



HEAR-ECO E-newsletter

February-June 2020

Introduction

Welcome to the 6th HEAR-ECO newsletter! This newsletter focuses on HEAR-ECO's recent experimental studies, known as the "combination" studies. They are so named as the studies were designed and executed in pairs, drawing from combined expertise of the ESRs. Data collection was completed in autumn / winter of 2019/20 at Eriksholm Research Centre (Denmark). During the period covered by this newsletter, all HEAR-ECO students have been pre-processing and analysing their data (see further details provided below for each pair).

Also during February - June 2020, the COVID-19 global pandemic spread throughout Europe and many other parts of the world. From the middle of March onwards, virus-related restrictions were implemented in Denmark. As such, the ESRs traded the beautiful castle and surroundings of Eriksholm for their own "home offices"! Fortunately, the ESRs were able to make use of technology such as Skype and Microsoft Teams to continue meeting with supervisors and colleagues.

Study on social stress and listening effort using pupillometry and cardiovascular measures

This study (combination study 1) was jointly conducted by Hidde Pielage and Bethany Plain and supervised by Adriana Zekveld, Sophia Kramer, Michael Richter, Gaby Saunders, Tanveer Bhuiyan, and Thomas Lunner. It involved measuring both the pupil and cardiovascular response during listening. Beth and Hidde tested hearing impaired participants when they were listening alone, compared to when they were observed by two peers. The aim was to show how the presence of other people affected their listening effort. As of February 2020 the pre-processing of this data set has started!

Beth: "Hidde and I are now busy analyzing the data we collected. We are looking forward to publishing our results!"



Bethany Plain and Hidde Pielage working in the lab in Eriksholm Research Center

Celebrating the new lab “Pitch”

The arrival of the HEAR-ECO students put even more pressure on the lab spaces at Eriksholm than was already experienced at the growing research centre. Hence, Eriksholm decided to expand their lab space by adding a new lab to their offices.

The arrival of the lab was a sight to behold. A crane lifted the pre-fabricated building all the way over the castle before putting it down in place. After a few weeks of hard work, the lab was ready for testing and would soon be used for the first combination study of the HEAR-ECO students.



Hidde Pielage in the opening ceremony

Every lab deserves a grand opening, so did this one. Eriksholm celebrated the addition of the new lab, named ‘Pitch’, by inviting all employees to join a short ceremony and enjoy a glass of champagne. Meanwhile, Beth and Hidde had prepared a short demo about the first study that would be conducted in the lab.

Pitch is a sound-proof lab that is larger than its sibling ‘Loudness’. The extra space comes very handy when more people need to be present in the same room, as was the case for the “combination study 1”. Pitch is ready to be used for more testing by HEAR-ECO and beyond.



Lorenz Fiedler and Bethany Plain in the 'Pitch'.

Study using pupillometry on how fatigue, motivation, signal-to-noise ratio, and memory load, influence listening effort

Patrycja Książek and Defne Alfandari combined forces in this study (combination study 2). After days of brainstorming together, they worked on designing, planning, and conducting experimental study. The study aimed to broaden scientific knowledge on the factors that influence listening effort as reflected in the pupil responses.



Defne Alfandari listening to speech in the lab while her pupil size is recorded.

Supported by the supervisory team (Dorothea Wendt, Graham Naylor, Adriana Zekveld, Sophia Kramer, Lorenz Fiedler, Michael Richter) Patrycja and Defne designed a study exploring how both internal (i.e. fatigue, motivation, and memory) and external (i.e signal-to-noise ratio) factors affect listening effort.

Participants of this study (34 normal hearing listeners) were invited to visit the Eriksholm Research Centre twice in the period of autumn 2019 – winter 2020 to perform a set of listening tasks. From the feedback of the participants, Patrycja and Defne have learned that the study was demanding. This highlights that the study captured the daily difficulties experienced by those with hearing impairment. As hearing-impaired listeners are the target group of the HEAR-ECO project, this validity of the study design.

As of May 2020, Patrycja and Defne have completed the pre-processing of their data. All researchers look forward to seeing the results, being able to answer some of the important research questions and setting the further research directions. To learn more about the results, stay posted with our channels on Social Media and publications.

