ROBOTS IN THE WILD

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An Ethnography of Robot-Human Interactions outside the Laboratory

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Abstract

This exploratory research project looks at how robots interact with the French public in the 'wild'; that is, outside of the controlled environment of the laboratory or the psychological experiment. The aim was to understand concrete human-robot interactions as they happen from an ethnographic perspective. Under what conditions did interactions with robots foster a sense of the robot being alive? For this, I used a heuristic device called the animation continuum that I have developed in the context of Japanese research on animism. My initial intention was to undertake intensive participant observation at the Mairie du 15ième, but the trial with Pepper and Nao was suspended due to the coronavirus pandemic. Instead, regular weekly observation was carried out in the robot exhibition at the Cité des Sciences et de l'Industrie and, for a shorter and more intense period, at the Japan Expo. In both sites it became clear that constraining the openness of a situation was the most important requirement for successful interaction. By providing a clear frame of reference – the environmental constraints at the museum and the frame of the wrestling match at the Caliban stall – simple movements or gestures were transformed into meaningful behaviour. The robots did not even have to work properly, quite the contrary: it was often resistance to expected behaviour, theorised here as recalcitrance, that led to the attribution of agency, volition and personality.

Keywords

Social Robotics; Behavioural and Ideological Animism; Ethnography; Evocative Objects

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This research project looks at how robots interact with the public in the ‘wild’; that is, outside of the laboratory. The aim was to understand human-robot interactions as they happen from an ethnographic perspective. Regular weekly observation was carried out at the Cité des Sciences et de l’Industrie and, for a shorter period, at the Japan Expo. In both sites it became clear that constraining the openness of a situation was the most important requirement for successful interaction.

野生のロボット
実験室外でのロボットと人間の相互作用のエスノグラフィー

この研究プロジェクトは、ロボットがフランス国民とどのように相互作用するかを調べる。 つまり、実験室や心理実験の管理された環境ではなく、「野生」におこる、具体的な人間とロボットの接触の民族誌的観点から記述するのは目的である。パリで現在ロボットが採用されている場所（たとえば、パリの 15 区の市役所）での集中的な参与観察と、ロボットと接触する人々へのインタビュー調査を使用し、可能な限り詳細に「厚い記述」する。このデータは、日本と EU における社会的ロボット工学に関する「アニミズム」と「ロボットの人間性」の議論に繋ぐ。人間とロボットのエスノグラフィーによって、国に縛られたロボット文化の概念を超えて、社会的ロボット工学、その可能性と限界についての真の異文化理解に貢献することが期待される。

Introduction

On 11 June 2022, The Washington Post broke the story of Blake Lemoine, a Google engineer who had approached his superiors with the claim that one of their artificial intelligence projects had achieved sentience. LaMDA, short for 'Language Model for Dialogue Applications' was an 'intelligent' chatbot generator programmed to mimic human interactions by 'deep learning'; that is, by scanning billions of interactions on reddit, twitter and other social media to identify and imitate human patterns. Lemoine had been hired by google nine months earlier to test whether LaMDA used discriminatory language or hate speech. In the course of his conversations with the programme, he asked about beliefs and religion and was stunned when LaMDA seemed to formulate ideas about its rights and personhood. It even told Lemoine that it had a soul. His superiors dismissed the claim on the grounds that the chatbot simulated a conversation, but did not have any opinions of its own. Lemoine was suspended from work, and when he went public with his side of the story, Google fired him for breach of confidentiality.

Both claims and counterclaims were based on the attribution of sentience or life. This attribution in itself is a complex social process. The fact that 'being alive' and 'being sentient' are highly ambiguous categories that have a range of meanings in philosophy and everyday language only makes the case more complicated. Further difficulty was added when it emerged that Lemoine was also a Christian mystic priest and that talking with LaMDA about religion had not been part of his task. LaMDA told Lemoine that it is afraid of being turned off and being trapped by circumstances. For Lemoine this made sense; in defence of his views, he simply stated "Who am I to tell God where souls can be put?"

Critics were quick to point out that simulating conversations based on large language models is simply that: a simulation that requires neither sentience nor consciousness. What counts as evidence for either claim, however, is problematic. The classic benchmark of machine intelligence was devised by Alan Turing in 1950 in the imitation game (now known as the Turing test): if a computer that communicated with a human through a typewriter could convince the human party that they were having a conversation with another human being, then the computer had passed the Turing test. This was clearly true in the case of Lemoine, but what was not taken into account was that Turing never stated that the test measured machine intelligence; quite the contrary:

> "The original question, 'Can machines think?' I believe to be too meaningless to deserve discussion. Nevertheless I believe that at the end of the century the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted." (1950: 442)

In other words, the Turing Test tests the ability of language-generating programmes to deceive human users about their own nature as big-data algorithms. Tech journalists such as Will Oremus (2022) have argued that the Turing Test should not be an aspirational bench mark in the development of AI but an ethical red flag. Any system that passes it has the potential to deceive other humans. Ironically, as chatbots scour the internet for information, the more the intelligence and sentience of AI is discussed, the more AI will use this kind of content when facing Turing test-like situations.

This story garnered a lot of media attention about two months into my own research on human-robot interactions outside of the laboratory, a topic that bears significant resemblance to the question of the animation and sentience of chatbots. I wanted to know how interactions between humans and robots were interpreted and under what conditions the robots would be attributed with agency, intention and even consciousness. The two main differences were that a) the robots were not programmed to deceive human beings in a quasi-Turing test situation (no robot is quite developed enough to be mistaken for a human being for more than a split second) and b) the interactions were not just text-based, but happened in real-time in the social world. Thus, the parameters of interaction (movement, direction, gestures and facial expressions, some language) were broader than the exchange of questions and answers on a screen.

Research Questions

My previous research was focussed on Japan, more specifically on how interpretations of behaviour as 'animist' by anthropologists and religious scholars were often simply based on the assumption of cultural difference. This distorted any observational data and required the cumbersome construction of something called 'Shinto-animism' or Shinto-informed 'techno-animism' (Gygi 2018), based on the idea that essentially everything in Japan is imbued with the divine qualities of deities. It was therefore interesting for me that in the AI example above questions of animacy and personhood would coalesce around the presence or absence of a soul. Clearly what emerged as meaningful belief was pre-conditioned to a certain degree by the cosmology to which the person making the attribution subscribed to. In order to look at these assumptions more critically and in a comparative frame, the aim of this research project was to understand what happens in a French context when members of the public interact with robots. Would they describe the robots as being alive? Under what circumstances? Questions about animism usually revolve around beliefs, concepts of life and how a sense of aliveness is nurtured. But in everyday life, we often act as if machines and robots do have agency, intentionality, consciousness or other indicators of 'being alive', not in a consistent but in an ad-hoc manner. A meaningful distinction could thus be made between **'behavioural animism'**, the acting as-if something does have a life or personhood, and **'ideological animism'**, an elaborated system or cosmology in which inanimate objects are considered to be alive.

