

# Daniel Roggen, Ph.D.



Family name, First name: Roggen, Daniel  
Function: Reader (Associate Professor) in Sensor Technology  
Head of the Wearable Technology Lab  
Director of the Sensor Technology Research Centre  
University of Sussex

Google Scholar : [scholar.google.co.uk/citations?user=JGjtLtYAAAAJ](https://scholar.google.co.uk/citations?user=JGjtLtYAAAAJ)  
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[www.sussex.ac.uk/strc/research/wearable](http://www.sussex.ac.uk/strc/research/wearable)

## ABOUT MYSELF

I am an Associate Professor (Reader) in Sensor Technology at the University of Sussex, UK. With an H-index of 39, £3.2m total funding, I am an expert in the analysis of human activities and the context in which they occur from sensors - a key aspect of Computational Behavioural Science.

I was program chair of the IEEE International Symposium on Wearable Computers (ISWC) in 2013, the pioneering conference for sensor-based human activity and context recognition.

I am experienced organising large events: in 2006 I was local chair for ISWC, a 4-day, 180 participants event; in 2008 I was general chair of the 3-days, 80-participants European Conference on Smart Sensing and Context.

I managed large multi-site interdisciplinary research projects, such as the 1.5m€ EU-FP7 project OPPORTUNITY (2009-2012) involving 10+ PhD students across 4 sites. I applied my research to pervasive healthcare, manufacturing, sports, HCI, crowd behaviour, and others.

I organised several computational behavioural science machine learning challenges. The most recent is the 2018 Sussex-Huawei Locomotion Recognition Challenge, and prior to that the 2011 OPPORTUNITY activity recognition challenge. I joined the University of Sussex in 2014 and since then obtained funding through a prestigious Google Faculty Research Award (the resulting deep model for activity recognition is cited in an Apple technical document as an exemplary approach), the Austrian FFG, Huawei, the UK EPSRC and a EPSRC CASE fellowship with Unilever.

I am also director of the University of Sussex Sensor Technology Research Centre since 2016. I am a member of the "Intelligent Cyber-Physical Systems" Task Force of the IEEE CIS Smart World TC.

## PROFESSIONAL ACTIVITIES

06.2016 - **Director of the Sensor Technology Research Centre**, University of Sussex, UK  
present Department of Engineering, School of Engineering&Informatics  
01.2014 - **Reader in Sensor Technology**, University of Sussex, UK  
present Department of Engineering, School of Engineering&Informatics  
03.2013 - **Principal Research Assistant**, Digital Interaction Group, University of Newcastle, UK  
08.2013  
11.2005 - **Senior research fellow (Oberassistent)**, Wearable Computing Laboratory, ETHZ  
02.2013  
11.2001 - **Research assistant and PhD student**, Laboratory of Intelligent Systems, EPFL  
04.2005  
2001 **R&D engineer** at VisioWave S.A.

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## EDUCATION

2001- March 2005 **PhD Thesis** in bio-inspired AI and robotics, EPFL, Switzerland  
1995-2001 **Master degree in microengineering**, EPFL, Switzerland

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## PERSONAL DEVELOPMENT

2014-2016 **Leadership Training Course** (Ashridge)

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## ACCREDITATIONS

Sept 2016 **Fellow** of the Higher Education Academy in recognition of attainment against the UK Professional Standards Framework for teaching and learning support in higher education

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Jan 2016 **Associate Fellow** of the Higher Education Academy in recognition of attainment against the UK Professional Standards Framework for teaching and learning support in higher education

## FUNDED RESEARCH

In bold projects where I am principal investigator.

