CNRS Research Project

Pr. Séverin Lemaignan

Academic track record and contributions

Contents

Academic profile

Since I completed my joint PhD in Cognitive Robotics from the CNRS/LAAS (France) and the Technical University of Munich (Germany), for which I received the GdR Robotique *Best PhD in Robotics 2012* award from French CNRS and the prized *Cumma Summa Laude* distinction in Germany, I have emerged as a rising leader in HRI.

Soon after my PhD, I created and successfully led for 2 years a HRI research group within the AI for Learning CHILI Lab at EPFL (Switzerland). While my original training was in **symbolic cognition & AI for autonomous robotics**, my postdoctoral stay at the highly cross-disciplinary CHILI Lab gave me the opportunity to become an expert in **child-robot interaction** and **robotics for learning**, while providing me with a solid footing in **experimental sciences, socio-psychology and education sciences**.

I was then awarded an highly competitive **EU H2020 Marie Sklodovska-Curie Individual Fellowship** to engage in basic research on artificial cognition at the University of Plymouth, UK: over a 2 years period, I explored the **underpinnings of artificial social cognition**. I **contributed significantly to the framing of the emerging field of data-driven HRI**, also releasing the PInSoRo open dataset [1], a one-in-a-kind dataset of natural child-child and child-robot social interactions.

I joined the Bristol Robotics Lab (BRL, largest co-located robotics lab in the UK) in 2018, first as a Senior Researcher, and since 2019, as a permanent **Associate Professor in Social Robotics and AI**. I am **in charge of defining and implementing the lab's research strategy in human-robot interactions**, and my field of expertise covers **the socio-cognitive aspects of human-robot interaction, from the perspective of human cognition, social signal processing and the design and implementation of cognitive architectures for robots**. I focus my experimental work on **real-world, natural human-robot interactions**, with a particular interest for **child-robot interactions in educative settings**, exploring how robots can support teachers and therapists to develop engaging novel learning paradigms.

Significant awards

HRI'2017	Best Paper award
HRI'2016	Best Paper award
AAAI'2015	Best Video award in Artificial Intelligence
HRI'2014	Best Late Breaking Report award
2012	GdR Robotique **Best PhD in Robotics 2012** award, CNRS, France
2012	PhD with **High Distinction** ("Summa Cum Laude"), TU Munich
Ro-Man'2010	Best paper award

Significant fellowships and grants

2020	**Submission of an ERC Consolidator** fellowship (unsuccessful)
2020	PI **robots4SEN** project, UWE VC Grand Challenges, £30K
	$\rightarrow$ *deployment of autonomous robots in a school for autistic children*
2019	UWE Vice Chancellor Accelerator Fellowship
2018	Co-I **CAV Forth** project, Innovate UK, £5M
	$\rightarrow$ *first deployment of an autonomous bus service in Scotland*
2015 – 2017	**EU Marie Skłodowska-Curie Individual Fellowship**
	$\rightarrow$ *Theory of Mind and social robotics, Plymouth University, UK*

Scientific and technical contributions

My main scientific contributions can be summarised as:

1. **a pioneering work on *symbolic knowledge representation* and *semantic-aware decisional architecture* for interactive robots;**
2. **a key role in the development of *situation assessment*, and more recently, *social situation assessment*, as the formal investigation of the models required by robots to achieve autonomy in human environments;**
3. **a key role in bridging research in cognitive psychology and sociology with robotics, with a number of cross-disciplinary literature surveys and experiments;**
4. **a major contribution to the field of child-robot interaction, in particular by studying the importance of social engagement between a child and a robot;**
5. **a leading role in the recent development of *data-driven human-robot interaction*, via for instance the acquisition of large datasets, and the development of novel 'human-in-the-loop' machine learning algorithms.**

In addition to these scientific contributions, I have led a number of efforts on the methodology and technical tools used in robotics and human-robot interaction through targeted publications and numerous open-source contributions. This section contextualises all these contributions, and presents the impact of my research through key scientific outputs.

My scientific contributions cover three main research directions: **Knowledge representation and cognitive architectures**, **Social Robotics** and **Data-driven Human-Robot interactions**. I detail each of those, as well as my main methodological and technical contributions, in the following subsections. In addition, Table 1 gives an overview of my scientific fields of contribution, focusing on those which are directly relevant to the research programme I propose to conduct at CNRS.

My research on these topics has resulted in a substantial track record of academic outputs. Since 2008, I have authored or co-authored **75+ peer-reviewed publications** in international journals and conferences, leading to **2700+ citations**, h-index of 26, i10-index of 43 (source: Google Scholar).

Knowledge representation and cognitive architectures

My early research focused on investigating how high-level symbolic reasoning could benefit human-robot interaction. My main insight was to bridge the research performed in the Semantic Web community (that I had already researched during my MSc [44]) with robotics, **integrating ontologies into the robot's decisional architecture** [32, presented below]. This highly-cited work, that I conducted between LAAS-CNRS (Pr. Alami) and the Technical University of Munich (Pr. Beetz), has had a large impact in AI for interactive robots, **bridging low-level robot perceptions and commands, to human-level semantics**.