Study with EEG on how reverberation and signal-to-noise- ratio affect listening effort

Sergio Aguirre and Tirdad Seifi Ala worked together during autumn-winter 2019-2020 (combination study 3) in creating realistic listening environments to measure listening effort in these environments using EEG. Supported by their supervisory team (William Whitmer, Carina Graversen, Lauren Hadley, Thomas Lunner, Lars Bramsløw), they designed a study that explored the interactive effects of reverberation and signal-to-noise-ratio on listening effort. The study was performed in the anechoic chamber at Eriksholm. 18 normal hearing adults participated. Preliminary results and feedback from the participants indicate that Sergio and Tirdad were successful in recreating a realistic acoustic experience in the anechoic chamber. Sergio and Tirdad have produced a video explaining their study! The video is published on the webpage on HEAR-ECO (<http://hear-eco.eu/combination-study-3/>).

Introducing Sergio



Sergio Aguirre
 Research fellow (ESR)

“At the beginning of the project I was based at the Hearing Sciences department of the University of Nottingham - Scottish Section, in Glasgow. Here we implemented a virtualization system and evaluated the acoustic influence of the presence of a second person in the virtualized sound field. This study gave us a basis from which to evaluate our future implementations. After this learning period, I moved to Denmark to continue my work at Eriksholm Research Centre. Here we developed the implementation of an audiologic test using a virtualization system of sound sources to reproduce realistic scenarios. My current challenge is to develop new hybrid forms of simulation that allow for realistic acoustic presentations with limited facilities. This will be used to test the latest hearing technology while maintaining ecological validity.

The Hear-Eco project is incredible, the people involved and the support for innovative ideas are extremely stimulating key elements. I am excited about the prospective future for audiological testing and the possibilities for developing new hearing aid technologies.”

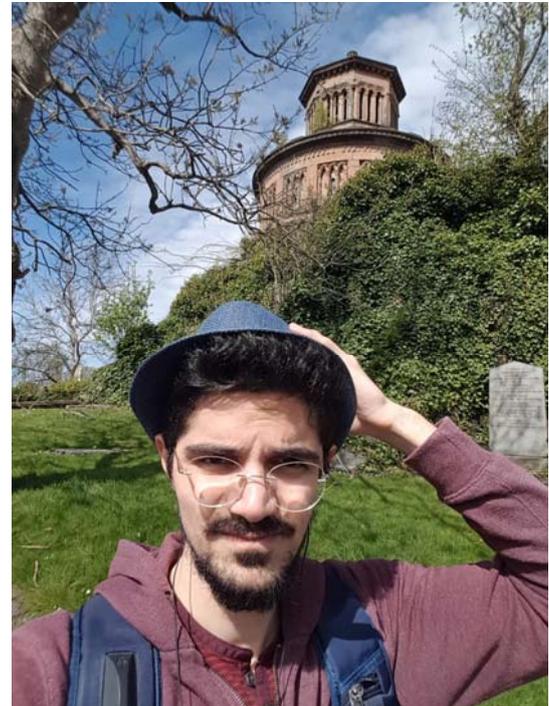
Tirdad moves from Eriksholm to the University of Nottingham

In March 2020 Tirdad said goodbye to Eriksholm and moved to Glasgow, UK to start his second part of PhD in University of Nottingham.

Tirdad: "My departure was delayed due to visa issues, but thankfully I could get into the UK before the lockdown! It was a hard time to move because of the whole COVID19 pandemic. But I made it!"

Glasgow is a very beautiful city, with lots of fascinating buildings. People are very friendly, but because of the lockdown there haven't been many chances for me to go and explore the city. Hopefully once everything is safe again, I will get more chances.

Also, people in the UoN are very nice and it seems a warm place. I'm happy to be here and finish my PhD."



Upcoming in the HEAR-ECO calendar:

Federation of European Neuroscience Societies (FENS) Virtual Forum

Dates: 11-15 July 2020

Location: Online

Information: Tirdad Seifi Ala is participating with a poster presentation. The title of the poster is "EEG evidence for the interaction between demand and motivation on listening effort"

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