2018-2022	Unilever (PI): <b>Industrial Case PhD scholarship</b>	£126K
2018-2021	EPSRC (CoI): Shape sensing textile for orthotics - SmartSensOtics	£360K (out of £732K)
2017-2018	Huawei (PI): <b>Activity sensing technologies for mobile users</b>	£168K
2016-2019	Austrian FFG (CoI): Attention Management in Minimal Invasive Surgery	46K€
2016-2018	EPSRC (PI): <b>Lifelearn: Unbounded activity and context awareness</b>	£99K
2015-2016	Google Faculty Research Award (PI): <b>Is Deep Learning Useful for Wearable Activity Recognition?</b>	86K\$
2011-2014	EU FP7-ICT-2011-7 (CoI): Closed-loop system for personalized and at-home rehabilitation of people with Parkinson's Disease	399K€ (out of 3500K€)
2011-2014	Foundation Hasler (PI): <b>Smart Distributed daily living Activity-recognition Systems</b>	165KCHF (out of 330KCHF)
2009-2013	EU FP7-FET Proactive (CoI): Complex Socio-Technical System in Ambient Intelligence	347K€ (out of 5299K€)
2009-2012	EU FP7-FET Open (PI): <b>Activity and Context Recognition with Opportunistic Sensor Configurations</b>	449K€ (out of 1509K€)
2008-2009	NanoTera (PI): <b>Educational Kit for Wearable Computing</b>	49KCHF

## EVIDENCE OF ESTEEM

### Membership

2017-	Member of the Task Force on "Intelligent Cyber-Physical Systems" under the Smart World Technical Committee of the IEEE Computational Intelligence Society
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### Reviewer

2016-	Invitation to EPSRC Associate College
2016	Hasler Stiftung (1 project), Leverhulme (1 project)
2014-	Reviewer for UK EPSRC projects
2012-	Reviewer for FET (Future Emerging Technologies) projects, EC ICT programme

### Advisory

2013-2015	Scientific advisory board EU FP7 Dem@Care (Dementia Ambient Care: Multi-Sensing Monitoring for Intelligent Remote Management and Decision Support)
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### Conference

2017-ongoing	Technical program committee: IEEE Body Sensor Networks
2016-	PC member&Poster chair: Ubicomp
2014-ongoing	Human Activity Sensing Corpus and Applications workshop at Ubicomp: co-organiser
2013	Program chair: International Symposium on Wearable Computers (ISWC), Zurich
2011	Program chair: workshop on robust machine learning techniques for human activity recognition at IEEE Int. Conf. on Systems, Man and Cybernetics
2010	General chair: Workshop on context awareness and information processing in opportunistic ubiquitous systems at ACM Int. Conf. on Ubiquitous Computing (UbiComp)
2008	General chair: 3d IEEE European Conference on Smart Sensing and Context (EuroSSC)
2008-ongoing	PC member: International Symposium on Wearable Computers (ISWC)
2006	Local chair: International Symposium on Wearable Computers (ISWC)

Reviewer for various journals/conferences: IEEE pervasive computing magazine, IEEE transactions on mobile computing, IEEE robotics and automation, ACM IMWUT, etc.