Table 1: PI's domains of expertise relevant to the research project

Psycho-social underpinnings of HRI	
human factors	anthropomorphism[2, 3], social influence[4]
trust, engagement, social presence	[5, 6, 7, 8, 9]
theory of mind	perspective taking[10, 11], social mutual modelling[12, 13]
Social signal processing	
non-verbal behaviours	attention[14], child-child dataset[15], internal state decoding[16]
verbal interactions	speech recognition[17], dialogue grounding[18]
Behaviour generation	
social behaviours	[19], verbal interactions[20, 21], physical interactions[22]
interactive reinforcement learning	[23, 24, 25, 26]
Socio-cognitive architectures	
architecture design	[27, 28, 29, 30, 31]
knowledge representation	ontologies [32, 33]
spatio-temporal modelling	object detection [34], situation assessment[35, 36]
Fieldwork in HRI	in classrooms [37, 38, 39, 40, 41, 42], at home [43], in public spaces [26]

ORO, a Knowledge Management Module for Cognitive Architectures in Robotics
Lemaignan, S., Ros, R., Mösenlechner, L., Alami, R., Beetz, M.
IEEE IROS 2010

One of the very first knowledge base designed and integrated in service robots. Pioneering work which played a key role in understanding how intelligent robot can represent their knowledge to facilitate communication with humans.
[Contribution: principal investigator; 177 citations to date]

One of the most significant application of this work has been on **natural language understanding**: by relying on ontologies with human-level semantics to annotate information flows in the robot's decisional layers [33], **I have been able to greatly simplify the creation of a semantic common-ground between the robot and the human user**, as I show in [18, presented below] and in eg [45].

Grounding the Interaction: Anchoring Situated Discourse in Everyday Human-Robot Interaction
Lemaignan, S., Ros, R., Sisbot, E. A., Alami, R., Beetz M.
International Journal of Social Robotics 2012

In this paper, I develop a natural language parser and I show how symbolic knowledge representation can be used by robot to ground natural language interactions, also taking into account the unique perspective of the human interactor. One of the first example of establishing a semantic common-ground between humans and service robots.
[Contribution: principal investigator; 110 citations to date]

I also integrated this work on knowledge representation into a much larger **semantic-aware architecture**. I led the design of this architecture, into which were integrated a number of additional cognitive and manipulation capabilities designed by colleagues. To date, the resulting system [27, presented below] is still **one of the very few complete robotic architecture enabling high-level human-robot interaction**, and the paper has been the most or second-most cited paper of the *Artificial Intelligence* journal for the past 4 years.

Artificial Cognition for Social Human-Robot Interaction: An Implementation
Lemaignan, S., Warnier, M., Sisbot, E.A., Clodic, A., Alami, R.
Artificial Intelligence 2017

Landmark article: one of the first complete, semantic-aware, robotic architecture for human-robot interaction, including symbolic knowledge representation, situation assessment, natural language grounding, task planning, human-aware motion planning and execution.
[Contribution: principal investigator & coordinator; 210 citations to date]

Social robotics and child-robot interaction

Building on my research on semantic-aware human-robot interaction, I shifted my scientific focus to the **social aspects of the interaction** from 2012 onwards. I did put a particular emphasis on the **psycho-social underpinnings of social interaction with robots**: investigation of perspective taking, and what is called 'mentalizing' in psycho-linguistics (the cognitive ability to model what others know about the word, a key pre-requisite to interaction). This led to several publications [10, 11, 12, 13] and I was awarded in 2015 a EU H2020 Marie-Sklodovska Curie fellowship to specifically investigate this question.

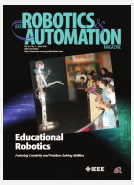
I also investigated a range of other psycho-social determinants, with significant work on anthropomorphism while supervising J. Fink [3, 7, 46, 6], trust and engagement [5, 6, 7, 9], or social influence [8, 4] (K. Winkle's PhD).

In parallel to this basic work, I have developed an expertise in real-world field deployments of social robots, in particular in educational settings: in addition to numerous lab-based experiments, **I have led about 15 field studies over the last 8 years**, in schools [37, 39, 40, 41, 47, 42, 48],

medical surgeries [38], people's homes [43], sport facilities [49, 26] and entrainment [50] venues.

This breadth of experience gives me a **unique understanding of the scientific value, as well as the practical and technical challenges, associated with real-world deployments of interactive robots**, a key aspect of the research programme.

My work in child-robot interaction is particularly well recognised, with some highly-cited publications [37, 38, presented below], [51, 17, 39]. My main contribution in this field is **a better understanding of the role and importance of *socio-cognitive* engagement** between the child and the robot. Using psychological mechanisms like meta-cognition and the *Protégé effect*, I have been able to demonstrate long-term engagement in a difficult learning task for children with learning impairments [38].



Learning by Teaching a Robot: The Case of Handwriting
Lemaignan, S., Jacq, A., Hood, D., Garcia, F., Paiva, A., Dillenbourg, P.
Robotics and Automation Magazine 2016

Long-term studies with children and therapists, where we *reverse* the social role of the robot (it becomes the learner, and the child, the teacher) to significantly improve the children' engagement and self-confidence. A highly-cited, landmark contribution to social robotics for education.
[Contribution: principal investigator; 179 citations (incl. associated conf. article)]

Data-driven Human-Robot Interaction

More recently, my research has expanded towards the emerging field of *data-driven human-robot interaction*. **I am one of the pioneer of this field, and I have led several recent efforts, both 'bottom-up' (eg creating datasets of social interactions) and 'top-down' (eg developing algorithms to enable data-driven social behaviours)**.

