JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)

APPLICATION FORM FOR JSPS SUMMER PROGRAM 2021

***Please type only alphabet and do not use letters with marks such as umlaut or diacritic.**

1. Personal Details

Title	☐Mr. ☒Ms. ☐Dr. ☐Others（ ）
Gender	☐Male ☒Female
Surname/Family name	GUEROUAOU
Middle name	
First / Given name	NADIA
Date of Birth (day / month / year)	29/02/1988
Nationality	FRENCH
Permanent Residency	☐UK ☒France ☐Germany ☐Canada ☐Sweden ( )
Current appointment / status **(If you do not have current appointment, type N/A)**	☐Master's student ☒Ph.D. Student ☐Postdoctoral researcher ☐Others（ ）

2. Educational Background

<Bachelor's degree>

Research Field/Main subject(s)	**BACHELOR in Psychology**
Name of University /Institute	Lille III University, FRANCE
Date Obtained	2008

<Master's degree>

Research Field/Main subject(s)	**MASTER 2 Research in Biology and Health** Majoring: Physiology, Physiopathology and Neuroscience
Name of University /Institute	Lille II University, FRANCE
Name of Department	HEALTH and BIOLOGY
(Expected) Date Obtained	2010
Research Field/Main subject(s)	**MASTER 2 in Psychology – Neuropsychology** Majoring : Clinical Neuropsychology, peri-surgical evaluation and cognitive rehabilitation
Name of University /Institute	Lille III University, FRANCE
Name of Department	PSYCHOLOGY
(Expected) Date Obtained	2015

<Doctoral degree>

Research Field	Cognitive Neurosciences
Name of University /Institute	Sorbonne University and University of Lille (co PHD) National Center for Research and Resilience on Psychotraumatism
Name of Department	Psychiatry
(Expected) Date Obtained	December, 2022

Please give the name of your current research advisor and his/her affiliation in your home university or research institute.
Dr Jean-Julien Aucouturier (1st co director)
CNRS Research Director in Cognitive Sciences
Music and Sounds Science and Technology Department (STMS UMR9912, IRCAM/CNRS/Sorbonne University) Paris
Pr Guillaume Vaiva (2nd co director)
Professor of Psychiatry
PSY Team, Lille Neuroscience & Cognition Centre (LiNC), INSERM U-1172 and CHRU Lille

3. Employment Record (Begin with your most recent employment.)

Name of Institute	Period of Employment	Position
CHRU Lille	since december, 2015	Clinical and Research Psychologist
University of Lille	since march,2018	Part time lecturer in NeuroEthics
Sorbonne University and University of Lille	since December,2019	Doctoral Researcher

4. Subjects and Achievements of Past Research (Additional sheets may be attached if necessary.)

Master thesis : Neurovisceral Impact of Emotions in Anxiety

My MSc project (Neuroscience, University of Lille, 2010) was concerned with the physiology of emotional reactions in humans. It aimed, first, at evaluating the reactivity of visceral signals, measured with electrogastrogram (EGG), in response to emotional stimuli and, second, to study how trait anxiety impacts such reactivity To this aim, I conceived a study combining EGG with two more classical measures of emotional reactivity (electrodermal activity and heart rate variability), and collected data in N=24 female participants as they watched neutral and emotional video clips, which we had previously validated. The results showed that gastric reactivity increased in response to unpleasant emotional stimuli, and that this reactivity was increased in high-anxiety participants. This study was a relatively early example of using EGG to study emotional processing, a field that has since then flourished (ex. Vujic et al. 2020)

Vujic, A., Tong, S., Picard, R., & Maes, P. (2020, October). Going with our Guts: Potentials of Wearable Electrogastrography (EGG) for Affect Detection. *In Proceedings of the 2020 International Conference on Multimodal Interaction* (pp. 260-268).

PhD Thesis : Emotional vocal feedback in PTSD patients

I'm currently a second-year PhD students in Neuroscience, co-supervised at the University of Lille and Sorbonne Université in Paris. My PhD research is concerned with emotional processing in post-traumatic stress disorder patients (PTSD), and more precisely, with the application of the emotional vocal feedback paradigm to the context of exposition therapy.