## INVITED TALKS

2018, December 3	INRIA, Grenoble, France	Community datasets for activity recognition research: Sussex-Huawei Locomotion Dataset
2018, November 8	Workshop on Physics and psychology of human crowd dynamics, Lorentz Centre, NL	Sensor-based crowd behaviour analysis
2018, October, 17	IET Seminar Series, University of Sussex, UK	Designing BlueSense - an extensible platform for wearable motion sensing, sensor research and IoT applications
2017, November 15	Home Office, Centre for Applied Science and Technology Innovation, Call on Wearable Technologies, Birmingham, UK	Wearable sensing and machine learning: Enabling contextual awareness
2017, September 6	British Science Festival Talk, University of Sussex, UK	In the era of wearable technologies
2017, June 22	SPHERE project Seminar Series, Bristol University, UK	Towards unbounded activity & context awareness in wearables and ubicomp
2017, June 21	Invited talk, Acrossing Initial Training Network, De Montfort University, UK	Towards unbounded activity & context awareness in wearables and ubicomp
2017, June 7	Bosch, Palo Alto, USA	Towards unbounded activity & context awareness in wearables and ubicomp
2017, June 6	Google, Mountain View, USA	Towards unbounded activity & context awareness in wearables and ubicomp
2016, June 21	Automation and Analytical Management Group, Royal Society of Chemistry, London, UK	Novel Wearable Sensor Technologies - An Overview
2016, January	Invited talk in S. Aziz's group, University of Edinburgh, UK	Wearable Technologies
2015, November 12	Invited talk in Plamen Angelov's group, Lancaster University, UK	Wearable Technologies
2015, November 17	Local IET Network Talk, University of Sussex, UK	Wearable technologies: what's brewing in the lab?
2014, March	UK Design Forum, Liverpool, UK	Activity/context-awareness in wearables
2013, September	EU project DemAAL summer school, Crete, GR	Activity/context-awareness in wearable computing
2013, February	Samsung Research, San José, USA	Opportunistic and collective activity recognition
2012, April	Pervasive Computing Systems, Karlsruhe Institute of Technology Karlsruhe, Germany	Activity recognition: opportunistic, collective, crowd-sourced
2012, March	Foundation Balearic Islands For The Technological Innovation (iBit) Mallorca, Spain	Wearable sensing and human activity recognition: a crash course
2011, November 11	Bio-Robotics Network in Zurich (BiRoNZ) Seminar ETHZ, Switzerland	Wearable sensing and human activity recognition
2011, November	Unilever Physiological Monitoring Workshop Port Sunlight, UK	Wearable sensors and activity recognition
2011, September	Qualcomm Context Awareness Symposium San Diego, USA	Future directions in mobile activity recognition: "Smartphones in need of open-ended context awareness"
2011, May	Pervasive Computing System Development Lecture at University Linz, Austria	Lecture: "Wearable Computing and Activity Recognition"
2010, November	Swisscom Strategy & Innovation / ETHZ workshop, Switzerland	Mobile crowd behavior sensing
2010, September	"Context awareness and information processing in opportunistic ubiquitous systems" workshop at UbiComp 2010 Copenhagen, Denmark	Introduction to opportunistic activity recognition
2010, August	Chinese-German Advanced Workshop on Wearable Computing Chengdu, China	Towards activity recognition with opportunistic sensing

2010, July	Culture Lab, Newcastle University (Prof. Patrick Olivier) Newcastle, UK	Opportunistic activity recognition
2010, July	KAIST, Semiconductor Systems Lab (Prof Hoi-Jun Yoo, Prof. Kyoung-Soo Park) Daedeok, South Korea	OPPORTUNITY: Activity recognition in opportunistic sensor configurations
2008, November	Science City (ETHZ open door day) ETHZ, Switzerland	Ein Computer, der unsere täglichen Aktivitäten erkennt: Wo liegt die Grenze zwischen Assistenz und «Big Brother»?
2007, March	Wearable computers workshop at the 3rd Spring school of Informatics in French-speaking Switzerland Villars, Switzerland	Wearable computing: Where does it lead? Industry and life style management applications

## TEACHING EXPERIENCE

### Regular

2017-	Wearable Technologies (Sussex, MSc, 15 students) 12 weeks, weekly 2 hours theory and 2 hours labs
2013-	Digital Systems and Microprocessor Design (Sussex, undergrad, 55 students) 12 weeks, weekly 3 hours theory and 2 hours labs
2013-	Reconfigurable System on Chip (Sussex, MSc, 15 students): 12 weeks, weekly 2 hours theory and 2 hours labs
2006-2012	Unit within "Wearable Systems I" (ETHZ, MSc, 30 students): Recognition chain design and optimization, hidden Markov models, ensemble classifiers 3x2 hours theory, 2x2 hours exercises
2002-2004	Unit within "Bio-inspired Adaptive Machines", EPFL (MSc, 40 students): Evolvable Hardware 1x2 hours theory, 1x2 hours exercises