Applying data-driven approaches (including eg deep learning) to social interactions is notoriously difficult: what a 'social interaction' mean is difficult to properly frame; it mixes low-level social signals with high-level semantics; it is dynamic in nature; it features a large number of non-observable or partially-observable parameters (like the cultural background or the emotional state of the participants); etc. It is also very hard to study in practice, as there is no such thing as 'reference social interactions' that we could record and from which we could train generic machine learning algorithms.

My on-going contributions to this field include **the definition and design of social tasks practically suitable for scientific investigation** [52, 15], and the subsequent **acquisition of a large open dataset** of playful social interactions between children and robots [15, presented below], and made publicly available to the community [1].

The PInSoRo dataset: Supporting the data-driven study of child-robot social dynamics
Lemaignan, S., Edmunds E. R., C., Senft, E., Belpaeme, T.
PLOS ONE 2018

A first-in-kind, large scale dataset of 45h+ of child-child and child-robot social interactions. Designed with machine learning in mind, this dataset effectively opens up the field of data-driven social psychology, with direct applications in AI and social robotics.
[Contribution: principal investigator]

This dataset made it possible for my student M. Bartlett and myself to discover that (1) **the psycho-social *internal state* of a person can be largely decoded from her/his body language**, and (2) **this internal state can be estimated from only three externally observable characteristics of the interaction: interaction valence, interaction balance, and user engagement** [16, presented below].

What Can You See? Identifying Cues on Internal States from the Kinematics of Natural Social Interactions
Bartlett, M., Edmunds, C. E. R., Belpaeme, T., Thill, S., Lemaignan, S.
Frontiers in AI and Robotics 2019

Investigates how partially hidden 'internal states' (like emotions, cooperativeness, etc) can be decoded from simple visible cues, like skeletons. Also demonstrates that social situations can be described along 3 simple dimensions: interaction valence, interaction balance, and user engagement.
[Contribution: main study supervisor]

Since 2017, I have also worked with my students E. Senft and K. Winkle on developing new machine learning techniques to teach autonomous action and social policies to robots. **Our key scientific discovery is that, with the appropriate algorithm, the end-users themselves can quickly teach complex action and social policies to social robots, leading to full autonomy on selected tasks, while eliciting a high level of trust and acceptability** (since the end-users taught the robot themselves). This breakthrough has been published in Science Robotics [25, presented below] and other major international journals and conferences (eg [24, 26]), with several more publications under preparation.

Teaching robots social autonomy from in situ human guidance
Senft, E., Lemaignan, S., Baxter, P., Bartlett, M., Belpaeme, T.
Science Robotics 2019

A novel human-in-the-loop machine learning approach to implement social autonomy in a robot, with several deployments in UK public schools. This is a first-in-kind demonstration of learning autonomous action policy in a high dimensional, socially complex, environment.
[Contribution: main study supervisor]

Contributions to methodology

My research also has a significant impact on research *methodology*. Inspired by the high scientific standards found in eg psychology literature, I have been a strong and vocal advocate of open-science, experimental replicability and statistical robustness.

Indeed, and grounded in my extensive fieldwork experience, I have co-authored several publications on 'meta-science' in HRI:

- I evidenced the current methodological weaknesses in HRI, along with recommendations to address them [53];
- I showed that HRI researchers sometimes overly rely on, and blindly trust, questionable (and typically old) results from psychology [8];
- I also made the case for a more balanced view of how robots are perceived, in particular in educational settings [41].

To support these efforts, I created and shared with the community tools and dataset to develop our methodological toolkit and ultimately support better science. For instance, I presented a novel methodology to assess user engagement in real-time, based on gaze patterns [14]. This work received the Best Methodology Paper award at the IEEE/ACM HRI conference in 2016; we also created in 2017 a dataset and a set of recommendations to improve speech recognition for child-robot interaction [17].

Many of my other technical contributions (presented hereafter) have had a methodological impact for the broader community (eg I created `morse` in 2012, the first robot simulator for human-robot interaction; I played an important role in developing and disseminating the Robot Operating System ROS; etc.)

Contributions to techniques and tools

I have indeed a number of significant technical contribution to the field. I have always adopted a open-science approach, releasing all of my software and hardware contributions to the wider community under open-source licenses. I list hereafter the most significant of these technical contributions.

- the `oro` knowledge base [32] – this highly cited work introduces the usage of ontologies (and associated techniques like semantic reasoning) in robotics;
- the natural language processing with semantic grounding tool `dialogs` [18] – this other highly-cited tool demonstrates how natural language and interactive semantic learning can be realised by combining semantic reasoning with advanced human perception;

- the MORSE simulator [54, 55], one of the very first simulator enabling human-robot interaction simulation, and used by tenths of universities worldwide since its inception;
- the GenoM verifiable software module generator [31] – this tool makes it possible to abstractly specify a robotic module, and automatically generate a code skeleton whose behaviour can be proven correct;
- the Python-based pyRobots asynchronous supervision framework [56] – adapts in Python some of the concepts originally introduced in the URBI language, making it possible to easily write asynchronous supervisors for robots using eg ROS;
- a high-accuracy 2D localisation method based on structured patterns [57] – I supervised this work in which we attempt to address the difficult issue of high-accuracy indoor localisation in complex, highly-occluded environment. Our method, which relies on decoding structured patterns placed in the environment, allows for sub-mm localisation with very low computational cost (can fully run on a microcontroller);
- the design and implementation of Cellulo, a novel holonomic and back-drivable mobile robot with haptic feedback, designed from the ground-up for child-robot interaction [58, 59];
- the 3D situation assessment platform underworlds [35] – this tool is a distributed scene-graph, making it possible to maintain a joint dynamic 3D model of environment across software modules. It features sensor fusion and spatial reasoning capabilities like perspective taking;
- a new algorithm for interactive reinforcement learning [24] – the algorithm, developed by my student E. Senft, has enabled for the first to teach a robot both a task and a social action policy *while being in use in the field*. We were able to show that after a short training phase, the robot was able to reach fully autonomy on a complex educative task.

