



NEWSLETTER # 2

The GAP_NOISE project has recently reached a significant milestone with its mid-term meeting held at UPC on July 4-5. This event brought together all project members, representatives from institutions involved, and project adviser Riccardo Ricci from the European Commission. Over the course of the meeting, participants reported on project progress and deliverables, with each doctoral candidate presenting their research topics, current studies, and future plans. It was an inspiring occasion to witness the advancements achieved in each specific area, as well as the deep technical discussions among researchers. The meeting proved to be a major success, underscoring the dedication and collaborative spirit of all participants, and marking a crucial step forward for the GAP_NOISE group.



Conferences

On the 28th and 29th of March 2023, the Consortium met in UPC. In addition to the mid-term meeting, project members actively engaged in international conferences to present their work to the wider scientific community. One of the key events was ISNVH, organized by partner company Virtual Vehicle in Graz from June 19-21, 2024. Three of our candidates, Ludovica, Javier, and Giovanni, attended and introduced the project to the audience of experts and industry professionals. Similarly, at



the ISMA conference, hosted by KU Leuven from September 9-11, 2024, our candidates Sara, Giovanni, Rodrigo, Javier and Luyao

participated, further enriching the exchange of knowledge within the community. Moreover, meetings with Associate partners Barcelona City Council, Sabadell City Council, and Universitat Autònoma de Barcelona took place to involve them from the beginning. Francisco Ulloa from IDIADA represented the project at the CENEX-EXPO, held on September 4-5, 2024, at Millbrook, UK. His talk, titled "Inverter Vector Control for Traction Units: Experimental & Simulation Approach," provided insights into his research while engaging with industry stakeholders interested in innovative solutions for traction systems.



Trainings

The project also emphasized continuous learning through specialized training sessions. All candidates had the opportunity to attend crash courses provided by KU Leuven, choosing topics most relevant to their research. Some delved into Advanced Techniques in Applied and Numerical Acoustics, gaining insights into cutting-edge developments in applied acoustics. Others explored Modal Analysis Theory and Practice, deepening their understanding of structural dynamics. Another group focused on applied mechatronic simulation, learning about system-level modeling techniques for mechatronic and dynamical systems. These



training opportunities have proven invaluable in equipping researchers with advanced knowledge and skills essential for their ongoing and future studies. In the meantime, two Doctoral Candidates, Ludovica Luciano and Zhenxian Li, participated in their first secondment, both at SIEMENS facilities.

Secondment Time in Leuven

As part of their PhDs, several of our Doctoral Candidates (DCs) have undertaken their secondments in Leuven in recent months, fostering collaboration and knowledge exchange across institutions. Javier and Luyao (DC3 and DC4 at KU Leuven, respectively) hosted Giovanni, Rodrigo, and Sara (DCs 7, 8, and 10) for their secondments at KU Leuven, while Ludovica (DC2) completed her second secondment at Siemens.



As part of their academic progress, Luyao, Giovanni, Rodrigo, and Sara successfully defended their first progress presentations at KU Leuven. This milestone allowed them to demonstrate the significance and potential of their research while outlining their future plans. Additionally, as per KU Leuven's PhD requirements, they contributed to teaching activities by conducting exercise sessions for students. From a research perspective, Sara carried out successful measurements on metamaterial specimens, making significant progress in her work.



Ludovica developed a multi-physics simulation framework for Permanent Magnet Synchronous Motor (PMSM) modeling using Siemens software packages. During her secondment at Siemens, she worked with experimental data collected at UPC to calibrate models with increasing levels of detail, aiming to capture the motor's key characteristics and compute electromagnetic radial forces at different frequencies. This work provided insights into force distribution across the stator and enabled comparison with the simplified model she is developing as part of her PhD

Throughout these secondments in Leuven, the DCs actively collaborated, exchanging insights and engaging in technical discussions, further strengthening the consortium's research network.

On a more social note, the DCs organized a series of cultural dinners, where each participant prepared dishes from their home countries. Given the international diversity of the GAP Noise consortium, this initiative was a great way to celebrate different backgrounds and bring everyone closer together.



Short visits

Several short but impactful research visits took place:

- Ludovica and Mahmoud hosted a Siemens team at UPC for a measurement campaign on the electric motor setup under various operating conditions, including run-ups and steady-state operations at varying speeds and loads, and the application of modulation techniques at different frequencies. Additionally, microphones were used to record the noise emitted under these conditions, while modal testing was performed to identify structural modes. These data will support future validations, linking the work of the DCs with the tools used during the secondments in Siemens.



- Joshua (DC 9) traveled to INSA Lyon to install the Simcenter Testlab NVH Simulator system for Zhenxian (DC 6), who is conducting psychoacoustic research through subjective evaluations. The research focuses on passengers' perception of differences between electric vehicles (EVs) and internal combustion engine (ICE) vehicles, analyzing factors such as perceived speed and other psychoacoustic metrics. This collaboration effectively bridges acoustics and psychoacoustics, contributing to the understanding of the relationship between sound synthesis and human perception.

Outreach Activities

GAP Noise has been actively engaging in outreach and knowledge-sharing activities:

- Javier (DC3) organized and presented the first webinar of our consortium on useful tools for researchers. This webinar is now available on our new YouTube channel!
- Joshua (DC9) participated in the ABAV Research Day, a full-day symposium showcasing ongoing research projects in Belgium's acoustics domain.

These recent months have been a period of growth, collaboration, and achievement for the GAP Noise consortium. Stay tuned for more updates on our progress and upcoming events!

Second Workshop at ViF

The entire consortium gathered during the 6th week of the year for the second Workshop at Virtual Vehicle in Graz. This event brought together experts from various fields to bridge the knowledge gap in electric vehicle (EV) acoustics and human psychoacoustics. The DCs had the opportunity to present new insights gained from their research progress.



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