Emmanuel Senft

Curriculum Vitae – May 2021

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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, Prof. Paul Baxter, and Prof. Séverin Lemaignan.

2011–2013 **Master of Science in Microengineering**, *EPFL (École Polytechnique Fédérale de Lausanne)*, Switzerland, with Minor in Area and Cultural Studies.
Master thesis with Prof. Auke J. Ijspeert.

2008–2011 **Bachelor of Science in Microengineering**, *EPFL (École Polytechnique Fédérale de Lausanne)*, Switzerland.

AWARDS and FUNDING

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)
IROHMS - Cardiff (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 **Task-Level Authoring for Remote Robot Teleoperation.**
E. Senft, M. Hagenow, K. Welsh, R. Radwin, M. Zinn, M. Gleicher, B. Mutlu
Accepted in Frontiers in Robotics and AI.

LEADOR: A Method for End-to-End Participatory Design of Autonomous Social Robotsy.
E. Senft, K. Winkle, S. Lemaignan
Accepted in Frontiers in Robotics and AI.

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. Múnera
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. Rincon-Roncancio, M. Múnera, 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

2021 **Situated Live Programming for Human-Robot Collaboration.**
E. Senft, M Hagenow, R Radwin, M Zinn, M Gleicher, B Mutlu
Accepted to the 34rd Annual ACM Symposium on User Interface Software and Technology (UIST), 2021.

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. Céspedes, J. Casas, **E. Senft**, L.F. Gutiérrez, M. Rincon-Roncancio, M. Múnera, 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. Céspedes, **E. Senft**, B. Irfan, L.F. Gutiérrez, M. Rincón, M. Múnera, T. Belpaeme, and C.A. Cifuentes
IEEE 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. Múnera, **E. Senft**, B. Irfan, L.F. Gutiérrez, L. Pinzón, T. Belpaeme, M. Rincon, and C.A. Cifuentes
Congreso Iberoamericano de Tecnologías de Apoyo a la Discapacidad (IBERDISCAP), 2017.

Human-Robot Sensor Interface for Cardiac Rehabilitation.
J. Lara, J. Cases, A. Aguirre, M. Múnera, 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
International Conference on Social Robotics (ICSR), 2015.

Higher Nonverbal Immediacy Leads to Greater Learning Gains in Child-Robot Tutoring Interactions.
J. Kennedy, P. Baxter, **E. Senft**, and T. Belpaeme
International Conference on Social Robotics (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. Múnera, 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. Múnera, 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.

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"*.

ACADEMIC SERVICES

EDITORIAL WORK
Frontiers in Robotics and 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

Wisonsin Robotics Seminar Series, *Organizer*
AAAI Symposium - AI-HRI (2017-), *Program Chair / Committee member*
HRI Workhop - 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, Pragathi Praveena, and Prajna Bhat
Past Students: Titus Smith, Yash Hindka, and Timothy Lieb

COLLABORATIONS

EDUCATION

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

HEALTHCARE

Therapists (Babeș-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 platforms 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	**Mother tongue**	
English	**Advanced**	*Conversationally fluent and technical*
Mandarin	**Basic**	*Level A2*
German	**Basic**	*Level A2*