The vocal feedback paradigm (Aucouturier et al. 2016) is a recent manipulated feedback paradigm in which participants are asked to read a text out loud, while the sound of their voice is manipulated with real-time digital transformations to appear happier or sadder than they really are. In healthy participants, research has shown that participants who hear themselves read with a more positive or more negative tone of voice become themselves happier or sadder. The effect was recently replicated when participants simply told a story about themselves, instead of reading a text (Goupil et al. 2020).

The development of the vocal feedback paradigm has a lot of links with Japan. The original vocal feedback paper was published in PNAS as the result of a collaboration between my current PhD advisor JJ Aucouturier, and my proposed JSPS Host, Prof. Katsumi Watanabe (Aucouturier et al. 2016). The voice transformation tool DAVID, which I use in my thesis, was validated on both French and Japanese voices, and also co-published with Prof. Watanabe (Rachman et al. 2017). Finally, since it was published, the software has also been used independently in a number of Japanese laboratories, incl. Prof. Yuko Yotsumoto's laboratory in the University of Tokyo (Kimura & Yotsumoto, 2018), which I propose to visit during my JSPS stay.

In my first-year PhD research, I have conducted an acoustical analysis of the voice of PTSD patients, as they retell their traumatic story in the course of exposition therapy. Audio recordings were collected on a cohort of N=30 patients, each during 6 successive exposition sessions, and analysed with acoustical analysis software. Our results show that, as the severity of symptoms decreases session after session, the pitch (fundamental frequency) of patient decreases, and the jitter (index of pitch modulation) increases (see Figure 1). These results indicate potential acoustic biomarkers to track the severity of symptoms in patients, and provide a target to design a digital voice transformation able to reduce anxiety in patients voice, to be used in vocal feedback.

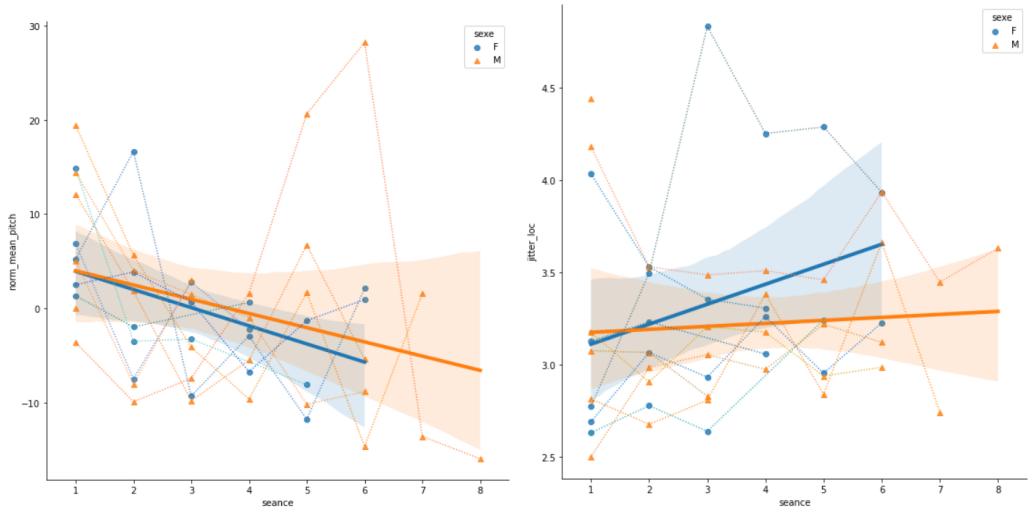


Figure 1: Evolution of Pitch (left graph) and Jitter (right graph) of N=11 PTSD patients in the course of session therapy

Following this study, and before launching a vocal feedback clinical trial, my current research is now concerned with studying the ethical aspects of manipulating a patient's voice without their knowing. It is this question which motivates my current application for a JSPS research stay in Watanabe Laboratory – see section (7) below.