In addition to these academic outputs, other significant technical contributions include:

- **The port to Python3 of the Robot Operating System (ROS)**, the large software framework used by the vast majority of the robotics community worldwide;
- The **ROS4HRI** suite of software module to streamline complex human-robot perception pipelines (pre-print: [60]);
- a multi-player online game to simulate human-robot interactions, used for teaching and research (eg online studies);
- The initial support of the widely used Softbank Nao robot to ROS (this work was later officially endorsed by Softbank, ex. Aldebaran Robotics), as well as the HOAP-3 humanoid robot;
- a review of object recognition techniques [34];
- a number of tutorials and lectures on software engineering for robotics.

Contributions to the development of individuals

Research management

In addition to my scientific contributions, I play an increasingly important role in managing research.

While at the 'AI for Learning' CHILI Lab at EPFL, I created and successfully led for 2 years the HRI research group, supervising in total 10 students (including 4 PhD students with whom I

co-authored a total of 18 papers). Within that short time frame, I established CHILI as an internationally recognised research lab in robotics for education.

Next, during my EU Marie Skłodowska-Curie post-doc at Plymouth University, I further co-supervised 3 PhD students (co-authoring 17 publications with them).

My current role as a permanent Associate Professor in Social Robotics and AI at the Bristol Robotics Laboratory further acknowledges my leadership, as I am **in charge of defining and implementing the lab's research strategy in human-robot interactions**. I created the Embedded Cognition for Human-Robot Interactions (ECHOS) research group, that I now co-lead with Pr. Giuliani, jointly supervising 15+ PhDs and post-docs. Specifically, the ECHOS group covers most aspects of situated AI for human-robot interaction, and **my role includes strategic planning of the group activities, scientific guidance, recruitment of staff and prospective students, and grant applications**. I also co-supervise the BRL's Connected Autonomous Vehicles research group (5 students and post-docs), with the same management role.

Supervision of graduate students and postdoctoral fellows

2018 – 2019	**5 post-docs**, **5 PhDs**, **8 MSc students**, Bristol Robotics Lab, UWE, UK
2015 – 2018	**3 PhDs**, Plymouth University, UK
2013 – 2015	**5 PhDs**, **5 MSc students**, EPFL, Switzerland
2012 – 2013	**2 MSc students**, LAAS-CNRS, France

Teaching activities

2019 –	**Associate Professor** teaching mainly HRI at postgraduate level, UWE, UK
2018 – 2019	**Senior Lecturer** teaching mainly HRI at postgraduate level, UWE, UK
2015 – 2018	**Lecturer** teaching at undergraduate & postgraduate levels (robotics fundamentals, software engineering, human-robot interaction), Plymouth University, UK
2013 – 2015	**Teaching Assistant** teaching at undergraduate level (Visual Computing), EPFL, Switzerland
2008 – 2012	**Teaching Assistant** teaching at undergraduate level (programming, databases, ontologies), INSA Toulouse, France

Contributions to the wider research community

Since my PhD, I have established strong peer recognition in the field of human-robot interaction and cognitive robotics. This includes:

- numerous **invited talks** at national and international symposiums and events (9 invited talks since Jan. 2018, including **keynotes** at the UK Robotics and Autonomous Systems 2019 conference, and at the 2018 AAAI Fall Symposium);
- invited to **high-profile editorial roles**: Programme Committee member of the HRI conference since 2015; editor of Frontiers In Robotics and AI journal; editor or Programme Committee member of several leading conferences in AI and Robotics (RSS, IROS, IJCAI, HAI, AAMAS);
- invited member of the UK EPSRC Peer Review College; member of the EU H2020 peer review college; invited reviewer for the French, Dutch, Israeli research agencies;
- six invitations as external panel member for PhD defenses over the last two years.

Organisation of scientific meetings

2021	**ACM/IEEE Human-Robot Interaction conference**, Student Design Competition chair, virtually held
2020	**ACM/IEEE Human-Robot Interaction conference**, 700+ participants, local chair, Cambridge, UK
2017	**ACM/IEEE Human-Robot Interaction conference**, 400+ participants, alt.HRI chair, Vienna, AT
2016	**2nd Intl. workshop on Cognitive Architecture for Social HRI**, 45 participants, programme chair, Christchurch, NZ
2014	**Intl. workshop on Simulation for HRI**, 35 participants, programme chair, Bielefeld, DE
2012	**Intl. workshop on MORSE and its applications**, 30 participants, programme chair, Toulouse, FR
2009	**Cognitive Sciences' Young Researchers Conference**, 150 participants, steering committee, Toulouse, FR

