

Voices Shaping the Future of Laser Manufacturing – Kim Glumann

University of Stuttgart - IFSW is one of Europe's leading research centers in laser materials processing and industrial photonics. The institute is internationally recognized for its pioneering work in high-power laser systems, beam shaping, ultrafast laser processing, additive manufacturing, laser welding and digital manufacturing technologies. IFSW combines fundamental photonics research with strong industrial collaboration, working closely with major players in automotive, aerospace, manufacturing and laser technology sectors. Within Lasers4MaaS, University of Stuttgart – IFSW contributes its expertise in advanced laser materials processing, beam shaping and digital manufacturing, supporting the development, optimization and industrial validation of flexible Laser-as-a-Service solutions for next-generation manufacturing applications.



Today, as part of the *Voices Shaping the Future of Laser Manufacturing* series, we interviewed Kim Glumann, Researcher at University of Stuttgart - IFSW. We will learn more about the work developed by Kim within Lasers4MaaS and her ideas to improve Gender Balance in advanced technology environments.

1. Could you briefly describe your role in Lasers4MaaS and your involvement in the project activities?

Kim: As a researcher at USTUTT, I am primarily responsible for developing the optimization algorithm. This involves close collaboration with the other research groups to ensure effective interaction between our services, as well as working with the platform developers to optimize user experience and integrate our code into a cloud-based platform. In addition, I collaborate with our industry partners, who provide valuable insights into daily operations and offer practical feedback on what is applicable in real-world scenarios versus what remains purely academic.

2. How would you describe gender balance in your organization, particularly in technical or leadership positions related to photonics and advanced manufacturing?

Kim: In line with many technical fields, gender balance in our organization is still not fully achieved. While I would say, there has been an increase in the number of women at early career stages, such as student assistants or those completing their theses, their representation tends to decrease in more advanced or long-term research and leadership positions.

3. Do you consider gender balance and diversity important for innovation in industrial photonics? Why?

Kim: I believe that every individual—regardless of gender—can contribute to innovation through their enthusiasm and interest. What truly drives innovation, however, is diversity in a broader sense. Different backgrounds, experiences, and perspectives lead to a wider range of approaches and valuable viewpoints.

Therefore, I consider diversity to be essential for innovation in industrial photonics. Reducing gender imbalance is an important part of this, but it should be seen as one aspect of a larger goal: fostering heterogeneous teams. Innovation benefits from bringing together people with varied perspectives, and gender diversity is one important dimension within this broader context.

4. Do you feel women and underrepresented groups have equal opportunities to contribute to technical decision-making, work package leadership, dissemination and visibility activities, industrial stakeholder engagement, and innovation discussions?

Kim: I believe that, in principle, the opportunities are there. However, I think that personal and psychological barriers can still play an important role. As a member of an underrepresented group, you tend to stand out. Often, this is not meant negatively—for example, during my studies I frequently heard comments like, “That’s great that you study this as a woman.” While such remarks are usually intended as encouraging, they can also highlight that what you are doing is still perceived as somewhat unusual.

When representation is low, individuals from underrepresented groups can become more visible by default. In such situations, actions—such as making a mistake—are less likely to be perceived as anonymous. For instance, in a predominantly male group, it is often harder to single out which male student made an error, whereas for a small number of female students, the same situation can feel more personally attributable. This can subtly influence how comfortable individuals feel participating.

Therefore, I would say that underrepresented groups generally have the same formal opportunities to contribute. At the same time, it may take more confidence or courage for individuals in these groups to actively voice their opinions. In many cases, this barrier is not intentionally created by others, but rather shaped by the overall environment and perception.

5. Have you observed barriers to participation or advancement in your sector?

Kim: No

6. Are there specific challenges in industrial deep-tech environments that affect gender balance?

Kim: Yes, I believe there are some structural and cultural challenges that can affect gender balance in industrial deep-tech environments. These fields are often traditionally male-dominated, which can influence both workplace culture and expectations. Additionally, career paths in deep-tech—often requiring long-term specialization, high commitment, and sometimes less predictable working conditions—may unintentionally discourage a more diverse workforce.

Another challenge is the limited visibility of role models, which can make it harder for underrepresented groups to identify with such career paths. While these factors are not necessarily intentional, they can still impact participation and retention over time.

7. What obstacles remain to achieving better gender balance in photonics and advanced manufacturing ecosystems?

Kim: One remaining obstacle is the limited representation of women and other underrepresented groups, especially in more senior technical and leadership positions. This can make it harder for younger researchers or students to identify with these career paths. In addition, unconscious biases, traditional expectations, and a lack of visibility can still influence who feels encouraged to enter and remain in these fields.

9. What additional actions should Lasers4MaaS implement?

Kim: Lasers4MaaS could expand its outreach and communication efforts, for example by engaging more actively with students through lectures, workshops, or public events. Increasing visibility of the project and demonstrating how its technologies are applied in real-world scenarios may help attract a broader and more diverse group of future researchers and engineers.

10. What practices should continue beyond the project?

Kim: Practices that encourage open collaboration and knowledge exchange between research and industry should definitely continue beyond the project. This includes regular communication, interdisciplinary cooperation, and involving different perspectives in discussions.

In addition, giving early-career researchers opportunities to contribute, present their work, and gain visibility is something that should be maintained. Outreach activities that raise awareness and interest in the field could also be continued to attract future talent.

11. What recommendations would you give for future EU projects in this area?

Kim: Future EU projects should promote diversity and inclusion in a way that feels meaningful and sustainable, rather than purely formal. Measures that are perceived as quotas can sometimes have unintended effects, such as making individuals feel they are included for representation rather than for their expertise.

In my view, it is equally important to address this issue at an earlier stage, for example in schools, by fostering interest and enthusiasm for technical fields such as photonics and the natural sciences. Providing visible role models and demonstrating the relevance and excitement of these fields can help attract a more diverse group of people in a more organic way.

At the same time, it is important that individuals feel confident in their role based on their skills and interests. Creating supportive environments and clear career perspectives can help ensure that people choose and remain in these fields because they genuinely identify with them, rather than questioning their place.