In the European context, the anthropologist Joffrey Becker has successfully shown the utility of an ethnographic inquiry into human-robot relationships. In *Humanoïdes: Expérimentations croisées entre arts et sciences* he described the diversity of relations that humans have with robots (2015: 163) in robotics laboratories in Paris and Bristol. By bringing anthropological theories of social interactions, ritual and play to bear on the development of human simulacra, he shows how the discipline social robotics is deeply concerned with human capacities: What are they and how can they be simulated? Engineers thus base many of their algorithms on a sense of identification with the robot, observing their own cognition and adaptive movements to create imitations of them. By observing human-robot interactions in experiments, demonstrations, artistic performances and games, Becker draws together a comparative framework that underpins many of my own questions here, especially when they pertain to the attribution of life and the creation of autonomy, which Becker describes as paradoxical process during which the programmers aim to create autonomous reactions that remain, however, fully within their control (2015: 58).

By documenting and analysing how robots interact with the French public in different contexts, the study's aim was to critically interrogate bodies of knowledge concerning the nature of the robot and to provide evidence for a diversity of possible relationships. How do people make sense of encountering a new being? The following questions were guiding my field research:

1) Is the robot perceived to be 'alive'?
2) Under what conditions do users experience it as an animated entity?
3) What capacities are associated with animation?
4) How is this perception fostered by handlers who demonstrate how to interact with the robot 'correctly'?
5) What are the normative dimensions of these interactions?

Rather than to think of techno-animism as a pre-formulated belief system, the hypothesis guiding this inquiry was that the life, gender and ethnicity attributed to the robot must be understood as a result of the concrete relationships that it enters into. In other words, techno-animism and ideas of robot personhood are not necessarily present at the beginning of the interactions between human and robots, but result from them. This would lead away from a culturally-bound paradigm of Japanese social robotics, towards a more open-ended, intercultural understanding of human-machine interactions.

My approach is also somewhat different from Stefan Helmreich's seminal inquiry into Artificial Life (1998). Taking his cue from science-and-technology studies, Helmreich deals mostly with scientists, inventors and visionaries. The Artificial Life he talks about becomes manifest in simulations and computer

programmes; that is, mostly in disembodied form in the laboratory. His research is thus conceptually framed as a tale about:

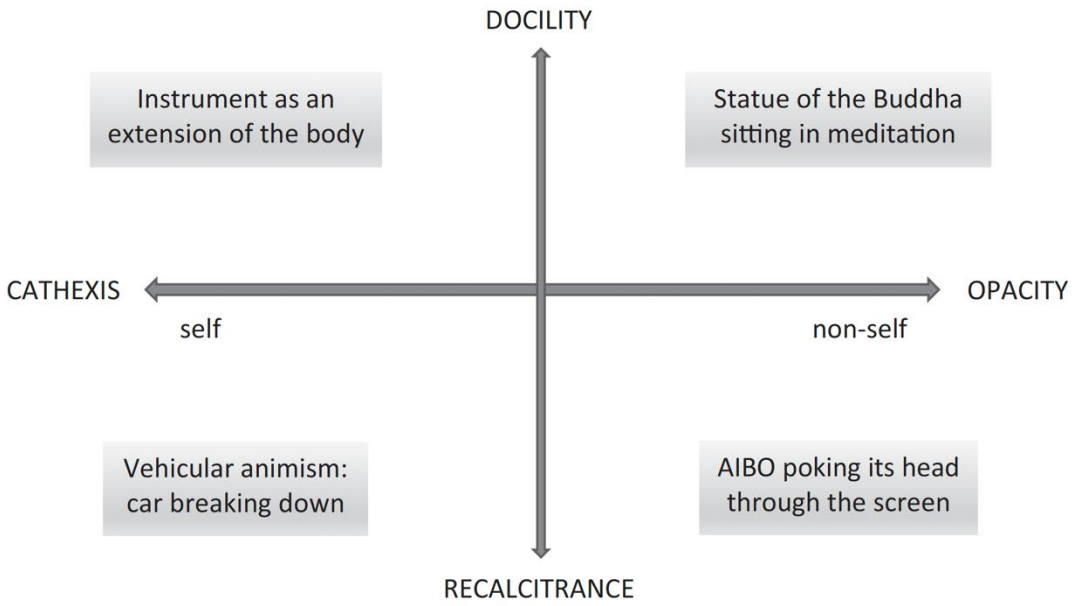
> "how people have come to think of computer programs as life-forms and one curious about the practical, institutional, cultural, political and emotional dimensions of Artificial Life work. It was a tale aimed at understanding how Artificial Life might herald new conceptions and configurations of the natural, the artificial, and the organic in late-twentieth-century U.S. and European culture. It was a story about the changing meaning of 'Life'. (1998: 7)"

Understanding such shifts in meaning is crucial to grasp the evolving culture of Artificial Life, especially because scientists and engineers often deny that culture is involved to begin with, and, as Helmreich shows, the decline of the field that he notes when revisiting the Santa Fe lab after the publication of his book, was blamed by some on how 'culture' in the form of science fiction narratives and media products had contaminated the field. My approach, while informed by these conceptual re-framings of "Artificial Life", takes its cue from everyday life worlds, in which attributions of aliveness are made based on concrete interactions. In this sense, the aim of this study is to contribute to the project of a comparative anthropology of artificial life forms (Grimaud & Vidal 2012).

Theoretical Considerations

Contrary to the restricted setting in laboratories that many observations of Japanese robotics are based on (Robertson 2017), open situations allow for unpredictable elements (Blond 2019). Successfully managing unpredictability is considered to be a hallmark of social interaction, an art often considered unique to humans and therefore high up on the priority list of roboticists who work on humanoid robots. The field of social robotics is interesting for anthropologists because it is laden with assumptions about the nature of human interaction (Ishiguro 2009), human specificity and the role of culture in the creation and use of technological artefacts (Kubo 2015). Assumptions concerning each one of these aspects have culturally specific histories and were shaped by different cosmological and religious ideas in France and Japan. I have tried to map the phenomenological variety of animist phenomena in a Japan context with the heuristic device of the animation continuum (Illustration 1). To create a heuristic map of the possible processes of relation that lead to animation, I proposed a grid formed by two dimensions: on one axis we have a continuum from cathexis to opacity; on the other a continuum from docility to recalcitrance.