Institutional responsibilities

2019 –	Full member of the EPSRC Peer Review college
2017–	EU H2020 member on the Peer Review College
2019 –	Head of the Outreach cluster, Faculty of Technology and Environment, UWE, UK
2019–	Invited PhD committee examiner (Örebro U., Uppsala U., KTH, Bielefeld U., LAAS-CNRS, BRL)
2018 –	HRI module co-lead, MSc level, University of the West of England, UK
2017 – 2018	Module leader, Robotics fundamentals (undergraduate level), University of Plymouth, UK

Editorial activities

2019 –	Member of the Robotics, Science and System (RSS) Programme Committee
2018 –	Editorial board of *Frontiers in AI and Robotics*
2017 –	Member of the IJCAI Programme Committee
2015 – 2020	Member of the IEEE/ACM HRI Programme Committee
2017 – 2019	Member of the IEEE IROS Programme Committee
2017 – 2018	Member of the HAI Programme Committee

Contributions to the broader society

I **actively engage with policy makers, at national and European level**: for instance, over the past 2 years, I have been directly interacting (through participating to panels, visits and one-to-one discussions) with the EU Research Executive Agency (MSCA AI Cluster 2019); the UK minister for Business, Energy and Industrial Strategy Greg Clark; the UK minister for Universities, Science, Research and Innovation Chris Skidmore; the chair of the West of England authority Tim Bowles; the UK Research & Innovation Portfolio manager for Robotics Clara Morri.

I have a **strong track record of tech transfer**, through patenting (US patent US20190016213A1) and involvement in national (UK) and EU-level projects focused on tech-transfer (InnovateUK

ROBOPILOT, CAPRI, CAVForth; EU Terrinet, SABRE).

Finally, I actively engage in **research communication**: my past research has been covered several times by mainstream international media, including press releases by Reuters, Press Association; TV coverage by the BBC, Sky News; radio interviews and broadcast. My academic website (academia.skadge.org) showcases this media coverage. I also maintain an active, science-focused, presence on the social media (Twitter handle: @skadge).

Policy making

2020 –	**Expert Collaborator for the European Joint Research Centre** contributing to the UNICEF Guidelines for Responsible Child-Robots Interactions
2019	**Invited panel by the EU Research Executive Agency** at the 2019 MSCA AI Cluster, sharing expertise in Human-Robot Interaction

Technology transfer

2018 –	Co-I on UKRI InnovateUK projects ROBOPILOT, CAPRI, CAVForth, involving direct transfer of technology for automated verification of autonomous vehicles
2018 –	Scientific advisor for KickSum Ltd., in the frame of the EU-funded SABRE project
2018	Co-inventor on US patent US20190016213A1 on back-driveable, haptic locomotion for small robots

Selected outreach and public dissemination

2019–	Cluster Lead for STEM outreach, University of the West of England
2019–	Scientific advisor for the Bristol's Science Centre
2019	Hosted large media event for the Couch25K study [26]
2016–	UK & EU Robotics Weeks coordinator, University of Plymouth, University of the West of England
2015	Hosted large media event for the CoWriter study [38] (coverage by Reuters, BBC Arabic, FastCompany)
2011	'Roboscopie' Human-Robot public theater performance, Science Day'11 http://bit.ly/1LQpNWA
2008–2011	Toulouse's Cognitive Sciences Students Association, Co-chair
1997–2012	Executive Committee & Head of Educational Robotics, Planète Sciences (including coordination of the *EUROBOT* Robotic Competition)

References

[1] S. Lemaignan, C. Edmunds, and T. Belpaeme. *The PInSoRo dataset*. Dec. 2018. DOI: 10.5281/zenodo.1043507.

[2] S. Lemaignan, J. Fink, and P. Dillenbourg. "The Dynamics of Anthropomorphism in Robotics". In: *Proceedings of the 2014 ACM/IEEE Human-Robot Interaction Conference*. 2014.

[3] S. Lemaignan, J. Fink, P. Dillenbourg, and C. Braboszcz. "The Cognitive Correlates of Anthropomorphism". In: *Proceedings of the Workshop: A bridge between Robotics and Neuroscience at the 2014 ACM/IEEE Human-Robot Interaction Conference*. 2014.

[4] K. Winkle, S. Lemaignan, P. Caleb-Solly, U. Leonards, A. Turton, and P. Bremner. "Effective Persuasion Strategies for Socially Assistive Robots". In: *Proceedings of the 2019 ACM/IEEE Human-Robot Interaction Conference*. 2019. DOI: 10.1109/HRI.2019.8673313.

[5] R. Flook, A. Shrinah, L. Wijnen, K. Eder, C. Melhuish, and S. Lemaignan. "On the Impact of Different Types of Errors on Trust in Human-Robot Interaction: Are laboratory-based HRI experiments trustworthy?" In: *Interaction Studies* (2019). DOI: 10.1075/is.18067.flo.

[6] S. Lemaignan, J. Fink, F. Mondada, and P. Dillenbourg. "You're Doing It Wrong! Studying Unexpected Behaviors in Child-Robot Interaction". In: *Proceedings of the 2015 International Conference on Social Robotics*. 2015.

[7] J. Fink, P. Rétornaz, F. Vaussard, F. Wille, K. Franinović, A. Berthoud, S. Lemaignan, P. Dillenbourg, and F. Mondada. "Which Robot Behavior Can Motivate Children to Tidy up Their Toys? Design and Evaluation of "Ranger"". In: *Proceedings of the 2014 Human-Robot Interaction Conference*. 2014.