### Invited

2017	Moderation of Thad Starner's Activity Recognition Reading Group jointly with Thad Starner, Georgia Tech (via Skype, 4x1 hour sessions)
2011, May	"Wearable Computing and Activity Recognition" within the Pervasive Computing System Development Lecture at University Linz, Austria
2007, March	"Wearable computing: Where does it lead?" within the Wearable computers workshop at the 3rd Spring school of Informatics in French-speaking Switzerland, Villars, Switzerland

## PREVIOUS AND PRESENT DOCTORAL STUDENTS

### As main advisor

Name	PhD period	<i>PhD title</i> or research topic
Zygimantas Jocys	2019-	TBD
Mathias Ciliberto	2016-	Wearable technologies in Beach volleyball
Long-Van Nguyen-Dinh*	2011-2016	Wearable Activity Recognition with Crowdsourced Annotation
Michael Hardegger	2011-2015	Simultaneous Activity Recognition, Indoor Localization and Semantic Mapping using Wearable Sensors
Sinziana Mazilu*	2011-2015	Systems and Methods for Treatment of Freezing of Gait in Parkinson's Disease
Martin Wirz	2009-2013	Crowd context recognition with wearable sensors
Alberto Calatroni	2009-2013	Transfer of activity recognition capabilities to untrained sensor systems
Kilian Förster	2007-2011	Adaptation of activity recognition systems
Marc Bächlin	2006-2010	Human motion assistance with wearable computing

\* Supervision handed over after leaving ETH Zürich.

### As informal advisor

Name	PhD period	<i>PhD title</i> or research topic
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Thomas Stiefmeier	2004-2008	Real-time spotting of human activities in industrial environments
Clemens Lombriser	2005-2008	Reconfigurable context recognition in sensor networks
Andreas Bulling	2006-2010	Eye movement analysis for context inference and cognitive-awareness
Holger Harms	2006-2011	Body posture detection using non-tight fitting garments
Bernd Tesselndorf	2008-2012	Multimodal context-aware hearing instruments

## TEN MOST IMPORTANT PUBLICATIONS

L Wang, H Gjoreski, M Ciliberto, S Mekki, S Valentin, D Roggen, *Enabling reproducible research in sensor-based transportation mode recognition with the Sussex-Huawei dataset*, IEEE Access 7, 10870-10891, 2019

H. Gjoreski, M. Ciliberto, L. Wang, F.J. Ordonez Morales, S. Mekki, S. Valentin, D. Roggen. *The university of sussex-huawei locomotion and transportation dataset for multimodal analytics with mobile devices*, IEEE Access 6, 42592-42604, 2018

JF. Ordonez Morales, D. Roggen. *Deep convolutional and LSTM recurrent neural networks for multimodal wearable activity recognition*. *Sensors*, 16(1) pp. 1-25, 2016

D. Roggen, P. Lukowicz, A. Ferscha, J. del R. Millán, G. Tröster, R. Chavarriaga. *Opportunistic human and context recognition*. IEEE Computer Magazine, 46(2), pp. 36-45, 2013

D. Roggen, S. Magnenat, M. Waibel, G. Tröster. *Wearable Computing: Designing and Sharing Activity-Recognition Systems Across Platforms*. IEEE Robotics and Automation Magazine, 18(2), 2011

D. Roggen, M. Wirz, G. Tröster, and D. Helbing. *Recognition of crowd behavior from mobile sensors with pattern analysis and graph clustering methods*. *Networks and Heterogeneous Media*, 6(3):521-544, 2011.