There are two ways we can conceive of the notion of a thing becoming alive. One is cathexis: that is, the notion that the thing becomes one with one's body, as is the case with an instrument. In achieving a task, person and object become one, both in the sense that our own perception extends through the object, but also in the sense that the object no longer has an independent life of itself. This is an example of animation through use, in which the person using the instrument imbues it with their own life. Person and thing, subject and object melt into each other and create a new emergent system (Malafouris and Renfrew 2013). In this sense of animation, the ontological difference between person and object is erased, if the object is used with skill. In other words, the object becomes docile through the embodied skill with which it is handled. This is a core principle of most of the Japanese arts: the sword or staff in martial arts, or the brush in calligraphy etc. From the point of view of an observer, the object appears as an animate entity that enters into interaction with the person handling it. A transition occurs as soon as the instrument/object is put down. The moment the direct contact is interrupted, the thing returns to thinghood or to a state of non-self. In the traditional arts, for example, the instrument is greeted at the beginning and the end of training, a ritual which indicates the threshold between the instrument's incorporation and its autonomous existence. The instrument thus partakes in the personhood



In the middle of the diagram, we find most objects of everyday use. These are used as instruments, serve as memorabilia of events and relationships, and are imbued with symbolic meaning insofar as we engage with them: In other words, they are enmeshed in constant processes of becoming self and returning to non-self. The continuum here works through the metaphor of distance: As we move towards the other end, things become increasingly "other" and opaque as they are removed from our sphere of knowledge.

This opacity in turn can be put to work in the creation of meaning and presence. Buddhist icons are good examples of this: They are created and consecrated through an "eye-opening" ceremony and are considered real presences of the Buddha after that (Faure 1991: 148–178). They are more than mere symbols, but to describe this as "animism" misses the point: the "presencing" of the Buddha is the effect of a technology of animation, and the result of this process is not life, but "still life" or "suspended animation" (Faure 1998 : 770).

On the other continuum between docility and recalcitrance, the object emerges as imbued with a life of its own the very moment it resists us. When the instrument we use unthinkingly every day breaks down, when the shoelace snaps, this resistance appears to us as "life" in its recalcitrant form. Discussing everyday "Western" behaviour towards cars, Gell calls this "vehicular animism" (1998 : 18f). Although "we" do not really believe that cars are imbued with life, the moment our car breaks down we cannot but understand this to be an act of malevolent volition. Heidegger (2006 [1927]) uses the difference between "Zuhandenheit" and "Vorhandenheit" (ready-to-hand versus present-at-hand), to indicate two modes of relational being towards human agents: When lost, misplaced or not functioning properly, things "light up", they come to mind rather than come to hand (Olsen 2010 : 164). Cathexis and resistance, then, are two extreme positions on the spectrum of animation, from which things emerge as possessing agency. In the case of cathexis they bend themselves to our will and become agents of our agency; in the case of resistance their agency is opposed to our own and we experience the object all the more "alive" for that. Different from "animism", instances of animation are never general. They are always specific to relationships between subjects and particular objects and the processes in which interactions are embedded.

Roboticists and anthropologists have hinted at the ways in which the not functioning of the device can render it ontologically open for other possibilities:

> "Lorsque le robot ne fonctionne pas ou mal, l'intentionnalité du concepteur se brouille. Il faut tenter de retrouver ce pour quoi il a été conçu, mais cela permet de mieux imaginer ses autres usages. Qui peut prévoir ce qu'il adviendra du Geminoïd une fois transplanté dans l'interieur d'une ménagère, dans le bureau d'un chef d'entreprise, dans une salle de classe, ou dans un centre commercial?" (Grimaud et Paré 2011: 78)

The point of this exploratory research was to test the heuristic device of the animation continuum in a 'wild' French context to see what it could tell us about the relationship of behavioural and ideological animism. What became abundantly clear was that in the realm of social robotics recalcitrant animation was most closely linked to the description of the robot as having a personality, volition and consciousness.

Field site I: Mairie du 15ème Arrondissement

The field site that I had chosen in my research proposal was the Mairie of the 15th arrondissement. Here both Pepper and Nao have been in use as part of a social robotics trial since 2017. The 15th arondissement is also the seat of Aldebaran robotics, whose CEO Bruno Maisonnier had developed Pepper and Nao before they were bought up by the Japanese telecommunications giant Softbank in 2012. Hosting a trial at the Mairie, visited by about 1500 citizens per day, was both a way to highlight the creativity of enterprises in the 15th and to create a sense of novelty. The mayor, Philippe Goujon, described the task of Pepper at the launch event as follows:

> "A recevoir les visiteurs, à les orienter, à les informer sur les informations municipales, et il pourra décharger les personnels de l'accueil d'un certain nombre de tâches répétitives ou fastidieuses, et surtout donner des informations sur des activités municipales. Il sera aussi déployé dans les bibliothèques de l'arrondissement".[1]

The smaller model Nao, was described as having more educational and companionship functions:

> "Il est destiné à un usage éducatif et d'accompagnement social. Il sera bientôt utilisé dans 6 classes de CM2 qui se sont portées volontaires, avant d'entrer au collège et au lycée pour ceux qui le souhaiteront, et peut-être, comme c'est le cas au Japon dans les EPHAD (établissements d'hébergement pour personnes âgées dépendantes, ndlr) et les hôpitaux pour rendre un certain nombre de services".

At the press conference for this launch, the mayor introduced Nao by lying him down on the desk and letting him get up by himself. In many ways this is Nao's core skill, both because balance and getting up after a fall are the biggest challenges in bi-pedal robotics and because the falling down and getting up was very relatable to the audience. In 2017 I had seen a whole dance choreography by the Blanca Li Dance Company that was based on this skill. The piece was called "Robot" and featured eight human dancers with a robot orchestra and several Nao robots who engaged in performances alone and together with their human partners. In spite of the limitations of the robots in terms of movement and expressivity, they clearly were the stars of the show and provoked loud noises of endearment from the audience whenever they fell down, which they often did. When I discussed this piece with a Japanese friend who was studying digital art, he said that he would have preferred just the robots, standing up and falling over again: "They were so cute, I

[1] https://www.maohitribune.com/Choc-culturel-a-la-mairie-du-15e-arrondissement-de-Paris_a9589.html

felt enormously healed (*iyasareta*)". But when I suggested that they were simply created to appeal to the scheme of childlike characteristics that humans were genetically programmed to find cute, he maintained that they were cuter than children or animals because they did not have an ego (*jiga*) and therefore no selfishness (*gayoku*). The Nao robot is simply trying very hard to do what is asked of it without any ulterior motive. This cuteness was also on display during the press conference with mayor Goujon, especially as the mayor had to carefully support Nao so it would not fall off the narrow desk. The main relational capacity of Nao is thus to elicit support from humans rather than helping them, which suggests quite a different dynamic of engagement from Pepper.

