



## ADVANCED MATERIALS SCIENCE

Fields of Expertise TU Graz

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**Advanced Materials Science**

Source: Lunghammer – TU Graz

**M**achine learning and artificial intelligence is also changing research into materials, i.e. by the predictive modelling of structures and materials as well as finding a hidden structure-properties relationship in large sets of experimental data. Already today, researchers in the FoE AMS, among others Oliver Hofmann, are using AI in their research and we are sure that the importance of AI will increase in the future.

AI in Materials Science was already present in quite a few talks at the EUROMAT conference, the most important European congress in Materials Science, which was organized by ASMET and chaired by Christof Sommitsch this year. Scientists of all areas of Materials Research (metals, ceramics and polymers) presented and discussed their latest results. Nowadays, tailored functional and structural materials are developed for specific applications in modern society. Climate change

calls for rapid sustainable transformation in energy production, transport and storage, for circular economies as well as for new lightweight and smart materials to mitigate CO<sub>2</sub> emissions. Advanced, tailored and graded materials are developed by efficient processing. Here, additive manufacturing by manifold process variants opens possibilities of lightweight design, complex and hybrid structures, tailored local properties and functional integrations. Artificial approaches combined with deterministic physically based models pave the way to future materials design and process optimization. In the area of biomaterials, the latest results of bioceramics, bioglasses, bioinspired materials, metallic, polymeric and smart biomaterials are shown.

The 14th polymer meeting (PM14) focusing on all aspects of polymer science took place in late summer at TU Graz. Organized by the Institute for Chemistry and Technology of Materials this conference was the first on-site conference for many scientists for almost two years.

In the 15th call of initial seed funding of TU Graz, we are proud to finance eight interesting project ideas in chemistry, physics and mechanical engineering. The awardees are Anne-Marie Kelterer (Institute of Physical and Theoretical Chemistry), Stefan Topolovec (Institute of Materials Physics), Andreas Hauser, Florian

Lackner (both Institute of Experimental Physics), Katrin Unger, Oliver Hofmann (both Institute of Solid State Physics), Ricardo Henrique Buzolin (Institute of Materials Science, Joining and Forming), Rupert Kargl (Institute of Chemistry and Technology of Biobased Systems). We wish them good luck for the proposal submission and we look forward to your submissions to the next call.

In the second online edition of the FoE AMS update, we had two very interesting talks given by IMAT's Fulbright visiting professor, Herman F. Nied, (Lehigh University, USA) on both his university and his own research focus, viz. modelling of materials joining, fatigue and fracture mechanics, and by Martin Leitner on fatigue design considering local material properties.

Regarding future activities, please save the date of the Advanced Materials poster day on the 22nd April 2022, where the latest research of the FoE will be presented in a poster and discussion session.

Finally, on the next pages, the newly appointed FoE tenure-track assistant professor for chemical or physical properties of materials, Jurij Koruza, will elucidate his excellent research on functional ceramics and talk about his future plans at the Institute for Chemistry and Technology of Materials. ●