

# Emmanuel Senft

Curriculum Vitae – May 2021

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<https://emmanuel-senft.github.io>

## RESEARCH MISSION

To develop human-centered robotic tools for end-users to design effective robot behaviors in situ; to explore how to deploy robots in human environments with high cost of failure, large variability of tasks, and real-world application; and to enable robots to be used by anyone to positively impact our society.

## EMPLOYMENT

2019–Current **Research Associate**, *People and Robots Lab, University of Wisconsin–Madison, USA*, PI: Prof. Bilge Mutlu and Prof. Michael Gleicher (since Oct. 2019).

2019 **Cooperate Researcher**, *JSPS Summer program, IRC - ATR, Japan*, PI: Prof. Takayuki Kanda (June to August 2019).

**Research Fellow**, *Plymouth University, UK*, PI: Prof. Tony Belpaeme.  
part-time (January to March 2019)

2018 **Research Assistant**, *Plymouth University, UK*, PI: Prof. Tony Belpaeme.

## EDUCATION

2014–2018 **PhD**, *Plymouth University, Plymouth, UK, Teaching Robots Social Autonomy From In Situ Human Supervision*.

Supervisory team: Prof. Tony Belpaeme, Dr. Paul Baxter, and Dr Séverin Lemaignan

2011–2013 **Master of Science in Robotic and Autonomous Systems**, *EPFL (École Polytechnique Fédérale de Lausanne)*, Switzerland, with Minor in Area and Cultural Studies.

Master thesis with Prof. Auke J. Ijspeert

2011–2013 **Bachelor of Science in Microengineering**, *EPFL (École Polytechnique Fédérale de Lausanne)*, Switzerland.

## AWARDS and FUNDING

2021 **National Robotics Initiative 3.0**: Collaboration on writing two grants (under review).  
*Enabling Robotic Assistance in Construction Work*

*Designing Social Companion Robots for Long-term Interaction*

2019 **JSPS Summer Program**: 2 months research with Prof. Takayuki Kanda at ATR, Japan.

2019 **Queen Mary UK Best PhD in Robotics Award**: Second position.

## INVITED TALKS and PRESENTATIONS

2021 **NASA Transformative Aeronautics Concepts Program (TACP) Showcase** (online)

2020 **HRI Lab - University of Chicago** (online)

2019 **CHILI Lab - EPFL** (Lausanne, Switzerland)

**Robot Learning and Interaction Lab - IDIAP** (Martigny, Switzerland)

## PUBLICATIONS

### Journals

2021 **Corrective Shared Autonomy for Addressing Task Variability.**

M. Hagenow, E. Senft, R. Radwin, M. Gleicher, B. Mutlu, and M. Zinn  
IEEE Robotics and Automation Letters 6 (2), 3720–3727.