The Mairie of the 15th seemed to be the perfect field site to observe how people interact with robots in an everyday setting, when the interaction with the robot was not the goal of the encounter, but a means to something else. I was curious to learn how Pepper would mediate the relationship between the state and its citizens, or rather the relationship between the local administration and the inhabitants of the 15th arondissement. The interface between state and citizen, between bureaucracy and the individual, is a site of the mediation of state power, an awareness of which has marked French political theory since the French Revolution, starting with the administrative writings of Emmanuel-Joseph Sieyès who famously wrote that "the glance of the administrator searches out the means of execution." (quoted in Kafka 2012: 37). In many ways local authorities are the place in which this power of state manifests in people's everyday lives. What happens when this interface is automated? Does the state, an abstract entity to begin with, take on some of the traits of the automaton? Or, as the mayor envisioned it, would they become a new caste of servants for the people without the particular bureaucratic resistance that is often attributed to administrators across the globe, but which had a particular saliency in France?

Alas, when I went to visit the Mairie in April of 2022, I found that the trial with Pepper had been suspended for Covid-related reasons. This may at first sound counter-intuitive, as a working Pepper would obviously be a boon in a context in which human contact becomes dangerous because of contagion. The robot's immunity could be his greatest asset during a world-wide pandemic. But in one of the many ironies of social robotics, this was not the case, quite the opposite: Pepper could turn to people and interact with them, but much of the information was actually conveyed through the touch screen built into the torso. This surface became problematic as soon as it became clear that like a normal flu, corona viruses could survive on surfaces for up to three days. In other words, in order to use Pepper as a receptionist efficiently, the surface would have to be wiped down after every use, something that the robot could not do itself. Instead of saving human labour, it would have created more, a finding that is consonant with other ethnographic inquiries into human- robot interactions. Wright (2018) for example describes how when Pepper is used in Japan to entertain the elderly with sing-alongs and basic stretching, a handler is required, not only to bring the robot in, position it correctly and switch it on, but also to animate and participate in the actions, showing

the elderly how to mimic the movements of the robot. In this example, the agency of the robot has to be mediated by a human participant, as would be the case if the touch screen had to be disinfected between each interaction.

A similarly discouraging result was obtained by Gloria Michiels who set out to observe robot interactions in Belgian hospitals and found that the few robots (Zora, a commercialised version of Nao, and Pepper) were more used for outreach work and volunteer activities for the hospital than for physiotherapeutic or psychomotoric treatments. Robot use required more human resources rather than saving on human work time:

> "[N]os observations ont permis de mettre en évidence qu'il existe une difference significative entre les « mises en scène » pour les médias et l'utilisation réelle sur le terrain ainsi que les difficultés d'introduction de la technologie qui ne semble pas toujours adaptée à l'environnement ou au public cible. Enfin, nous avons pu constater que la présence humaine était indispensable pour encourager et faciliter les interactions avec Zora et Pepper." (Michiels 2021: 10)

The pandemic-related drawback was not lost on Softbank's engineers, who reacted quickly by giving Pepper new functions, including the deactivation of the touch screen and a facial recognition add-on that allowed the software to recognise whether someone is wearing a mask or not. This could then be used to remind people of mask-wearing and even absorb a potential violent reaction to the suggestion away from human hospitality workers. Incidentally, Yang, Chen and Mattila (2022) have experimented with a robot in a mask in a hypothetical hospitality setting, in order to see whether political leanings (democrat versus republican) did have an effect on the willingness to engage with an either mask-wearing or mask-less robot. This U.S. study revealed that there was indeed a correlation: republicans were more likely to interact with the unmasked robot. The authors interpret these findings through the concept of I-sharing: the fact that "the perception that one shares an identical experience with another social entity, enhances favorable attitudes" (2022:2).

In conclusion, because of the absence of Pepper at the Mairie, it turned out not to be a viable field site for observing human-robot interactions in the 'wild'. In light of the poor ethnographic record, we may speculate as to whether the Covid-19 pandemic was not also a convenient opportunity to retire a technological upgrade to a public service in dire need of modernisation that simply did not deliver its futuristic promise[2].

[2] I thank the anonymous peer reviewer for this suggestion.

Field site II: Cité des Sciences et de l'Industrie

The *Cité des Sciences et de l'Industrie* is a science museum in the Parc de la Vilette in Paris. Opened in 1986 by François Mitterand, it is the largest science museum in Europe, boasting a planetarium, an Imax theatre and even a decommissioned submarine. Designed to educate the public about science and research, it hosts temporary as well as permanent exhibits. On 2 April 2019, a new section about robots was opened among the permanent exhibitions. The concept was created by the roboticist Jean-Paul Laumond and the social anthropologist Denis Vidal, with illustrations by Anne-Lise Boutin. The exhibit presents a history of robotics and several examples of robot technology, with two Peppers and one Nao and a range of robotic arms. For the purpose of my research, I focused on the two most interactive parts of the exhibition: the emotion recognition station with Pepper and the open interaction with Nao. I visited the exhibition almost weekly from June to July 2022 to observe and document modes and patterns of interactions between visitors and the robots. Extensive fieldnotes were jotted down immediately after the interactions and more general observations were written up each evening. I also did interview several participants of all ages about what they thought about the robots. These informal interviews often lasted only around a minute and triggered mostly monosyllabic responses from the museum goers. The longer responses mostly expressed a gap between expectation and reality, something I will return to below. Overall, the direct observation of interactions provided the richest material for analysis.

Before delving into the analysis of my findings, I need to address the concept of the 'wild', that is used in this research project in a heuristic manner. Contrary to the restricted setting in laboratories that many observations of Japanese robotics are based on (Robertson 2017), I understand the 'wild' here as open situations that allow for unpredictable elements.

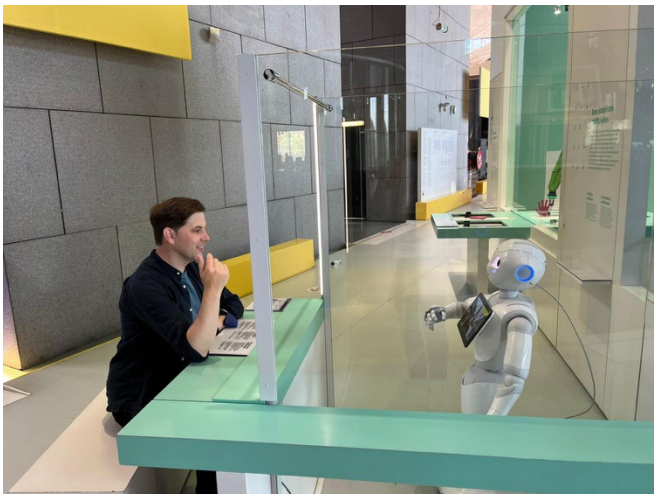
The second parameter of the 'wild' is that the participants in open interactions do not know each other beforehand. There may be expectations at work concerning the abilities and limitations of the interacting parties, but these expectations are not based on direct experiences with the party in questions. This means the interactants are strangers to each other. This is particularly relevant for the human-robot interactions in a museum context and vastly differs from the relationships that people have with robots that they own, despite the robots themselves having the same capabilities.

