. 9, no. 4, pp. 499–507, Aug. 2016, ISSN: 1939-1412. DOI: 10.1109/TOH.2016.2573298.

[10] E. L. Graczyk, M. A. Schiefer, H. P. Saal, B. P. **Delhaye**, S. J. Bensmaia, and D. J. Tyler, "The neural basis of perceived intensity in natural and artificial touch," *Science Translational Medicine*, vol. 8, no. 362, 362ra142–362ra142, Oct. 2016, ISSN: 1946-6234. DOI: 10.1126/scitranslmed.aaf5187.

[11] B. P. **Delhaye**, "Skin mechanics involved in dynamic touch.," PhD thesis, 2014.

[12] B. P. **Delhaye**, P. Lefevre, and J.-L. Thonnard, "Dynamics of fingertip contact during the onset of tangential slip," *Journal of The Royal Society Interface*, vol. 11, no. 100, pp. 20 140 698–20 140 698, Sep. 2014, ISSN: 1742-5689. DOI: 10.1098/rsif.2014.0698.

[13] B. P. **Delhaye**, V. Hayward, P. Lefevre, and J.-L. Thonnard, "Texture-induced vibrations in the forearm during tactile exploration," *Frontiers in Behavioral Neuroscience*, vol. 6, p. 37, Jul. 2012, ISSN: 1662-5153. DOI: 10.3389/fnbeh.2012.00037.

Conference presentation/proceedings

1. BP Delhaye, HP Saal, BC Rayhaun, SJ Bensmaia. Simulating tactile signals from the whole hand with millisecond precision. WorldHaptics conference, June 2017, Munich, Germany (talk).
2. A Barrea, BP Delhaye, P Lefèvre, JL Thonnard. Fingerpad Mechanics during Dexterous Object Manipulation. WorldHaptics conference, June 2017, Munich, Germany (poster, **best work-in-progress award**).
3. BP Delhaye, AI Weber, SJ Bensmaia, Decoding motion speed from the responses of tactile afferents. Society for Neuroscience Annual Meeting, Nov 2016, San Diego, USA (poster).
4. A Barrea, E Jarocka, P Lefèvre, JL Thonnard, BB Edin, BP Delhaye, Human tactile afferent responses to skin strain patterns caused by fingertip shearing. Society for Neuroscience Annual Meeting, Nov 2016, San Diego, USA (poster).

5. SJ Bensmaia, T Callier, HP Saal, BP Delhaye The dynamics of neural signals about contact pressure - implications for bionic hands. Society for Neuroscience Annual Meeting, Nov 2016, San Diego, USA (talk).
6. AK Suresh, BP Delhaye, HP Saal, SJ Bensmaia. Coding of edge orientation in afferent responses of macaques. Society for Neuroscience Annual Meeting, Nov 2016, San Diego, USA (poster).
7. EL Graczyk, MA Schiefer, HP Saal, BP Delhaye, SJ Bensmaia, DJ Tyler. Fascicular organization affects tactile sensation evoked from peripheral nerve cuff stimulation (poster). Society for Neuroscience Annual Meeting, Nov 2016, San Diego, USA (poster).
8. A Barrea, BP Delhaye, P Lefèvre, JL Thonnard. Perception of Partial Slips under Tangential Loading of the Fingertip. Eurohaptics conference, London, UK (poster).
9. BP Delhaye, EW Schluter, MS Johannes, KD Katyal, FV Tenore & SJ Bensmaia. What can bionic fingers tell us about objects? Extracting behaviorally relevant features from the output of sensors on prosthetic fingertips. Society for Neuroscience Annual Meeting, Oct 2015, Chicago, USA. (poster)
10. BP Delhaye, HP Saal, BC Rayhaun & SJ Bensmaia. A model that simulates the response of the somatosensory nerves to arbitrary spatio-temporal deformations of the skin of the hand. Society for Neuroscience Annual Meeting, Oct 2015, Chicago, USA. (poster)
11. Barrea A, Delhaye B, Lefèvre P, Thonnard JL. Perception of partial slips under tangential loading of the fingertip. Society for Neuroscience Annual Meeting, Oct 2015, Chicago, USA. (poster)
12. Delhaye B, Lefèvre P and Thonnard JL Skin strain measurements of the fingertip under shearing stress. Society for Neuroscience Annual Meeting, Nov 2013, San Diego, USA. (poster)
13. Delhaye B, Lefèvre P and Thonnard JL Fingertip deformation during the onset of a tangential sliding movement. Society for Neuroscience Annual Meeting, Oct 2012, New Orleans, USA. (poster)
14. Delhaye B, Lefèvre P and Thonnard JL Tactile detection of slip: Fine characterisation of skin deformation during the onset of slip. Society for the Neural Control of Movement Annual Meeting, Apr 2012, Venise, Italy. (poster)
15. Delhaye B, Hayward V, Lefèvre P and Thonnard JL Vibrations in the forearm during active touch of rough textures. Active touch sensing at The Royal Society at Chicheley Hall, home of the Kavli Royal Society International Centre, Feb 2011, Buckinghamshire, UK. (talk + poster)
16. Delhaye B, Hayward V, Lefèvre P and Thonnard JL Textural vibrations in the forearm during tactile exploration. Society for Neuroscience Annual Meeting, Nov 2010, San Diego, USA. (poster)

Teaching experience

2017	Methods in Neuroscience (UChicago, graduate), single lecture: Machine learning
2016	Systems Neuroscience (UChicago, graduate), single lecture: Neural basis of somatosensation at the periphery
2007–2014	Graduate teaching assistant (UCLouvain, undergraduate and master): Physics, Mathematics, Electricity, Mechatronics, Linear control theory, Bio-medical engineering

Ad hoc reviewer

invited	Sensors; Scientific Reports; Perception; IEEE Transactions on Haptics; PLOS ONE; Journal of Neurophysiology; IEEE Haptics symposium; Eurohaptics; Worldhaptics
as junior	Journal of Neuroscience; Journal of Biomechanics; Journal of the Royal Society Interface; Attention, Perception, & Psychophysics; Biology Letters; Medical & Biological Engineering & Computing; Acta Psychologica; Clinical Neurophysiology; Tribology International; Experimental Brain Research
Publons ID	1176681

Others

Languages	French (Mothertongue), English (Full professional proficiency), Dutch (basics)
Computer skills	MATLAB, LaTeX(advanced); C/C++, R, Python, Bash, Gnuplot, Linux (intermediate); HTML/PHP (basics)
Personal interests	Running (Half-Marathon, 1:23:40; Marathon, 3:08:52)