- A Socially Assistive Robot for Long-Term Cardiac Rehabilitation in the Real World.**  
N. Céspedes, B. Irfan, **E. Senft**, C.A. Cifuentes, L.F. Gutiérrez, M. Rincon-Roncancio, T. Belpaeme, and M. Múniera,  
Frontiers in Neurorobotics 15, 21.
- 2020 **Social Assistive Robots: Assessing the Impact of a Training Assistant Robot in Cardiac Rehabilitation.**  
J. Casas, **E. Senft**, L.F. Gutiérrez, M. Rincón-Rocancio, M. Múniera, T. Belpaeme, and C.A. Cifuentes  
International Journal of Social Robotics.
- The DREAM Dataset: Supporting a Data-Driven Study of Autism Spectrum Disorder and Robot Enhanced Therapy.**  
E. Billing, ... , **E. Senft**, ... , and T. Ziemke  
PloS one 15 (8), e0236939.
- 2019 **Teaching Robots Social Autonomy From in Situ Human Guidance.**  
**E. Senft**, S. Lemaignan, P. Baxter, and T. Belpaeme  
Science Robotics 4 (35).
- Generating Spatial Referring Expressions in a Social Robot: Dynamic vs Non-Ambiguous.**  
C.D. Wallbridge, S. Lemaignan, **E. Senft**, and T. Belpaeme  
Frontiers in Robotics and AI 6 (2019): 67.
- Robot-Enhanced Therapy: Developing and Validating a Supervised Autonomous Robotic System for Autism Spectrum Disorders Therapy.**  
H.L. Cao, ... , **E. Senft**, ... , and T. Ziemke  
EEE Robotics & Automation Magazine, vol. 26, no. 2.
- 2018 **The PInSoRo dataset: Supporting the Data-Driven Study of Child-Child and Child-Robot Social Dynamics.**  
S. Lemaignan, C. Edmunds, **E. Senft**, and T. Belpaeme  
PloS one 13 (10), e0205999.
- A Personalized and Platform-Independent Behavior Control System for Social Robots in Therapy: Development and Applications.**  
H.L. Cao, G. Van de Perre, J. Kennedy, **E. Senft**, P.G. Esteban, A. De Beir, R. Simut, T. Belpaeme, D. Lefeber, and B. Vanderborght  
IEEE Transactions on Cognitive and Developmental Systems 11 (3).
- 2017 **Supervised Autonomy for Online Learning in Human-Robot Interaction.**  
**E. Senft**, P. Baxter, J. Kennedy, S. Lemaignan, and T. Belpaeme  
Pattern Recognition Letters.
- How to Build a Supervised Autonomous System for Robot-Enhanced Therapy for Children with Autism Spectrum Disorder.**  
P.G. Esteban, ... , **E. Senft**, ... , and T. Ziemke  
Paladyn, Journal of Behavioral Robotics. De Gruyter Open.

### Conferences

- 2020 **Would You Mind Me if I Pass by You? Socially-Appropriate Behaviour for an Omni-based Social Robot in Narrow Environment.**  
**E. Senft**, S. Satake, and T. Kanda  
ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2020.
- Using a Personalised Socially Assistive Robot for Cardiac Rehabilitation: A Long-Term Case Study.**  
B. Irfan, N.C. Gomez, J. Casas, **E. Senft**, L.F. Gutiérrez, M. Rincon-Roncancio, M. Munera, T. Belpaeme, and C.A. Cifuentes  
International Symposium on Robot and Human Interactive Communication (RO-MAN), 2020.

- 2018 **Social Psychology and Human-Robot Interaction: an Uneasy Marriage.**  
B. Irfan, J. Kennedy, S. Lemaignan, F. Papadopoulos, **E. Senft**, and T. Belpaeme  
ACM/IEEE International Conference on Human-Robot Interaction (alt.HRI), 2018.
- Architecture for a Social Assistive Robot in Cardiac Rehabilitation.**  
J. Casas, N.C. Gomez, **E. Senft**, B. Irfan, L.F. Gutiérrez, M. Rincón, M. Múnera, T. Belpaeme, and C.A. Cifuentes  
Colombian Conference on Robotics and Automation, 2018.
- 2017 **Child Speech Recognition in Human-Robot Interaction: Evaluations and Recommendations.**  
J. Kennedy, S. Lemaignan, C. Montassier, P. Lavalade, B. Irfan, F. Papadopoulos, **E. Senft**, and T. Belpaeme  
ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2017.
- Sensor Interface for Cardiac Rehabilitation Monitoring: Pilot Clinical Study.**  
J. Lara, J. Casas, M. Munera, **E. Senft**, B. Irfan, L.F. Gutiérrez, L. Pinzón, T. Belpaeme, M. Rincon, and C.A. Cifuentes  
IBERDISCAP, 2017.
- Human-Robot Sensor Interface for Cardiac Rehabilitation.**  
J. Lara, J. Cases, A. Aguirre, M. Munera, M. Rincon-Roncancio, B. Irfan, **E. Senft**, T. Belpaeme, and C.A. Cifuentes  
IEEE International Conference on Rehabilitation Robotics (ICORR), 2017.
- 2016 **Social Robot Tutoring for Child Second Language Learning.**  
J. Kennedy, P. Baxter, **E. Senft**, and T. Belpaeme  
ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2016.
- From Characterising Three Years of HRI to Methodology and Reporting Recommendations.**  
P. Baxter, J. Kennedy, **E. Senft**, S. Lemaignan, and T. Belpaeme  
ACM/IEEE International Conference on Human-Robot Interaction (alt.HRI), 2016.
- 2015 **SPARC: Supervised Progressively Autonomous Robot Competencies.**  
**E. Senft**, P. Baxter, J. Kennedy, and T. Belpaeme.  
ICSR, 2015.
- Higher Nonverbal Immediacy Leads to Greater Learning Gains in Child-Robot Tutoring Interactions.**  
J. Kennedy, P. Baxter, **E. Senft**, and T. Belpaeme  
ICSR, 2015.
- Touchscreen-Mediated Child-Robot Interactions Applied to ASD Therapy.**  
P. Baxter, S. Matu, **E. Senft**, C. Costescu, J. Kennedy, D. David, and T. Belpaeme  
International Conference on Social Robots in Therapy and Education, 2015.
- 2013 **An Experimental Study on the Role of Compliant Elements on the Locomotion of the Self-Reconfigurable Modular Robots Roombots.**  
M. Vespignani, **E. Senft**, S. Bonardi, R. Möckel, and A. Ijspeert.  
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2013.