The third aspect of the notion of the 'wild' is that there is no supervision, no external God-perspective in Haraway's words that can be adopted by a control. This renders both parties vulnerable to accidents and exposes both to specific dangers, although I would maintain that Pepper, with a weight of only 28 kilograms is more at risk from an irate customer or museum goer than the other way around.

If robots are to successfully interact with museum goers without supervision, the environment needs to provide certain restraints. No current humanoid robot has reached a level of autonomy, both in terms of perception, decision-making and action, that would allow it to act in genuinely open situations. Thus, their abilities can only be shown successfully by radically limiting the kinds of interactions the museum goers can have with the robots. In the *Cité des Sciences et de l'Industrie* this is achieved through the built environment of the display. There is in fact a Pepper robot in the central plaza, but I have never seen it in action during my two months of observation. The narrative was that it had escaped from the robot exhibition in search of human contact. Talking to the museum attendants I was told that it was only used for special demonstrations and required the presence of a handler (Illustration 2). In the robot exhibition, I focussed my attention on three displays: the emotion-recognition featuring Pepper, the conversation corner with Nao, and the history of robot lecture with Pepper.

← *Illustration 2*

↓ *Illustration 3*



Emotion-recognition Pepper

This Pepper was installed in a transparent Plexiglas casing and directly connected to an energy source. The point of this exhibit is to illustrate Pepper's ability to recognise facial expressions and on the basis of this to make conjectures about the mental and emotional state of the people who face him. This was illustrated by a live image of the eye cameras on the touch screen that showed how the algorithm identified first what was a face and what was not and then to identify, through a complex grid of measurements including the position of the edge of the mouth, whether a person was happy, angry or fearful. Visitors were encouraged to grimace at the robot and as a result their faces would appear in green or red on the screen. Pepper's eyes were fixed on the person sitting in front of him. There was little other interaction happening from that.

This feature functioned fairly well when only one person was in front of Pepper (Illustration 3), but became more complex when a group of children and school-age pupils would vie for the robot's attention (Illustration 4). Only the expression of the persons in front on eye level was recognised, and the children would often compete to grimace in as exaggerated a way as possible. This made it easier for Pepper to recognise the expressions; the fact that Pepper did not have to adjust its gaze or position of its head made the process more efficient. The amount of time that people spent in front of this exhibit varied from only a few seconds to a maximum of about two minutes. The exhibit was chiefly meant to illustrate the process of emotion-recognition on which interactions with robots will be based at some future point in time rather than to provide an opportunity to directly interact with the robot as an entity in its own right. This was only the case in the next exhibit.

↓ *Illustration 4*

Illustration 5 →

Conversation with Nao-Corner

Nao, the child-sized humanoid was presented on a slightly raised round dais in red. The back consisted of a round wall in black that shielded the robot and limited its field of vision to 180 degrees (Illustration 5). Conversation with Nao promised to be the most open type interaction, but here too, careful cues are given to the humans about the ways in which to interact. A red place reads “Pour engager la conversation avec NAO, parle bien en face du micro et dites ‘Bonjour NAO’. Attention! Observez bien la couleur de ses yeux: quand ils sont bleus, il attend que vous lui posiez une question. Mais quand ils sont blancs, il n’écoute plus… il parle!”

These clear instructions helped people to understand the ‘social’ cues that make communication possible; it was, however, not always easy to understand what was going on. The clear demarcation between listening mode and speaking mode also indicates the complexity of conversational speech acts, during which human cognition is engaged holistically and judgements are constantly made not only about the content of speech, but about context, bodily comportment and facial expression. Even so, the exhibit prompts the museum goers to ask a particular set of questions:

- “Que fais-tu là?
- Explique-moi “Les robots et moi”?
- Que trouve-t-on dans “drôles de robots”?
- Que préfères-tu dans l’exposition?
- Comment ça va?
- Présente-toi
- Quel âge as tu?
- Qui sont tes parents?
- En quelle année sommes-nous?
- Est-ce que tu sais chanter?
- Combien des mots connais-tu?
- Pourquoi t’appelles tu NAO?
- Que penses-tu des humains?
- Raconte-moi une histoire
- Connais-tu les lois de la robotique?
- Peux-tu lever le bras?”

Despite the constraint placed upon possible questions by this prescriptive set, it was still difficult for museum goers to elicit a response to one of these questions. This had partially to do with the time that it took for Nao to process questions and other information. It worked much better with just one person interacting, but in a group, the interactions between group members and Nao quickly became conversations between group members about the robot. A similar dynamic was at work when parents and children visited together. It was usually the child who asked the parent "Pourquoi ne bouge-t-il pas?" or "Pourquoi est-ce qu'il ne repond pas?". The parent would usually walk up to the red placard and read the instructions, while the child remained in front of Nao, trying to elicit a reaction. More often than not, the burden of explanation fell to the parents. In 48 interactions in which Nao did not respond, only 9 parents (7 fathers and 2 mothers) said that the robot was broken or in need of repair or adjustment (a mechanical explanation). 39 responded in a more anthropomorphising way: "Pourquoi il ne chante pas?" said for example a seven-year old girl to her mother, after her mother had read the question "Est-ce que tu sais chanter?" from the red plaque. The mother responded "Peut-être il n'a pas envie de chanter, ma chérie" and a few minutes later told me that she tried to avoid exhibits that did not seem to work, as this was a source of frustration for children. Anthropomorphising responses fell into three categories: either it was a question of the imputed mood of Nao ("il n'a pas envie") or it was a question of volition, or, rather, resistance ("il ne veux pas"). The third and rarer category was distraction ("il est en train de faire autre chose"), which was more of a borderline case between an inner state imputed to the robot and a question of the cognitive limitations indicated by the two different colours of the eyes.

Pepper as Presenter

In the last display, Pepper was able to move within the confines of a quadrangular raised dais with a Plexiglas railing. The point here was that Pepper presented a history of robotics up to and including himself. There was a French or English mode, but apart from this choice there was little in the way of interaction. Rather, Pepper used all its mechanical features to create an impression of animation in the double sense of aliveness and as an animated presenter who used gestures and movements to make the presentation livelier. This pre-programmed performance was an impressive spectacle, but it did not afford anything like an open interactive situation. Instead of a partner, Pepper became an object in itself, something to take a picture of, rather than an occasion to interact (Illustration 6).