5. List of Major Publications

(Authors (all), Title, Journal, Vol, No., pp.-, Month/Year)

-Dujardin, K., Duhem, S., Guerouaou, N., Djelad, S., Drumez, E., Duhamel, A., Bombois, S., Nasreddine, Z., Bordet, R. & Deplanque, D. (2020). MOCATEL Validation in French of the Montreal Cognitive Assessment 5-Minute, a brief cognitive screening test for phone administration, La Revue Neurologique.

- Guerouaou Nadia, « Emotional vocal feedback : an augmented reality for therapy ? », 118th International Colloquial of the Psychiatry and Neurology of French Language Congress the 18th of Septembre, 2020.

- Guerouaou Nadia « Use of vocal feedback during the PTSD therapy », Consortium Meeting ANR Reflets Rennes, the 28th of Septembre, 2020.

6. Academic Awards

Title	Year
« Emergence » call for proposal, CHRU Lille: 30k€ granted to TraumacoustiK study (Principal Investigator : Guerouaou Nadia)	2019

7. Research Plan in Japan *Additional sheets may be attached if necessary.

- Please include at least the following items: 1) present research, :

Current research

Following our results on the acoustics of voice in PTSD patients, my current research aims at assessing participants' moral attitudes towards the idea to use a voice-transformation technology to repair or enhance their emotional/psychological states.
Voice transformation, as made possible by recent signal processing or artificial intelligence (AI) tools, has important existential and ethical implications. For instance, voice transformations can be used to make a lawyer or a call center operator's voice appear more convincing or trustworthy (Ponsot et al. PNAS 2018), or to make a call to emergency medical services sound more urgent and important (Boidron et al. Scientific Reports, 2017). For PTSD patients, we hope that manipulations of a patient's own voice can help regulate their emotional states. All these applications raise questions about the perceived morality of their use, yet we have limited knowledge about the public's intuitive attitudes toward them.

Inspired by the methodology of recent work in 'experimental ethics', e.g. on the subject of AI-powered autonomous vehicles (Bonnefon et al. Science, 2016) or brain stimulation (Medaglia et al., 2019), I am currently conducting studies in which I present online participants with short situational vignettes, describing potential applications of voice technologies. Participants are asked to read each vignette and answer a short series of questions about how morally acceptable they think each situation was. In addition to questions about the vignettes, participants are also asked to answer questionnaires measuring e.g. personal attitudes toward morality (Moral Foundations Questionnaire MFQ; Graham et al., 2011) and toward technology/science fiction (Science Fiction Hobbyism Scale; Laakasuo et al., 2018).

Several factors are manipulated in the vignettes, incl.:

- whether voice transformations are used to repair (e.g. therapeutically) or enhance user capacities
- whether voice transformations are applied covertly (e.g. without the speaker's knowing or without the listener knowing) or not
- The kind of transformation operated by the device : reducing anger, enhancing likeability, or reducing tension

In a pilot study, conducted on N=328 online participants, we found that interventions used to repair (i.e. moving individuals toward normative functioning) are judged more acceptable than interventions used to enhance performance beyond the normative level, and found that interventions that reduced negative factors in voice (such as anger or anxiety) are judged more acceptable that interventions which increase positive factors (such as making voice more smiling). Interestingly, in contrast with studies of other types of moral dilemma (Medaglia et al. 2019; Bonnefon et al. 2016), we also found that participants' judgements of morality did not depend on whether it is their voice, or someone else's voice, which is being manipulated, but that participants with high familiarity and liking for new technology and science-fiction judged voice manipulations more acceptable that participants who ranked low on that scale. (Figure 2)