D. Roggen, K. Förster, A. Calatroni, and G. Tröster. *The adARC pattern analysis architecture for adaptive human activity recognition systems*. *Journal of Ambient Intelligence and Humanized Computing*, 2011

M. Bächlin, M. Plotnik, D. Roggen, I. Maidan, J. M. Hausdorff, N. Giladi, and G. Tröster. *Wearable assistant for parkinson's disease patients with the freezing of gait symptom*. IEEE Transactions on Information Technology in Biomedicine, 14(2):436 – 446, 2010

D. Roggen, A. Calatroni, M. Rossi, T. Holleczeck, K. Förster, G. Tröster, P. Lukowicz, Bannach, G. Pirkel, A. Ferscha, J. Doppler, C. Holzmann, M. Kurz, G. Holl, R. Chavarriaga, H. Sagha, H. Bayati, M. Creatura, and J. del R. Millán, *Collecting complex activity data sets in highly rich networked sensor environments*, Proc. 7th Int Conf on Networked Sensing Systems, 2010

T. Stiefmeier, D. Roggen, G. Ogris, P. Lukowicz, and G. Tröster. *Wearable activity tracking in car manufacturing*. IEEE Pervasive Computing, 7(2):42-50, 2008

## BEST PAPER AWARDS

- M. Ciliberto, L. Ponce Cuspinera, D. Roggen, *Complex human gestures encoding from wearable inertial sensors for activity recognition*. International Conference on Embedded Wireless Systems and Networks, 2017
- D. Roggen, L.P. Cuspinera, G. Pombo, F. Ali, L.-V. Nguyen-Dinh, *Limited-Memory Warping LCSS for real-time low-power pattern recognition in wireless nodes*. Proc. European Conference on Wireless Sensor Networks, pp. 151-167, 2015
- R. McNaney, J. Vines, D. Roggen, M. Balaam, P. Zhang, I. Poliakov, P. Olivier, *Exploring the Acceptability of Google Glass as an Everyday Assistive Device for People with Parkinson's*. Proc. of CHI, 2014
- M. Hardegger, D. Roggen, S. Mazilu, G. Tröster, *ActionSLAM: Using location-related actions as landmarks in pedestrian SLAM*. Proc. Int Conf on Indoor Positioning and Indoor Navigation, 2012
- B. Tessendord, P. Derleth, M. Feilner, D. Roggen, T. Stiefmeier, G. Tröster. *Improving Game Accessibility with Vibrotactile-Enhanced Hearing Instruments*. 13th International Conference on Computers Helping People with Special Needs, 2012
- A. Manzoor, C. Villalonga, A. Calatroni, H.-L. Truong, D. Roggen, S. Dustdar, G. Tröste. *Identifying Important Action Primitives for High Level Activity Recognition*. 5th European Conference on Smart Sensing and Context, 2010
- M. Wirz, D. Roggen, G. Tröster. *User acceptance study of a mobile system for assistance during emergency situations at large-scale events*. 3rd International Conference on Human-centric Computing, 2010
- M. Bächlin, D. Roggen, M. Plotnik, J. Hausdorff, N. Giladi, G. Tröster. *Online Detection of Freezing of Gait in Parkinson's Disease Patients: A Performance Characterization*. 4th International Conference on Body Area Networks, 2009
- M. Bächlin, M. Plotnik, D. Roggen, N. Inbar, N. Giladi, J. Hausdorff, G. Tröster. *Parkinson's patients' perspective on context aware wearable technology for auditive assistance*. 3rd International Conference on Pervasive Computing Technologies for Healthcare, 2009
- J. Schumm, M. Bächlin, D. Roggen, B. Arnrich, C. Setz, G. Tröster. *Effect of movements on the electro-dermal response after a startle event*. 2nd International Conference on Pervasive Computing Technologies for Healthcare, 2008
- H. Harms, D. Roggen, O. Amft, G. Tröster. *SMASH: A distributed sensing and processing garment for the classification of upper body postures*. 3rd International Conference on Body Area Networks, 2008
- P. Zappi, C. Lombriser, T. Stiefmeier, E. Farella, D. Roggen, L. Benini, G. Tröster. *Activity recognition from on-body sensors: accuracy-power trade-off by dynamic sensor selection*. 5th European conference on Wireless Sensor Networks, 2008
- D. Roggen, D. Federici. *Multi-cellular development: is there scalability and robustness to gain?* Parallel Problem Solving from Nature VIII, 2004