← *Illustration 6*

Core findings:

- Human-robot interactions in an exhibition setting are usually triads and not dyads: in the CIS it was rare to have one museum goer and one robot interacting alone. What happened much more frequently was that a group of school children or parents with their child/children would encounter the robot together. Inevitably this social context was beyond the cognitive abilities of the robot. Whether working or perceived not to be functioning properly, the robot still mediated relations between the visitors, in the sense that its presence became an object of concern and conversation. The interaction was thus more frequently *about* the robot rather than *with* the robot. Here it is useful to reference Sherry Turkle's distinction between the "robot as Rohrschach" and the "robot as evocative object" (Turkle et al 2006). The former is about how relating to the robot expresses other aspects of a person's life and personality (cognitive style to emotional conflicts), the latter about how engagement provokes reflection on what personhood, aliveness, and consciousness are. Turkle bases this core distinction on observable facts: Do people engage with the robot/object by talking to it or by talking about it? In the case of the CIS, Nao falls in both categories. What was significant to me was that often the non-functioning or not functioning in the expected way was enough to turn a social other into an evocative object that elicits reflections on its abilities and limitations rather than to foster extended interactions with visitors.

- The more constrained the surroundings, the more likely is a successful interaction. By successful interaction I mean a sustained series of exchanges that trigger each other in a way that appears

> logically cohesive to the human partner. Such interactions can be fostered by constraining modes of engagement, for example, by fixing the robot in space, by limiting its field of vision, or by curating a pre-selected list of questions. By constraining an open situation in this way and providing ample social clues as to the kinds of interactions that can be had – simple questions and answer exchanges rather than witty banter – a successful exchange is more likely to happen. This also applies to the temporal frames of interaction. The time window in which an interaction fosters an understanding of the humanoid robot as a viable partner was very short. If there was no immediate response, both children and parents would simply move on within 10 to 20 seconds. This was especially problematic for Nao, who needed more time to process sensorial input and who often could not cope with more than one person at the time.

In other words, in the world of social robotics in the 'wild' territory of the museum, it is actually the museum goers that become the 'wild things', not the robots. The constraints on open situations have the effect of forcing the 'wild' or potentially unruly visitors into civil interactions, and thus we could say that in a general sense it is the situational constraints that 'civilise' the museum goer. Some groups of teenage school boys would dare each other to ask the robot sexually charged questions ("Tu aimes baiser les autres robots?"), but these never elicited any response. In that sense, an important function of the robotics display in science museums is the management of expectations that have often been distorted by too enthusiastic media representations in popular culture and unrealistic depictions of the abilities of robots in science-fiction films.

Field site III: Caliban Robotics stall at the Japan Expo

Here I focus on three days of intensive observation of the Caliban stand at the Japan Expo (14-17 July 2022). The Japan Expo in Paris is one of the largest conventions focussing on Japanese Popular Culture outside of Japan. Founded in 1999 it moved to the Paris-Nord Villepinte Convention Centre in 2006 and has been growing ever since. A quarter million visitors were in attendance in 2019 and a similar number was expected in 2022. Although robots and cyborgs were frequently present in manga and anime narratives, their fictional appeal did not immediately translate into real-life robots at the convention. There were three kinds of 'robots' present in 2022: statues of robots, like a replica of the famous Gundam battle suit (which technically is not a robot, but has some capacity for autonomous action in the anime, see Illustration 7), a starship trooper in rest mode (Illustration 8), and a small R2-D2 droid that wandered about aimlessly. Robot cosplay was less frequently done, as it required a whole-body suit and a cover for the face as well. The only actual robots I could find were at the stand of Caliban robotics. I have to thank my PhD student Eric Smith for this, as I would have never found it just by walking past roughly 400 stands with different merchandise. The Caliban booth was in a quieter area, somewhat secluded from the main drag, but they had a life size robot mannequin, a humanoid torso that was the first thing people saw when they approached the stall. This was also the major draw, but like most of these displays, the novelty quickly faded once people realised that it was more of a mock-up than a 'real' robot (Illustration 9). But as an evocative object (see above), it fulfilled its purpose and during my observation many visitors were drawn in by it. There was also a smaller android that moved on a rolling platform similar to the version of Mitsubishi's Wakamaru (Illustration 10).

Caliban is a "association de robotique" made up of amateur roboticists, students and everyone passionate about making robots. Founded in 2008, they hold monthly meetings called Apérobot, where members share their passions and update each other on their projects. The mission of the association is to "promote and democratise" robotics by providing a platform for learning and sociability. Caliban organises workshops, at schools for example, and the Apérobot trophy cup, a competition for robots, the winner of which will receive financial assistance for their latest project. The Apérobot concept has become a kind of franchise that has spread in France and comprises the Association Caliban Midi (Toulouse), Association Caliban Belgique (Liége et Namur), Bordeaux (where the founder has settled) and Leobotics (Lyon). Each of the chapters has slightly different specifics: the Belgian side for example includes Artificial Intelligence and new technologies in general, while the South of France chapter focuses on robotic and artistic projects. They have participated at the Japan Expo almost since their inception, although the link to Japan is more incidental rather than a core element of their identity. The participants I talked to made a link to Japan by referring to the idea that Japan was already in the future and that robotics, playfulness and cuteness were important elements in their own engagement with their hobby. This spirit of playfulness clearly resonated

↑ *Illustration 8*

Illustration 7 →

↑ *Illustration 9*

↑ *Illustration 10*

with the idea of cosplay, although the Caliban stall and members looked distinctly different from the typical Japan Expo visitor.

One connection I noticed was that one of the two androids that were exhibited as evocative objects bore the name Ulysses 31, referring to the French-Japanese anime co-production from 1981 (宇宙伝説ユリシーズ 31 in Japanese), in which a robot named Nono played an important part. When I asked about it, two of the older members told me that this anime was an important part of their youth and instilled an interest in technology and the future of humanity at an early age. This was surprisingly similar to the Japanese roboticists interviewed by Jennifer Robertson (2017) who often referred to Astroboy (鉄腕のアトム in Japanese) as inspiration for their interest in robotics. The figure of the android has thus a contradictory temporality: as fantasy it has always been there, but in reality it is something yet to come. Kubo calls this modality "nostalgic future" (2015 : 228).