[8] B. Irfan, J. Kennedy, S. Lemaignan, F. Papadopoulos, E. Senft, and T. Belpaeme. "Social psychology and Human-Robot Interaction: an Uneasy Marriage". In: *Proceedings of the 2018 ACM/IEEE Human-Robot Interaction Conference*. 2018. DOI: 10.1145/3173386.3173389.

[9] L. Wijnen, P. Bremner, S. Lemaignan, and M. Giuliani. "Performing Human-Robot Interaction User Studies in Virtual Reality". In: *Proceedings of the 2020 RoMAN Conference*. 2020. DOI: 10.1109/RO-MAN47096.2020.9223521.

[10] R. Ros, S. Lemaignan, E. A. Sisbot, R. Alami, J. Steinwender, K. Hamann, and F. Warneken. "Which One? Grounding the Referent Based on Efficient Human-Robot Interaction". In: *19th IEEE International Symposium in Robot and Human Interactive Communication*. 2010.

[11] M. Warnier, J. Guitton, S. Lemaignan, and R. Alami. "When the Robot Puts Itself in Your Shoes. Managing and Exploiting Human and Robot Beliefs". In: *Proceedings of the 21th IEEE International Symposium in Robot and Human Interactive Communication*. 2012.

[12] S. Lemaignan and P. Dillenbourg. "Mutual Modelling in Robotics: Inspirations for the Next Steps". In: *Proceedings of the 2015 ACM/IEEE Human-Robot Interaction Conference*. 2015.

[13] P. Dillenbourg, S. Lemaignan, M. Sangin, N. Nova, and G. Molinari. "The Symmetry of Partner Modelling". In: *Intl. J. of Computer-Supported Collaborative Learning* (2016). ISSN: 1556-1615. DOI: 10.1007/s11412-016-9235-5.

[14] S. Lemaignan, F. Garcia, A. Jacq, and P. Dillenbourg. "From Real-time Attention Assessment to "With-me-ness" in Human-Robot Interaction". In: *Proceedings of the 2016 ACM/IEEE Human-Robot Interaction Conference*. 2016. DOI: 10.1109/HRI.2016.7451747.

[15] S. Lemaignan, C. E. R. Edmunds, E. Senft, and T. Belpaeme. “The PInSoRo dataset: Supporting the data-driven study of child-child and child-robot social dynamics”. In: *PLOS ONE* 13.10 (Oct. 2018), pp. 1–19. DOI: 10.1371/journal.pone.0205999. URL: https://doi.org/10.1371/journal.pone.0205999.

[16] M. Bartlett, C. E. R. Edmunds, T. Belpaeme, S. Thill, and S. Lemaignan. “What Can You See? Identifying Cues on Internal States from the Kinematics of Natural Social Interactions”. In: *Frontiers in AI and Robotics* (2019). DOI: 10.3389/frobt.2019.00049.

[17] J. Kennedy, S. Lemaignan, C. Montassier, P. Lavalade, B. Irfan, F. Papadopoulos, E. Senft, and T. Belpaeme. “Child Speech Recognition in Human-Robot Interaction: Evaluations and Recommendations”. In: *Proceedings of the 2017 ACM/IEEE Human-Robot Interaction Conference*. 2017. DOI: 10.1145/2909824.3020229.

[18] S. Lemaignan, R. Ros, E. A. Sisbot, R. Alami, and M. Beetz. “Grounding the Interaction: Anchoring Situated Discourse in Everyday Human-Robot Interaction”. In: *International Journal of Social Robotics* (2011), pp. 1–19. ISSN: 1875-4791. URL: http://dx.doi.org/10.1007/s12369-011-0123-x.

[19] S. Lallée et al. “Towards a Platform-Independent Cooperative Human-Robot Interaction System: II. Perception, Execution and Imitation of Goal Directed Actions”. In: *Proceedings of the 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems*. 2011.

[20] C. Wallbridge, S. Lemaignan, E. Senft, and T. Belpaeme. “Generating Spatial Referring Expressions in a Social Robot: Dynamic vs Non-Ambiguous”. In: *Frontiers in AI and Robotics* (2019). DOI: 10.3389/frobt.2019.00067.

[21] C. Wallbridge, S. Lemaignan, E. Senft, and T. Belpaeme. “Towards Generating Spatial Referring Expressions in a Social Robot: Dynamic vs Non-Ambiguous”. In: *Proceedings of the 2019 ACM/IEEE Human-Robot Interaction Conference*. 2019. DOI: 10.1109/HRI.2019.8673285.

[22] M. Gharbi, S. Lemaignan, J. Mainprice, and R. Alami. “Natural Interaction for Object Hand-Over”. In: *Proceedings of the 2013 ACM/IEEE Human-Robot Interaction Conference*. 2013.

[23] E. Senft, S. Lemaignan, P. Baxter, and T. Belpaeme. “Leveraging Human Inputs in Interactive Machine Learning for Human Robot Interaction”. In: *Proceedings of the 2017 ACM/IEEE Human-Robot Interaction Conference*. 2017. DOI: 10.1145/3029798.3038385.

