

# THE VOICES OF MANUFACTURING

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### ABOUT HER

She serves as the Project Manager for the PeneloPe project, where her primary responsibilities encompass project management, decision-making, and active involvement in technical development.

### ABOUT PENELOPE

*Can you share an example of a significant milestone or achievement you and your team have reached during the project and what impact it had on the overall manufacturing process?*

First of all, I would say that the big achievement was coming up with solutions to improve production and then creating a real concept. As much of our work is a dynamic process, I cannot point to any specific milestones. However, I would say the achievements so far have been to create a software that recognizes the position and orientation of flanges in space from scanned images taken by a laser scanner. The next step is to use this information to assemble fitting pipes.

*Could you tell us about any innovative manufacturing techniques or technologies that have been implemented in the project and how they have improved the manufacturing process?*

By implementing our measuring demonstrator, the measuring of the flanges on ships needed for the fitting pipe manufacturing will be easier and faster. Furthermore, with our automated fitting pipe assembly cell, we are proposing the use of a robot and a cobot in the fitting pipe manufacturing process. Fitting pipe assembly is currently done mostly by hand, so our proposed concept will improve the manufacturing process through automation by making it more accurate, saving time and material, and helping workers.

*What do you enjoy most about working in the manufacturing industry, particularly on projects like this one?*

I work in research and development, which is of course closely linked to the manufacturing industry. While working in the manufacturing industry I can quickly see the changes that automation is bringing. In general, I like working in research because we are always developing new ideas and looking for new ways to make different processes easier and better. I see great importance in the projects like PeneloPe because they take us one step closer to the future. They are focused on improving our manufacturing industry by working closely with manufacturing companies, allowing for flexibility and constant discussion between developers and end users.



*What barriers need to be overcome to fully implement PeneloPe's methodology?*

For implementation in the industrial companies that are partners in the project, it is important to provide training for the operators, which is taken into account via a didactic factory and a showroom as part of the project. For a wider implementation of the technologies developed in this project, it is necessary to extend the knowledge about them in a global circle. It is important to inform the people about benefits which our technologies bring and how they are made to help the industry.

### INDUSTRY 4.0

*Which is for you the critical element in the implementation of a digital/4.0 factory?*

Integrating advanced technologies and training operators are key to implementing Industry 4.0 in the manufacturing companies.

“ PeneloPe is an important project because it influences economic growth and adoption of advanced technologies, crucial for the future of our manufacturing industry. ”



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*What are the new skill sets that you are seeing being required in Industry 4.0? How does your company deal with the training of these new skills?*

With Industry 4.0 comes the need to learn how to operate the new technologies that are being implemented. Industry 4.0 requires a foundation in engineering, so skills such as programming, digital communication, AI, data analysis and cybersecurity are needed. My company provides the necessary training for its employees to empower them in meeting the evolving demands of the industry.

*How do you see the role of workers in manufacturing in this Industry 4.0? Is training and role reorientation key?*

Yes, I think it is necessary for workers to be retrained for a different role, because machines cannot work without operators.

*What will happen to jobs within manufacturing as Industry 4.0 gets rolling - will more new jobs be invented than those that are replaced by machines?*

There is a significant workforce shortage in Western countries, which is driving the rapid development of Industry 4.0. However, existing workers won't be displaced, but rather retrained, as mentioned above. Even with the integration of advanced machinery, these systems will still need constant supervision and won't be able to operate autonomously. New technologies will also help workers to focus on their main job, as machines take over all the secondary tasks. In a sense, Industry 4.0 helps to make better use of skilled labor. At the moment, most research is focused on creating collaborative work between humans and machines in industries where this is possible, so I believe there will always be work for people, we just need to be ready to adapt and learn.

*Is Artificial Intelligence the key to enable Industry 5.0? Which role does AI play today and above all, in the manufacturing of the future?*

I think it is. We want our machines to be "smarter" if we are going to work together. AI is working on bringing the robots closer to us, so that they can understand us a little better and try to anticipate some actions. Additionally, ensuring safety is of great importance, we want to work in a safe environment, so increasing the intelligence of our partners is essential. Ongoing research is focused on achieving exactly these goals, building an Industry 5.0. AI is also there to take over repetitive tasks, analyze large amounts of data for insights, optimize processes, enable predictive maintenance in manufacturing, and support decision-making by providing data-driven recommendations

*What are the current challenges/issues that you have related to Industry 4.0, augmented/virtual reality, artificial intelligence, and data management?*

Current challenges tied to the implementation of Industry 4.0 principles revolve around the process of embracing new technologies in Small and Medium-sized Enterprises (SMEs), due to an ageing workforce caused by labor shortages.

*What is the value-added your company provides and how does PeneloPe contribute to it?*

Applied research is the foundation of our organization. We partner with companies to transform original ideas into innovations that benefit society and strengthen both the German and the European economies. In fact, Fraunhofer is the international leader in applied research. As driver of innovation, we lead strategic initiatives to master future challenges and thus achieve technological breakthroughs. The PeneloPe project, therefore, fits perfectly with our company's mission.

*What 'Smart Factory', 'Digital Factory' or 'Industry 4.0' initiatives are already underway in your organization?*

As an institute for large structures in production engineering, we are always looking for ways to integrate the latest technologies and create smart factories. The research focus at Fraunhofer IGP is on future-oriented industries such as shipbuilding and steel construction, energy and environmental technology, rail and commercial vehicle manufacturing as well as mechanical and plant engineering. Fraunhofer IGP is a part of many "smart" initiatives, for example Shipyard 4.0, Smart Farming, Digital Ocean Lab and Floating Offshore Wind Solutions.

## GENDER

*What advice would you give to other women who are aspiring to pursue a career in the manufacturing field or work on manufacturing projects?*

Keep pushing yourself and step out of your comfort zone, you could make a big difference. Don't be discouraged by existing stereotypes, break them. Have confidence and trust your instincts. Celebrate your achievements and those of your team. Always be true to yourself.

*How do you see the future of manufacturing evolving, and what role do you think projects like the one you're involved in play in shaping that future.*

I see smart factories becoming ubiquitous. I see many new technologies being developed and made available to everyone. In the process of creating new technologies, I see a collaborative work of people from different fields and different knowledge, bringing it all together to create the future. I think it is projects like this that allow me to see such a future.