

Name of the MSC Fellow: Giuseppe Habib

Nationality: Italian

Host organization: Budapest University of Technology and Economics

Country of the Host: Hungary

Project Acronym: PIEZOMACH

Project start and end date: 1/10/2016 – 30/9/2018

Type of MSC action, H2020: IF



Your story:

Project objectives and research field:

My project deals with mechanical vibration mitigation. In particular, the objective of the project was to design a passive device able to suppress vibration generated by milling machines. The idea was to exploit piezoelectric material to transform mechanical energy of the machine into electrical energy and dissipate it using resistors. This would allow faster and more precise machining operation.

Tell us why your topic is important and/ or how it brings to advancement in your research field:

During milling or turning machining operation, severe vibrations can abruptly appear, causing serious and costly damages to machines; this is an important issue in production engineering. The main innovative aspect of my work is the exploitation of non-linearity in a smart and controlled way, enabling us to enhance performance of vibration absorption devices and avoid unpredicted vibration. Besides this specific application, the introduction of controlled nonlinearity into a system allows us to have a greater control over the system dynamical behaviour. During the development of my project, I tried to pave the way for the application of the same principle to other engineering fields, with special attention to mechanical systems.

What are the benefits of participating in a MSC action?

Participating in a MSC action gave a significant progress to my career as a researcher. It allowed me to perform research in an excellent university, relying on my own funding, which also enabled me to establish a spread and solid research network, thanks to the financial availability provided by the fellowship for conferences and travels. I also improved my self-sufficiency research skills, since, for the first time in my career, I was the main responsible for my research work. The industrial implementation of the solutions I proposed could cause a significant drop on production cost for certain machined components, having effect on society. However, the passage from an academic study to an industrial product is definitely not trivial. Furthermore, my results could boost the application of similar theoretical solutions to different problems sharing analogous mathematical models, such as traffic jam control, human balance, haptics interfaces.

Did you encounter any challenges during application/ implementation and did you get any help?

For participating in a MSC action I faced several challenges, which required a lot of personal work and help from some colleagues. The preparation of the proposal itself was very challenging. It is a very competitive grant; therefore, proposals must be excellent from any point of view. My current and previous supervisors significantly improved the proposal, helping me in strengthening and clarifying its main idea. Some colleagues read the proposal and corrected minor aspects. During the action itself, colleagues at the host university enabled me to establish connections with industrial partners (including a very fruitful secondment in a production and research center in Spain), which allowed me to redirect the project towards more realistic objectives, rather than limiting it to an academic view point.

Why did you choose a widening country as a Host? What was the reason that convinced you? What is making you professionally happy here?

Honestly, from a scientific point of view, I do not really see Hungary as a widening country. Considering the department where I work, I would rather say it is a very well developed scientific environment. This is proven by relevant scientific contributions and by high quality of teaching. I had the opportunity to enjoy working in this department already during my PhD, which was a joint project between the Sapienza - University of Rome (Italy) and the Budapest University of Technology and Economics. This, together with the fact that Budapest is a very livable and entertaining city, convinced me to move here, despite some unavoidable homesickness.

Would you recommend others to apply? What useful advice/ tips can you give them?

I definitely recommend researchers to apply. Candidates should take seriously the preparation of the proposal. This requires a very good idea, a good academic record of the applicant and of the supervisor. Proposal preparation requires time (at least one-month full time work). Keep in mind that reviewers are scientists not expert in the field. You have to “sell” them your idea, making it clear, showing that you have a clear plan, you know the risks, but you also know why it will be successful. Try to show that your competences and those of the supervisor are complementary for the project.