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**Dr. Etienne Burdet** (MS Mathematics, MS Physics, PhD, ETH-Zurich) is a Professor in Human Robotics at Imperial College London and a visiting Professor at Université Paris 6. He uses an integrative approach of neuroscience and robotics to investigate human motor control, and to design efficient assistive devices and training systems for neuro-rehabilitation, which are tested in clinical trials. In the last 3 years, he has attracted funding for over 2M£, and published over 25 papers in top robotics, neuroscience and rehabilitation technology journals. According to Scopus ([www.scopus.com](http://www.scopus.com), 1/6/2015), his papers have been cited over 2300 times, with an h-index of 23. Recent awards include the 2011 best paper award of the IEEE Transactions on Robotics, the 2010 best paper award at the Asean Oceanian congress of physical and rehabilitative medicine, and the 2009 Apple Research & Technology Support award. Dr. Burdet is a PI in the recent EU-FP7 projects HUMOUR, VIATORS, ITN CONTEST and BALANCE, and leader of the Modeling Work Group of the European COST Action network on Rehabilitation Robotics. Alumni of his group (with over 15 PhD students and postdoctoral researchers) have taken positions at leading universities and research institute such as ETHZ (Switzerland), NUS (Singapore), Northwestern U (USA), Weizmann I (Israel), ATR International (Japan), A\*STAR (Singapore), and high-tech companies worldwide.

#### **Education**

84-90 Study of Mathematics and Physics at ETH-Zurich  
89 Masters in Mathematics (thesis in Differential Geometry, adv. W Ballmann, U Bonn),  
90 Masters in Physics (thesis in Computational Neuroscience, adv. K Hepp, ETH-Zurich)  
91-96 PhD studies in Robotics at ETH-Zurich (advs: G Schweitzer, ETH-Zurich, T Flash, Weizmann Inst. of Sci.)  
97-99 Postdoctoral education in Computational Neuroscience and Haptics (with TE Milner, McGill, Canada, M Kawato, ATR, Japan, JE Colgate, Northwestern U, USA)

Languages: studied and worked in French (mother tongue), German and English

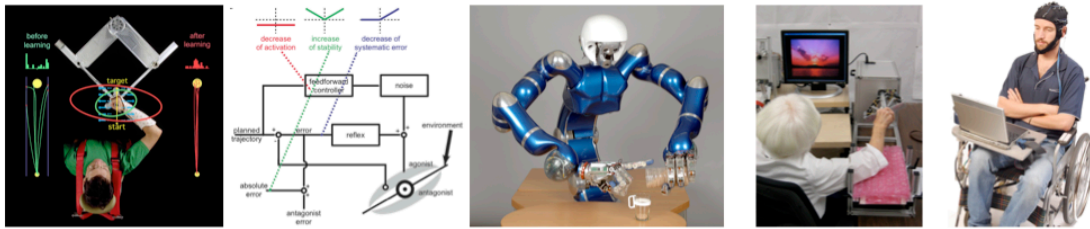
#### **Professional Experience**

13- Professor in Human Robotics, Imperial College London  
09- Invited Professor, Université Pierre et Marie Curie (Paris VI)  
7-8.12 Invited Professor, EPFL, Switzerland  
09-13 Reader in Human Robotics, Imperial College London  
09-11 Consultancy for A\*STAR, Singapore  
05-08 Senior Lecturer in Bioengineering, Imperial College London  
05-08 Senior Fellow, National University of Singapore  
99-04 Assistant Professor, National University of Singapore  
98-08 Consultancy for ATR International, Japan  
96-99 Postdoctoral Fellow, Simon Fraser U, Canada, and Northwestern U, USA  
6-8.96 Visiting Researcher, Fujitsu Ltd, Numazu, Japan  
91-96 Research Assistant at the Institute of Robotics, ETH-Zurich

#### **Awards**

2012 Best IROS Jubilee Video Award at the IEEE/RSJ International Conference on Robots and Systems (IROS2012)  
2011 King-Sun Fu Memorial Best Paper Award of the IEEE Transactions on Robotics  
2010 Best Paper Award at the Asean Oceanian Congress of Physical and Rehabilitative Medicine  
2009 Apple Research & Technology Support Award  
2009 Best Presentation Award at the International Conference on Rehabilitation Robotics (ICORR09)  
2007 First prize in the GSEPS Research Symposium Poster Competition, Imperial College London  
2006 Best Paper Award at the IEEE/RSJ International Conference on Robots and Systems (IROS2006)  
2004 Far East Economic Review Award  
2004 Offer of Canada Research Chair (declined)  
2003 ATR Prize  
2001 Research Prize of the Japanese Neural Networks Society  
1998 Recipient of the JISTEC research grant, Japan  
1998 STA-Fellowship, Japan  
1998 Advanced Researcher Award, Swiss National Science Foundations  
1996 Fellowship from Fujitsu Ltd, Japan  
1996 Prospective Researcher Award, Swiss National Science Foundations