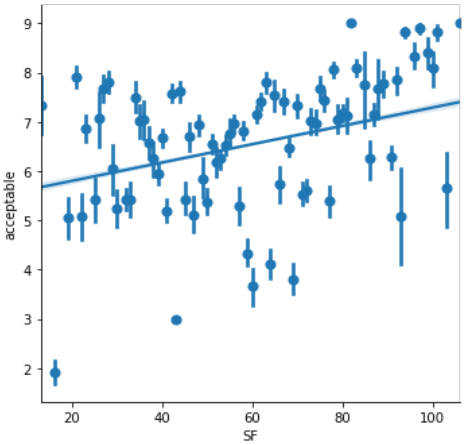


Figure 2: General moral acceptability of voice transformation is positively linked to the Science Fiction Hobbyism Scale's participants score

- 2) proposed research to be conducted in Japan,

My proposed research to be conducted during my stay in Japan is to adapt and replicate the above study on a corpus of Japanese participants, and thus conduct an intercultural study of how culture impacts moral judgements towards the use of voice transformations.

Every culture has rules about what is right or wrong, but they often disagree on the particulars of moral decisions. For example, most people refrain from acting in a purely self-interested manner in economic games, but different cultures have different expectations about what constitutes fair behavior in these games (Henrich et al., 2005). A recent online study of Awad et al, 2020 tried to approach the question of universals and variations in moral decisions investigating when people find it acceptable to sacrifice one life to save many, in 42 countries and 70,000 participants. They analyzed responses to three sacrificial dilemmas. In every country, the three dilemmas were ranked in the same way in terms of sacrifice acceptability, but the quantitative acceptability of each sacrifice, however, showed substantial country-level variations. In particular, the authors showed that one specific variable, relational mobility, was strongly associated with the rejection of sacrifices for the greater good, especially for Eastern countries. In societies with high relational mobility (such as France or the US), people have many options to find new social partners, which makes it easier to leave old friends behind and replace them with new friends (Tsuji, 2002). In contrast, in societies with low relational mobility (such as Japan – Yamagashi & Yamagashi, 1994), people develop lifelong relationships but have few options to develop new ones. This results in a greater social cautiousness, in order to avoid conflict in existing relationships. As a consequence, low relational mobility societies feature more acute pressure against holding unpopular opinions, a factor which may shape people's attitudes and make certain ideas "morally unthinkable" (Awad et al. 2020). In our experiment, we suspect that it might be the case e.g. of using voice transformations to enhance one's capacity and provide an unfair advantage to the user, or using transformations in a way that is unknown to the person being manipulated.

In addition, our own current research has shown that attitudes towards voice transformations depends on an individual's familiarity with science-fiction and new technology (Figure 2). It is well-known that attitudes towards e.g. robots differ in France and Japan (Haring et al. 2014) and it is possible that similar factors shape intercultural differences in moral attitudes to voice transformations.

Beyond its involvement, already noted, in voice transformation and vocal feedback (see section 4), the Watanabe Laboratory has extensive experience studying human attitudes towards AI (Haring et al. 2018), ethics (Knox & Watanabe, 2017), uncanny valley (Sasaki, Ihaya & Yamada, 2017), as well as cultural differences in these attitudes (Haring et al., 2014; Knox & Watanabe, 2018). Professor Watanabe also collaborates closely with the CREST (Japan Science and Technology Agency). However, it has never studied attitudes towards voice transformations, which lies at the intersection of all this previous work.

My proposed research plan during my stay in Japan includes
(1) presenting and discussing the results of my ongoing ethical studies on French participants with members of the host laboratory (one week)
(2) adapting the study's vignettes to the Japanese cultural context, and translating them in Japanese(two weeks)
(3) making an online version of the experiment, in a technical environment that is suitable to online research in Japan (eg. Qualtrix) (one week)
(4) recruiting an online sample of Japanese participants and collecting data (two weeks)
(5) analysing data and discussing preliminary results with members of the host laboratory (two weeks)

In addition, extra time during my stay will be devoted to presenting my research at other Tokyo laboratories, including those who are already using the vocal feedback paradigm (incl. Yotsumoto lab. and Okanoya lab. At University of Tokyo), and others suggested by my host. Presentations could also focus on the potential clinical application of the vocal feedback for PTSD patients (final work of my PhD). Given the catastrophes that have stricken Japan during the past few years, such an application could be particularly relevant.