[24] E. Senft, P. Baxter, J. Kennedy, S. Lemaignan, and T. Belpaeme. “Supervised Autonomy for Online Learning in Human-Robot Interaction”. In: *Pattern Recognition Letters* (2017). DOI: 10.1016/j.patrec.2017.03.015.

[25] E. Senft, S. Lemaignan, P. Baxter, M. Bartlett, and T. Belpaeme. “Teaching robots social autonomy from in situ human guidance”. In: *Science Robotics* (2019). DOI: 10.1126/scirobotics.aat1186.

[26] K. Winkle, S. Lemaignan, P. Caleb-Solly, U. Leonards, A. Turton, and P. Bremner. “In-Situ Learning from a Domain Expert for Real World Socially Assistive Robot Deployment”. In: *Proceedings of Robotics: Science and Systems 2020*. 2020. DOI: 10.15607/RSS.2020.XVI.059.

[27] S. Lemaignan, M. Warnier, E. A. Sisbot, A. Clodic, and R. Alami. “Artificial Cognition for Social Human-Robot Interaction: An Implementation”. In: *Artificial Intelligence* (2017). DOI: 10.1016/j.artint.2016.07.002.

[28] P. Baxter, S. Lemaignan, and G. Trafton. “Workshop on Cognitive Architectures for Social Human-Robot Interaction”. In: *Proceedings of the 2016 ACM/IEEE Human-Robot Interaction Conference*. 2016. DOI: 10.1109/HRI.2016.7451865.

[29] S. Lemaignan and R. Alami. “A Few AI Challenges Raised while Developing an Architecture for Human-Robot Cooperative Task Achievement”. In: *Proceedings of the AAAI 2014 Fall Symposium Series - Artificial Intelligence and Human-Robot Interaction*. 2014.

[30] S. Lallée et al. “Towards a Platform-Independent Cooperative Human Robot Interaction System: III. An Architecture for Learning and Executing Actions and Shared Plans”. In: *IEEE Transactions on Autonomous Mental Development* (2012).

[31] A. Mallet, C. Pasteur, M. Herrb, S. Lemaignan, and F. Ingrand. “GenoM3: Building middleware-independent robotic components”. In: *Proceedings of the 2010 IEEE International Conference on Robotics and Automation*. 2010.

[32] S. Lemaignan, R. Ros, L. Mösenlechner, R. Alami, and M. Beetz. “ORO, a knowledge management module for cognitive architectures in robotics”. In: *Proceedings of the 2010 IEEE/RSJ International Conference on Intelligent Robots and Systems*. 2010. DOI: 10.1109/IROS.2010.5649547.

[33] S. Lemaignan and R. Alami. “Explicit Knowledge and the Deliberative Layer: Lessons Learned”. In: *Proceedings of the 2013 IEEE/RSJ International Conference on Intelligent Robots and Systems*. 2013.

[34] C. Wallbridge, S. Lemaignan, and T. Belpaeme. “Qualitative Review of Object Recognition Techniques for Tabletop Manipulation”. In: *ACM Human-Agent Interaction Conference*. 2017.

[35] S. Lemaignan, Y. Sallami, C. Wallbridge, A. Clodic, and R. Alami. “underworlds: Cascading Situation Assessment for Robots”. In: *Proceedings of the 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems*. 2018. DOI: 10.1109/IROS.2018.8594094.

[36] Y. Sallami, S. Lemaignan, A. Clodic, and R. Alami. “Simulation-based physics reasoning for consistent scene estimation in an HRI context”. In: *Proceedings of the 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems*. 2019. DOI: 10.1109/IROS40897.2019.8968106.

[37] D. Hood, S. Lemaignan, and P. Dillenbourg. “When Children Teach a Robot to Write: An Autonomous Teachable Humanoid Which Uses Simulated Handwriting”. In: *Proceedings of the 2015 ACM/IEEE Human-Robot Interaction Conference*. 2015.

[38] S. Lemaignan, A. Jacq, D. Hood, F. Garcia, A. Paiva, and P. Dillenbourg. “Learning by Teaching a Robot: The Case of Handwriting”. In: *IEEE Robotics and Automation Magazine* (2016).

[39] A. Jacq, S. Lemaignan, F. Garcia, P. Dillenbourg, and A. Paiva. “Building Successful Long Child-Robot Interactions in a Learning Context”. In: *Proceedings of the 2016 ACM/IEEE Human-Robot Interaction Conference*. 2016. DOI: 10.1109/HRI.2016.7451758.

[40] P. Baxter, E. Ashurst, J. Kennedy, E. Senft, S. Lemaignan, and T. Belpaeme. “The Wider Supportive Role of Social Robots in the Classroom for Teachers”. In: *WONDER Workshop, 2015 International Conference on Social Robotics*. 2015.

[41] J. Kennedy, S. Lemaignan, and T. Belpaeme. “The Cautious Attitude of Teachers Towards Social Robots in Schools”. In: *Proceedings of the 21th IEEE International Symposium in Robot and Human Interactive Communication, Workshop on Robots for Learning*. 2016.

[42] E. Senft, S. Lemaignan, M. Bartlett, P. Baxter, and T. Belpaeme. “Robots in the classroom: Learning to be a Good Tutor”. In: *Proceedings of the 2018 HRI workshop R4L 'Robots for Learning'*. 2018.