## Recent research highlights



Our interdisciplinary approach of neuroscience and robotics has generated significant achievements including:

- The first clear evidence and computational model of how humans use learn appropriate force and impedance to control movements in unstable situations (Nature 414: 446-9, J Neuroscience 28(44): 11165-73, see first two panels above from the left). This translated to the first nonlinear adaptive robot controller able to deal with unstable situations typical of tool use, by learning appropriate force and mechanical impedance (Best Paper Award, IEEE Transactions on Robotics 27(5): 918-30).
- The first fMRI-compatible haptic interfaces, which are used in five labs in Japan and Europe in order to investigate the neural mechanisms of human motor control and rehabilitation.
- Robotic devices for decentralized rehabilitation of hand function in home and rehabilitation centers (best paper award at IROS06, the dominant conference for robotics applications), see middle photo above.
- A low-cost robotic wheelchair system based on path guidance assistance, which was shown to significantly reduce the effort necessary to control the wheelchair, and was tested by cerebral palsy and traumatic brain injury individuals.
- The first brain controlled wheelchair able to maneuver in a building environment (see right photo above).

## Selected recent patents and journal publications (students in *italic*)

- R Gassert, *L Dovat*, *O Lambercy* and **E Burdet**, Motor Skills Training Systems, UK patent filed on June 12, 2008.
- *L Dovat*, *O Lambercy*, R Gassert, CL Teo and **E Burdet**, Finger function rehabilitation device. Provisional patent US 61/130,764 filed on June 3, 2008.
- **E Burdet**, R Osu, DW Franklin, TE Milner, M Kawato (2001), The CNS skillfully stabilizes unstable dynamics by learning optimal impedance. Nature 414: 446-9.
- *R Gassert*, *R Moser*, **E Burdet** and H Bleuler (2006), An MRI/fMRI compatible robotic system with force-feedback for interaction with human motion. IEEE/ASME Transactions on Mechatronics 11(2): 216-24.
- *ES Boy*, **E Burdet**, CL Teo and JE Colgate (2007), Experimental evaluation of motion guidance with a cobot. IEEE Transactions on Robotics 23(2): 245-55.
- *O Lambercy*, *L Dovat*, R Gassert, CL Teo, T Milner and **E Burdet** (2007), A Haptic Knob for rehabilitation of hand function. IEEE Transactions on Neural Systems and Rehabilitation Engineering 15(3): 356-66.
- *G Ganesh*, **E Burdet**, M Haruno, M Kawato (2008), Sparse regression for mapping muscle to cortical activity in humans. NeuroImage 42(1): 1463-72.
- *DW Franklin*, **E Burdet**, *KP Tee*, T Milner, R Osu and M Kawato (2008), CNS learns stable, accurate and efficient movements using a simple algorithm. Journal of Neuroscience 28(44): 11165-73.
- *Q Zeng*, **E Burdet** and CL Teo (2009), Evaluation of a collaborative wheelchair system in cerebral palsy and traumatic brain injury users. Neurorehabilitation and Neural Repair 23(5): 494-504.
- *B Rebsamen*, C Guan, H Zhang, C Wang, CL Teo, M Ang and **E Burdet** (2010), A brain controlled wheelchair to navigate in familiar environments. IEEE Transactions on Neural Systems and Rehabilitation Engineering 18(6): 590-8.
- C Yang, *G Ganesh*, *S Haddadin*, *S Parusel*, A Albu-Schaeffer and **E Burdet** (2011), Human like adaptation of force and impedance in stable and unstable interactions, IEEE Transactions on Robotics 27(5): 918-30.
- *O Lambercy*, *L Dovat*, H Yun, SK Wee, C Kuah, K Chua, R Gassert, TE Milner, CL Teo and **E Burdet** (2011), Robot-assisted rehabilitation of grasp and pronation/supination. Journal of NeuroEngineering and Rehabilitation 8: 63, doi: 10.1186/1743-0003-8-63.
- D Campolo, *F Widjaja*, H Xu, WT Ang and **E Burdet** (2013), Analysis of accuracy in pointing with hand-held tools via coordinate-free uncontrolled manifold method. PLoS Computational Biology 9(4): e1002978. doi:10.1371/journal.pcbi.1002978.