Haring, K. S., Mougenot, C., Ono, F., & Watanabe, K. (2014). Cultural differences in perception and attitude towards robots. International Journal of Affective Engineering, 13(3), 149-157.

Henrich et al., "Economic man" in cross-cultural perspective: Behavioral experiments in 15 small-scale societies. Behav. Brain Sci. 28, 795–815 (2005).

Tsuji, R. (2002).Estimating Acquaintanceship Volume in Japan and US. Mathematical Sociology in Japan and in America, 2ndJoint Conference, Vancouver .

Yamagishi, T. & Yamagishi, M. (1994). Trust and commitment inthe United States and Japan.Motivation and Emotion, 18(2),129–166.

3) expected outcome of the proposed research.

The immediate outcome of the stay will be the collection of novel experimental data on the intercultural differences of moral attitudes towards voice transformation technologies. These results are expected to be published in at least one journal publication (ex. IEEE Transactions on Technology and Society), co-authored with members of the host laboratory.
More generally, it is expected that interactions with members of the Watanabe laboratory will generate novel experimental and theoretical ideas for the remainder of my PhD project, and lead to additional collaborations after my visit, incl. inviting Prof. Watanabe as a member of my PhD committee in 2022 and the preparation of joint grant applications between Waseda University and my University (ex. ANR/JST joint col). Among the potential future

collaborations, we plan to conceive an experiment on voice and psychophysiology that could be implemented in both our countries. It is a replication of Galvez-Pol preprint applicated to voice which would aim at assessing if voice carries information about our internal functioning (here the heartbeat) as it seems that "others' physiological dynamics, which have been thought of as hidden, can be inferred through visual perception of their faces".

Beyond my own Phd Project, the expected societal impact of studying ethical/moral attitudes towards voice transformations is manyfold. Technological progress is widely recognized as having considerable impact on human societies. Voice transformation in particular, as illustrated e.g. by recent concerns about deep-fake technologies, has important existential and ethical implications. It seems very important to us to do this kind of study in France and Japan before such voice transformation devices generalize. Conducting massive online studies of what potential users of these technologies consider morally acceptable is a new co-design posture, in which the public interest is integrated into the process of developing such devices (Michael et al.,2020).It is our hope that the results of this study will help us think and write collaborative ethical guidelines for the use of such technologies suitable to our two countries. The purpose being to make aware of, and talk about, the importance of thinking about the ethics of technologies we develop far upstream in the process than we (engineers and researchers) mostly do nowadays.

Galvez-Pol, A., Salome, A., Li, C., & Kilner, J. (2020, September 23). Direct perception of other people's heart rate. https://doi.org/10.31234/osf.io/7f9pq

K. Michael, R. Abbas, G. Roussos, E. Scornavacca and S. Fosso-Wamba, "Dealing With Technological Trajectories: Where We Have Come From and Where We Are Going," in IEEE Transactions on Technology and Society, vol. 1, no. 1, pp. 2-7, March 2020, doi: 10.1109/TTS.2020.2976425.

- In describing your proposed research in Japan, please specify necessary equipment, reagents, etc. for conducting the said research. :

The proposed study will be conducted online, using tools that are already available in the host laboratory. The Watanabe laboratory already has extensive experience running such online experiments (Sasaki & Yamada, 2019). Costs incurred for recruiting participants (expected 10,000 JPY per 100 participants) will be covered by the host laboratory. The applicant will work from her own laptop computer.

Note that the online nature of the study makes the proposed research especially feasible in the current pandemic context, which makes the physical availability of experimental participants in the lab difficult to predict.

Sasaki, K., & Yamada, Y.(2019)Crowdsourcing visual perception experiments: A case of contrast thresholdPeerJ, 7:e8339

8. Name of the Proposed Host Researcher and Host Institute:

Please give the name of the host researcher you have contacted and obtained the consent in advance.

Title and Name	University/Institute	E-mail
Pr Katsumi WATANABE	Waseda University	katz@waseda.jp

Notes: If you have already obtained your proposed host researcher's consent, attach a letter of acceptance/invitation from him/her, stating that he/she accepts you at his/her Institute.