[43] F. Mondada, J. Fink, S. Lemaignan, D. Mansolino, F. Wille, and K. Franinović. “New Trends in Medical and Service Robots”. In: vol. 38. Mechan. Machine Science. Appeared first as a paper at MESROB2014. Springer Publishing, 2015. Chap. Ranger, an Example of Integration of Robotics into the Home Ecosystem. ISBN: 978-3-319-23831-9. DOI: 10.1007/978-3-319-23832-6_15.

[44] S. Lemaignan, A. Siadat, J. Dantan, and A. Semenenko. “MASON: A proposal for an ontology of manufacturing domain”. In: *IEEE Workshop on Distributed Intelligent Systems (DIS)*. 2006, pp. 195–200.

[45] R. Ros, E. A. Sisbot, S. Lemaignan, A. K. Pandey, and R. Alami. “Robot, tell me what you know about...?: Expressing robot's knowledge through interaction”. In: *Proceedings of the ICRA 2010 Workshop on Interactive Communication for Autonomous Intelligent Robots*. 2010.

[46] J. Fink, S. Lemaignan, C. Braboszcz, and P. Dillenbourg. “Dynamics of Anthropomorphism in Human-Robot Interaction”. In: *Frontiers in Cognitive Science* (2014). Submitted.

[47] S. Chandra, P. Alves-Oliveira, S. Lemaignan, P. Sequeira, A. Paiva, and P. Dillenbourg. “Children's Peer Assessment and Self-disclosure in the Presence of an Educational Robot”. In: *Proceedings of the 25th IEEE International Symposium in Robot and Human Interactive Communication*. 2016.

[48] C. Wallbridge, R. van den Berghe, D. Hernández García, J. Kanero, S. Lemaignan, C. Edmunds, and T. Belpaeme. “Using a Robot Peer to Encourage the Production of Spatial Concepts in a Second Language”. In: *ACM Human-Agent Interaction Conference*. 2018. DOI: 10.1145/3284432.3284433.

[49] K. Winkle, S. Lemaignan, P. Caleb-Solly, U. Leonards, A. Turton, and P. Bremner. “Couch to 5km Robot Coach: An Autonomous, Human-Trained Socially Assistive Robot”. In: *Companion Proceedings of the 2020 ACM/IEEE Human-Robot Interaction Conference*. 2020. DOI: 10.1145/3371382.3378337.

[50] S. Lemaignan, M. Gharbi, J. Mainprice, M. Herrb, and R. Alami. “Roboscopie: A Theatre Performance for a Human and a Robot”. In: *Proceedings of the 2012 ACM/IEEE Human-Robot Interaction Conference*. 2012.

[51] M. E. Karim, S. Lemaignan, and F. Mondada. “A review: Can Robots Reshape K-12 STEM Education?” In: *Proceedings of the 2015 IEEE International Workshop on Advanced Robotics and its SOcial impacts*. 2015.

[52] S. Lemaignan, J. Kennedy, P. Baxter, and T. Belpaeme. “Towards Machine-Learnable Child-Robot Interactions: the PInSoRo Dataset”. In: *Proceedings of the 21th IEEE International Symposium in Robot and Human Interactive Communication, Workshop on Long-term Child-robot Interaction*. 2016.

[53] P. Baxter, J. Kennedy, S. E., S. Lemaignan, and T. Belpaeme. “From Characterising Three Years of HRI to Methodology and Reporting Recommendations”. In: *Proceedings of the 2016 ACM/IEEE Human-Robot Interaction Conference (alt.HRI)*. 2016. ISBN: 978-1-4673-8370-7. DOI: 10.1109/HRI.2016.7451777.

[54] G. Echeverria, N. Lassabe, A. Degroote, and S. Lemaignan. “Modular Open Robots Simulation Engine: MORSE”. In: *Proceedings of the 2011 IEEE International Conference on Robotics and Automation*. 2011.

[55] S. Lemaignan, E. G., M. Karg, M. Mainprice, A. Kirsch, and R. Alami. “Human-Robot Interaction in the MORSE Simulator”. In: *Proceedings of the 2012 ACM/IEEE Human-Robot Interaction Conference*. 2012.

[56] S. Lemaignan, A. Hosseini, and P. Dillenbourg. “pyRobots: a Toolset for Robot Executive Control”. In: *Proceedings of the 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems*. 2015.

[57] L. Hostettler, A. Özgür, S. Lemaignan, P. Dillenbourg, and F. Mondada. “Real-Time High-Accuracy 2D Localization with Structured Patterns”. In: *Proceedings of the 2016 IEEE International Conference on Robotics and Automation*. 2016.

[58] A. Özgür, W. Johal, and P. Dillenbourg. “Permanent Magnet-Assisted Omnidirectional Ball Drive”. In: *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2016, pp. 1061–1066. DOI: 10.1109/IROS.2016.7759180. URL: https://doi.org/10.1109/IROS.2016.7759180.

[59] A. Özgür, S. Lemaignan, W. Johal, M. Beltran, M. Briod, L. Pereyre, F. Mondada, and P. Dillenbourg. “Cellulo: Versatile Handheld Robots for Education”. In: *Proceedings of the 2017 ACM/IEEE Human-Robot Interaction Conference*. 2017. DOI: 10.1145/2909824.3020247.

[60] Y. Mohamed and S. Lemaignan. *ROS for Human-Robot Interaction*. 2020. arXiv: 2012.13944 [cs.RO].