### Posters and Workshops

- 2019 **Towards Generating Spatial Referring Expressions in a Social Robot: Dynamic vs Non-Ambiguous.**  
C.D. Wallbridge, S. Lemaignan, **E. Senft**, and T. Belpaeme  
Extended abstract at HRI, 2019.
- 2018 **From Evaluating to Teaching: Rewards and Challenges of Human Control for Learning Robots.**  
**E. Senft**, S. Lemaignan, P. Baxter, and T. Belpaeme  
Human/Robot in the loop Machine Learning Workshop at IROS, 2018.

- Robots in the Classroom: Learning to Be a Good Tutor.**  
**E. Senft**, S. Lemaignan, M. Bartlett, P. Baxter, and T. Belpaeme  
 Robot for Learning Workshop at HRI, 2018.
- Social Assistive Robot for Cardiac Rehabilitation: A Pilot Study with Patients with Angioplasty.**  
 J. Casas, B. Irfan, **E. Senft**, L.F. Gutiérrez, M. Rincon-Roncancio, M. Munera, T. Belpaeme, and C.A. Cifuentes  
 Personal Robots for Exercising and Coaching Workshop at HRI, 2018.
- Towards a SAR System for Personalized Cardiac Rehabilitation: A Patient with PCI.**  
 J. Casas, B. Irfan, **E. Senft**, L.F. Gutiérrez, M. Rincon-Roncancio, M. Munera, T. Belpaeme, and C.A. Cifuentes  
 Extended abstract at HRI, 2018.
- 2017 **Toward Supervised Reinforcement Learning with Partial States for Social HRI.**  
**E. Senft**, S. Lemaignan, P. Baxter, and T. Belpaeme  
 AI-HRI Symposium at AAAI FSS, 2017.
- Leveraging Human Inputs in Interactive Machine Learning for Human Robot Interaction.**  
**E. Senft**, S. Lemaignan, P. Baxter, and T. Belpaeme  
 Extended abstract at HRI, 2017.
- 2016 **SPARC: An Efficient Way to Combine Reinforcement Learning and Supervised Autonomy.**  
**E. Senft**, S. Lemaignan, P. Baxter, and T. Belpaeme  
 Future of Interactive Learning Machines Workshop at NIPS, 2016.
- Providing a Robot with Learning Abilities Improves its Perception by Users.**  
**E. Senft**, P. Baxter, J. Kennedy, S. Lemaignan, and T. Belpaeme  
 Extended abstract at HRI, 2016.
- Heart vs Hard Drive: Children Learn More From a Human Tutor Than a Social Robot.**  
 J. Kennedy, P. Baxter, **E. Senft**, and T. Belpaeme  
 Extended abstract at HRI, 2016.
- Socially Contingent Humanoid Robot Head Behaviour Results in Increased Charity Donations.**  
 P. Wills, P. Baxter, J. Kennedy, **E. Senft**, and T. Belpaeme  
 Extended abstract at HRI, 2016.
- 2015 **Using Immediacy to Characterise Robot Social Behaviour in Child-Robot Interactions.**  
 J. Kennedy, P. Baxter, **E. Senft**, and T. Belpaeme  
 Workshop on Evaluating Child-Robot Interaction at ICSR, 2015.
- The Wider Supportive Role of Social Robots in the Classroom for Teachers.**  
 P. Baxter, E. Ashurst, J. Kennedy, **E. Senft**, S. Lemaignan, and T. Belpaeme  
 Workshop on Evaluating Child-Robot Interaction at ICSR, 2015.
- Human-Guided Learning of Social Action Selection for Robot-Assisted Therapy.**  
**E. Senft**, P. Baxter, and T. Belpaeme  
 Machine Learning for Interactive Systems Workshop at ICML, 2015.
- When is it Better to Give Up? Autonomous Action Selection for Robot Assisted ASD Therapy.**  
**E. Senft**, P. Baxter, J. Kennedy, and T. Belpaeme  
 Pioneers Workshop at HRI, 2015.