9. Language Ability (Evaluate your ability using 'excellent', 'good' ,'fair' or 'none'.)

Language	Writing	Reading	Speaking/Listening
English	fair	good	good
Japanese	none	none	none
( )			

10. Past stay(s) in Japan: None

Place	Duration	Purpose

11. Address

	University / Institute	Home
Address	IRCAM 1 Place Igor Stravinsky, 75004 Paris FRANCE	104 BIS Boulevard de la Liberté 59800 LILLE FRANCE
Phone	+33619025808	+33619025808
E-mail	nadia.guerouaou@chru-lille.fr	nadia.guerouaou@chru-lille.fr

Correspondence address Please pick one : ☒University/Institute ☐Home

12. Person to be notified in your home country in case of emergency: (Be sure to fill out the information requested as it may be needed in the case of an emergency.)

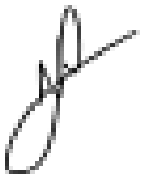
Name in full	GUEROUAOU DJELLOUL
Address	14 rue du marly 59151 HAMEL
Phone	0649773669
E-mail	dguerouaou@gmail.com

Relationship to you	Father

I certify the above information to be accurate and correct.

Date: 6 novembre 2020

Signature:



Full Name (Print) GUEROUAOU NADIA

JJ Aucouturier
STMS CNRS UMR9912
IRCAM, 1 Place Stravinsky
Paris (France)
E-mail: aucouturier@gmail.com

Paris, 6 November 2020

Dear colleagues,

I'm writing this letter in support of Ms Nadia GUEROUAOU, who is applying for the JSPS SUMMER PROGRAM 2021, to be held in the laboratory of Professor WATANABE Katsumi, Waseda University, Tokyo. I am currently a senior CNRS researcher (*directeur de recherche*) in Cognitive Science at the Science and Technology of Music and Sound laboratory (STMS), CNRS/IRCAM/Sorbonne Université, Paris, France. I have known Ms GUEROUAOU for about two years, first as a collaborator for a research project on post-traumatic stress disorder (PTSD) patients and, since Jan. 2020, as a PhD student co-supervised with my colleague Prof. Guillaume Vaiva, University of Lille, France. Even over this relatively short period, I have been extremely impressed by Ms. GUEROUAOU's potential as an early-career scientist.

The PhD work of Nadia GUEROUAOU lies at the crossroads of cognitive science, psychiatry and ethics, and is concerned with the application of a recent emotional manipulation paradigm (vocal feedback) to improve therapy for PTSD patients. During the first year of her PhD, Ms. GUEROUAOU has started a very ambitious research program documenting the acoustic features of anxiety in PTSD patients' voices, and how these features vary with the improvements of symptoms and physiological parameters such as heart rate variability. During this period, I have been impressed by Ms GUEROUAOU's ability to combine both a sharp eye for experimental research (owing to her 10+ years of experience as a clinical psychologist in contact with PTSD patients at the Lille University Hospital) and very solid intuitions about the underlying theoretical questions (owing to her formal training in basic neuroscience). Her first research results are very promising, and open the way for exciting new therapeutic solutions for PTSD patients based on voice transformation technologies.

The research project proposed by Nadia GUEROUAOU for her JSPS Summer Program at Prof. WATANABE's laboratory in Tokyo is both timely and excellent. Ms GUEROUAOU's current research is concerned with the ethical implications of modifying a patient's voice, and of voice transformation technologies in general, a topic of particular importance in an ear of growing concerns about AI and deep-fakes. She is currently conducting a series of online experiments, on French participants, which reveal very interesting trends in how users judge voice transformations, and she proposes to replicate these experiments on a Japanese sample of participants while in Tokyo. This proposal is both highly feasible during the duration of her stay, and has potential to reveal very interesting intercultural differences in how Western and Asian populations react to new technologies. I'm certain that this research stay will have a great positive impact, not only on Ms GUEROUAOU's already excellent

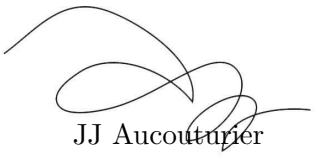
research career, but also on the collaboration of our two laboratories, creating the opportunity for joint publications between our research groups and fostering a wealth of future collaborations spanning voice technologies, ethics and clinical applications.