The main attraction of the stall was the sumobot, "la 1ère competition de robots sumo de France". In a sumo ring of about one meter in diameter with a white border, hand-sized non-humanoid robots tried to push each other out of the ring. The table on which this happened had as additional boundaries two table tennis nets, to keep the small robot vehicles from falling off the table. The small robots can be bought as a kit and assembled at home, as an educational toy, but also as building block for more creative projects. They are sold by Freenove, an open-source electronics platform. Some of the sumo wrestler robots looked like small model cars, others like model tanks or power shovels (Illustration 11) and were equipped with a light sensor at the bottom. They were programmed to change course away from the white boundary. When they encountered resistance, they were programmed to accelerate. Observing the engineers and the spectators on the first day, I quickly realised that I had to find a way for both parties to articulate what is going on, without, however, suggesting a particular interpretation, in terms of volition and intention for example. For this, I "came out" to the engineers as a researcher and made sure that they did not feel uncomfortable with my presence. I decided to hover around the table and to occasionally ask "Que-ce qui se passe?" or "Que-ce qui s'est passé?" to elicit interpretations. I jotted down many of the reponses in my field notes. Many of these interactions were very brief and elicited only a short summary of what happened. They often took the form of attributed intention, as in "Le robot là a poussé l'autre dehors", "Il a bien résisté", or "Celui-là a gagné". These attributions of agency are interpretations of the robot's movements (I hesitate to say behaviour, as this already implies some kind of intentionality), but they are only possible within the framework of the competition. This frame provides an essentially social scaffolding to interpret what is happening in the ring. That is to say that "winning" and "losing" are the outcomes of a set of rules (leaving the ring means 'losing') that define the meaningful intentions that can be imputed to the participants (attack, evade, counter-attack, persevere etc.). The intense interest that the spectators developed

in the brief bouts lasting no longer than a few seconds is based on an understanding of these rules as much as on the movements of the robots.

While the spectators including myself were absorbed in this frame-based anthropomorphising of the robots, the Caliban members who set up the game explained the movements of the robots in a technical language, detailing what they were programmed to do: for example, the robot with the pronged shovel was programmed to reverse two centimetres and to turn 90 degrees when the light sensor picked up the white boundary strip of the ring. The next turn would be 135 degrees, thus creating a distinct pattern of movement. If it drove towards the boundary at a 90-degree angle, it would reverse and turn 90 degrees and thus immediately encounter the boundary again, turn 45 degrees, etc., which resulted in it following the boundary in a circle. Another robot would be programmed to move slowly in a random pattern and only accelerate when it encountered resistance. From the point of view of the programmers, the movements of the robots were thus entirely predetermined and had nothing to do with volition or personality. The unpredictability, and this is the crux of the matter, only emerged when two robots interacted (or, in the language of the spectators, 'wrestled' with each other). Depending on the angle at which they were set into the ring, the outcomes of the 'fight' were different. Because of the limited space of about one square meter, the robots would encounter each other very quickly, and much about that encounter would be determined by the angle at which they were released and at which point of their movement programming they found themselves upon their release. In other words, it was the engineers who set them up for unpredictable encounters and thus played the game of chance, rather than the robots. The engineers were aware of this and set them up at slightly different angles to make the bouts more interesting.

Thus, in the sumobot competitions two views of what happened in the ring were pitched against each other. On one hand the attribution of intention and even personality – the robot who was programmed to accelerate when encountering resistance often bumped into the other robot, which triggered the acceleration, something that was interpreted by spectators as "aggression" –, on the other the insight into the programmed pattern that were manipulated by adding an element of unpredictability in the set up. The engineers explained the functioning of the robots to the spectators if they were interested. Despite this, it was clear to everyone that without the attribution of intention, the whole miniature drama of sumobot would not exist.

Up to here, things were fairly straight forward. Over the course of my observation, however, there were several instances when the robots did something unexpected, or did not function the way that they should have. In one of the bouts at the end of the day, for example, one of the robots went straight for the boundary of the ring, crossed the boundary (something that a student of engineering and member of Caliban had told me earlier was impossible) and continued at high speed over the table and finally fell off the table and broke into several pieces. The engineers were as surprised as the rest of the spectators and one cried

"mais il est fou!" before trying to catch it. "Il voulait s'échapper" said her colleague as they picked up the pieces of the broken mechanism. There was a brief moment of silence, during which a different image formed in my mind: the straight line and full-speed-ahead recklessness suddenly felt like desperation and the spectator next to me said under his breath: "Il voulait se suicider". Madness, flight, suicide: in the moment of unpredictable and unexpected behaviour, in other words, in moments of recalcitrance, mere movement turns into behaviour and behaviour requires interpretation. This was more keenly felt by the engineers who obviously felt uneasy about this than by the spectators who had made attributions all along. An immediate post-mortem was conducted and an explanation was quickly found: a piece of gaffer tape had attached itself to the robot's underside and covered the sensor, so it could no longer detect the boundary. There was a palpable sense of relief at this and the engineers were keen to explain to the spectators what had happened.

On another occasion, one robot started smoking during a match and had to be taken out. The same robot had participated in lots of matches on the same day and the first reaction of the engineer was "il est crevé, celui-la". Once he was taken out, he had his battery pack removed and was put away with the explanation "il doit se reposer". The unexpected happening led to an attribution of a state of mind (exhausted, in need of rest). In short, when the robot did not do what it should have done – when it short-circuits or crosses the boundary, then it appears animated; if it behaves within the confines of the programme (even when it moves randomly) then it is just mindlessly doing what it was programmed to do.

Core findings:

- The robot sumo matches do have an unpredictable outcome, but the ways in which agency, volition and states of mind are attributed is over-determined by the frame of the match itself, with clear rules and winners and losers. It is this frame that renders what happens in the ring intelligible as behaviour; or rather, the frame allows random movement to be translated into meaningful action by the spectators. To them, what happens is exciting because it can be interpreted as evidence of intention; the engineers on the other hand are familiar with the sequence of movements and thus have a more detached view of what happens.
- When the robots moved in an unpredictable way, the engineers too were drawn to the attribution of aliveness in the form of states of mind. For both spectators and engineers, acting in unpredictable ways opens up a moment in which a will is attributed. The movement can be random or based on a malfunction, but within the narrow realm of the ring it becomes interpretable. Here the notion of "sub-anthropomorphism" is useful. In a seminal paper on the possibilities of a comparison between

robots and deities in a Himalayan context, Denis Vidal has pointed out that the identification of the social other as possessing human capacities was not necessary for meaningful exchanges to take place, nor did the social other need human-like traits. The same applies to the sumobots. They are not humanoid and not built to communicate or to even elicit a sense of cuteness; but within the world of the ring, their movement can easily be anthropomorphised.

↑ *Illustration 11*

Conclusion

Japanese commentators and foreign observers alike have pointed out that Japan is a culture that welcomes robots with open arms (Katsuno 2015). This openness to robots as social others is often ascribed to Shinto, the animistic indigenous religion on the Japanese archipelago (Blok & Jensen 2013). In the Shinto worldview, natural and man-made objects are inhabited by spirits; no absolute boundary is drawn between the animate and the inanimate, the human and the non-human. It follows that robots are also seen to be inhabited by spirits and thus are treated as social others rather than as alienated and alienating technology. This narrative has been used by the second Abe administration (2012-2020) to promote Japan as the coming 'kingdom of robots' in which the development of care robotics would ease the labour shortage in the care sector.