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## PRESS COVERAGE

- 2020 **Financial Times.** Opinion sought for *“How AI eases teachers’ heavy workloads”*
- Teacher Magazine.** Interview for and research covered in *“Using robots to assist teachers and improve student learning”*

2019 **Financial Times**. Interview for and research covered in “*Robot trained to be useful teaching assistant in three hours*”

**The Telegraph**. Research covered in “*British schools test ‘robot teachers’ to tackle staff shortage*”

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## ACADEMIC SERVICES

### EDITORIAL WORK

Frontiers in Robotics & AI, *Guest Editor*

AAMAS 2019, *PC Member*

### REFeree SERVICE

#### *Journals*

Scientific Reports

Frontiers in Robotics and AI

Robotics and Automation Letters

Journal of Human-Robot Interaction

IEEE Transactions in Human-Robot Interaction

International Journal of Social Robotics

Mechatronics

Intelligent Service Robotics

Interaction Studies

Behaviour and Interaction Technology

#### *Conferences*

ACM/IEEE Human-Robot Interaction Conference (HRI)

Robotics: Science and Systems Conference (RSS)

IEEE International Conference on Robotics and Automation (ICRA)

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

IEEE-RAS Conference on Humanoid Robots

International Conference on Social Robotics (ICSR)

IEEE International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob)

International Conference on Human-Agent Interaction (HAI)

Towards Autonomous Robotic Systems Conference (TAROS)

IEEE International Symposium on Robot-Human Interactive Communication (Ro-Man)

### EVENT ORGANIZATION

Wisconsin Robotics Seminar Series, *Organizer*

AAAI Symposium - AI-HRI (2017-), *Program Chair / Committee member*

HRI Workshop - Robots in Therapy and Care (2019), *Committee member*

### TEACHING

Practical ROCO 318 - Mobile and Humanoid Robots at the University of Plymouth, *Demonstrator* (2015–2017)

### MENTORING

**Graduate Students:** Michael Hagenow, Kevin Welsh, Anna Konstant, and Prajna Bhat

**Past Students:** Titus Smith, Yash Hindka, and Timothy Lieb

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## COLLABORATIONS

### EDUCATION

Local schools (Plymouth, UK). Developing and evaluating robot tutoring solutions.

### HEALTHCARE

Therapists (Babeş-Bolyai University, Roumania), industry (Softbank Robotics EU) and academics in EU FP7 project. Developing therapy-driven robotic technologies for children with ASD.

Clinicians and hospital staff (Fundacion Cardioinfantil, Bogota, Colombia) and academics. Robot behaviours for cardiac rehabilitation.

### MANUFACTURING

The Boeing Company, NASA, and academics in a NASA ULI project. Designing robot platform for collaborative aircraft manufacturing.

## TELEVISION

Channel 4 (UK). Designing a teleoperation interface for the Pepper robot for the show: The Secret Life of 4 and 5 Year Olds.

## LANGUAGES

French	<b>Mother tongue</b>	
English	<b>Advanced</b>	<i>Con conversationally fluent and technical</i>
Mandarin	<b>Basic</b>	<i>Level A2</i>
German	<b>Basic</b>	<i>Level A2</i>