Having myself been the recipient of a JSPS Postdoctoral Fellowship for Foreign Researchers after my PhD (2006-2008), I am well positionned to measure the tremendous impact that a research stay in Japan can bring to an early scientific career. In my case, this translated, first, in being offered a position as a researcher at the RIKEN Brain Science Institute (2008-2009) and, then, transitioning to my first permanent academic position as an Assistant Professor in Temple University, Japan Campus (2010-2011). Ever since I returned to France in 2011, I have kept a solid and continuous stream of collaborations with Japanese researchers, including impactful research published with Prof. WATANABE (PNAS 2016, Behav. Research Methods, 2018). It therefore a honor and great pleasure to think of these solid ties with Japan being further amplified and renewed by the proposal of Ms. GUEROUAOU.

I must finally add that Ms GUEROUAOU is a keen kendo (剣道) practionner, and has a strong interest in Japanese culture, so I'm confident that the JSPS Summer Program will be the occasion of both fruitful scientific and human exchanges.

In summary, I can only give my greatest support to the application of Nadia GUEROUAOU for a JSPS Summer Program 2021 in Professor WATANABE's laboratory in Tokyo. Nadia is one of the most promising PhD students I have been priviledged to supervise, her project is timely, scientifically and clinically excellent, and true to the societal objectives of the JSPS exchange to foster human and academic exchange between our countries, all at the highest possible level.

Respectfully,



JJ Aucouturier

From: Katsumi Watanabe

Waseda University, Tokyo, Japan

November 6th, 2020

JSPS Summer Program - Ms. NADIA GUEROUAOU

To whom it may concern,

It is my pleasure to invite Ms. Nadia Guerouaou to visit my laboratory at Waseda University, Tokyo, for the period of the JSPS Summer Program (June 16th - August 28th, 2021).

Ms. Guerouaou, Dr JJ Aucouturier (her current PhD supervisor), and I have been in contact for discussing possible projects during her stay. The research topic is based on a clinical application of emotional vocal feedback to PTSD patients. This topic has a long history of collaboration between our two research groups. The development of the original vocal feedback paradigm was made in my laboratory, in collaboration with Dr Petter Johansson (Lund University) and Dr Aucouturier. The paper was published in PNAS in 2006. The voice transformation tool DAVID used in this project was also validated on both French and Japanese voices, and also co-published with Dr Aucouturier (Rachman et al. 2017). It is therefore of great interest of us to continue this history of collaboration with an exciting new development towards the field of applied ethics.

The project during her stay in my laboratory will involve examining cultural differences in moral attitudes towards voice transformations, such as the ones used in vocal feedback. This topic is important, because recent research in vocal feedback has shown that the emotional effect is bigger if participants/patients do not know that their voice is being manipulated (Goupil et al. 2020). Studying the ethics of such emotional manipulation and cultural differences have been the major research topics in my laboratory, as seen in the research on human attitudes towards robots (Haring et al. 2018) and intercultural differences between Western and Asian cultures (Haring et al. 2014). We also have experience running online experiments on Japanese participants (Sasaki & Yamada, 2019); so, the project is highly feasible. She will have access to a research workplace and resource in my laboratory. I expect that the experimental data collected in this project will lead to journal publications co-authored by our two groups. Follow-up experiments stemming from the project and designed during her stay will also lead to a continuing research after she is back to France.

As the research plan has been well developed and this collaboration is of interest of both laboratories in France and Japan, I strongly support her application for the JSPS Summer Program.

Your sincerely,

Katsumi Watanabe

Prof. Katsumi Watanabe

Waseda University

Email: katz@waseda.jp

http://www.fennel.sci.waseda.ac.jp