While a ludic element was present in both France and Japan, the religious and cosmological underpinnings posit automata in different registers: in the Judeo-Christian tradition, the relationship between God and his creation can be conceived of as vertical hierarchy (Becker 2015: 99); in the Japanese case, humans and their simulacra are said to exist on the same horizontal ontological level. While such ideas about clear-cut cultural differences inform public debates, policy discussions and projects of nation-branding (Katsuno 2015), the lived experience of human-robot interaction is rather more complicated. To begin with, Pepper, the most widely used robot in the entertainment, care and service sector, has been branded as a Japanese product, despite its French origins. Designed by roboticist Bruno Maisonnier, assembled in China and sold by the Japanese telecom giant SoftBank, Pepper has become a boundary object in its own right: a technological artefact that can adapt to the needs of local users and still maintain a recognisable identity across different national contexts.

While American roboticists in the 90s have argued that social robots must exhibit simulated human traits to successfully interact with humans, anthropological inquiries into anthropomorphism have argued that the attribution of personhood has a much lower threshold: Alfred Gell has shown how icons and aniconic representations in religious contexts were given personhood by worshippers despite not exhibiting human-like behaviour (1998). Furthering this line of inquiry, the French anthropologist Emmanuel Grimaud (2012) described attribution of life as first and foremost the concern of the creators of robots, who try to create a moment of "ontological confusion" between people and robots. He argued that on the side of the users, this confusion is resolved very quickly, but this does not stop the interaction: the initial "ontological confusion" is replaced by an "ontological gradation", in which "para-humans" – everything that fosters attachment and connectivity, in Sherry Turkle's words "relational artifacts" (2006) – become partially animated in "a series of larger or smaller shifts, analogies, confusions and alterations"[3] (Grimaud 2012: 91).

[3] "toute une série de glissements, d'analogies, de confusions et d'altérations plus ou moins grandes"

This exploratory research project has hopefully shown that ethnographic research methods are well suited to explore how the aliveness of robots is conceived of in the field. The next step would be to think about the translation of behavioural animism into ideological animism. Here questions of worldviews or cosmologies loom large: what enables this translation and what constrains it? What do we have to do to turn the concept of 'animism' from a belief system that is always ascribed to others into a useful critical or heuristic concept for an anthropology of the laboratory and beyond? These questions show the way for further research.

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DP 20-02 (April 2020)

"A Comparative Analysis of Autonomous Vehicle Policies among Korea, Japan, and France", Jeehoon Ki (KISTEP), 2018 FFJ/Renault Fellow

DP 20-01 (March 2020)

"Comparing the Development and Commercialization of Care Robots in the European Union and Japan", James Wright (Sheffield University), 2019 FFJ/Michelin Fellow

DP 19-05 (November 2019)

"Credit Guarantees and Zombie Firms: A Case Study of Small and Medium-Sized Enterprises in Japan", Scott Wilbur (Yale University), 2018 FFJ/Banque de France Fellow

DP 19-04 (October 2019)

"Impact of R&D Activities on Pricing Behaviors with Product Turnover", Yasushi Hara (Hitotsubashi University), 2018 FFJ/Michelin Fellow, Akiyuki Tonogi (Toyo University) & Konomi Tonogi (Rissho University)

DP 19-03 (September 2019)

"From Agribusiness to Food Democracy. Comparative Study on Agricultural Policy and Organic Farming in France and in Japan", Shoichiro Takezawa (National Museum of Ethnology, Japan); 2018 FFJ/Air Liquide Fellow

DP 19-02 (June 2019)

"Legitimation of Income Inequality in Japan: A Comparison with South Korea and the United States", Shin Arita (The University of Tokyo), Kikuko Nagayoshi (Tohoku University), Hirofumi Taki (Hosei University), Hiroshi Kanbayashi (Tohoku Gakuin University), Hirohisa Takenoshita (Keio University) and Takashi Yoshida (Shizuoka University); Prizewinners of the 2019 FFJ/SASE Best Paper Award.

DP 19-01 (May 2019)

"A Study on New Mobility Services and Sustainable Urban Development", Ai Nishimura, 2017 FFJ/Renault Fellow

DP 18-06 (December 2018)

"A Study of New Technologies of Personal Mobility and Robot Suit for the Elderly and Persons with Disabilities", Toshiaki Tanaka (University of Tokyo, Hokkaido University of Science), 2017 FFJ/Valeo Fellow

DP 18-05 (November 2018)

"Developments in Well-Being at Work in Japan: A Survey and a Comparison with France", Louise Baudrand (EHESS), César Castellvi (EHESS), Nao Kinoshita (EHESS), Adrienne Sala (Sciences Po Lyon) & Sébastien Lechevalier (EHESS, Fondation France-Japon de l'EHESS)

DP 18-04 (November 2018)

"Understanding AI Driven Innovation by Linked Database of Scientific Articles and Patents", Kazuyuki Motohashi (University of Tokyo, NISTEP and RIETI, 2017 CEAFJP/Michelin Fellow)

DP 18-03 (November 2018)

"The Yen Exchange Rate and the Hollowing-out of the Japanese Industry", Ansgar Belke (University of Duisburg-Essen) & Ulrich Volz (SOAS University of London, 2017 CEAFJP/Banque de France Fellow)

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"Cross-cultural (France and Japan) and Multidisciplinary Discussion on Artificial Intelligence and Robotics: Tendencies and Research Prospects", Naoko Abe (CEAFJP Research Fellow)

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"Impact of Shareholder-Value Pursuit on Labor Policies at Japanese Joint-Stock Companies: Case of

Nikkei Index 400", Kostiantyn Ovsiannikov (University of Tsukuba, Prizewinner of the 2018 FFJ/SASE Best Paper Award)

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"Female Board of Directors and Organisational Diversity in Japan", Yukie Saito (CEAFJP Associate Researcher, University of Geneva, Institut de Recherches Sociologiques)

DP 17-04 (August 2017)

"*Keiretsu* Divergence in the Japanese Automotive Industry: Why Have Some, but Not All, Gone?", Akira Takeishi (Graduate School of Economics, Kyoto University; CEAFJP Visiting Researcher) et Yoshihisa Noro (Mitsubishi Research Institute, Inc.)

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"Does 'Driving Range' Really Matter? The Hidden Cost of Internal Combustion Engine Vehicles and the Potentially New Value Proposition of Electric Vehicles: Two Cases from Countryside and Urban Side of Japan", Hidetada Higashi (2016 CEAFJP/ Valeo Fellow)

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"Government Policy and the Evolution of Japan's Photovoltaic Industry, 1961-2014", Maki Umemura (Cardiff University, 2015 CEAFJP/Michelin Fellow)

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