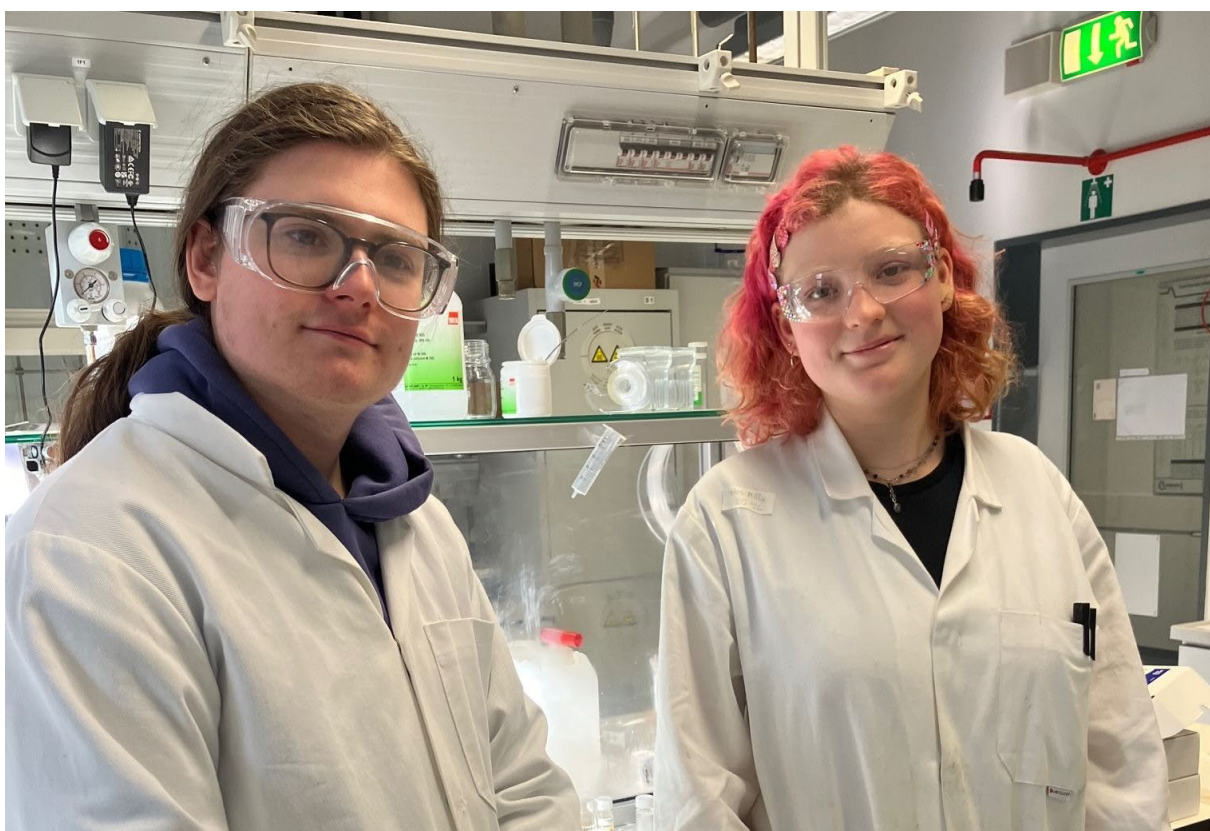


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A Lot of Hands-on Work and a Touch of Alchemy – Experiences at the FJN at the Leibniz Institute for Catalysis

Lab coats on, safety glasses put on, and then off to the workbench. After six months in the chemistry lab, the two high school graduates—Milla Steffens from Paderborn and Alvin Leske from Berlin— already have routine. At the Leibniz Institute for Catalysis in Rostock, they are currently completing their “Voluntary Social Year in Science, Technology, and Sustainability,” or FJN for short. Alvin is oxidizing and esterifying waxes for an industrial project. Milla is synthesizing catalysts for the selective production of precursors for new high-performance ceramics. And both are gaining insights that go far beyond the daily lab routine.



Milla Steffens and Alvin Leske are completing their FJN in the catalysis laboratory

The LIKAT’s FJN job description convinced Milla and Alvin above all because of the prospect of being fully integrated into a research group. “A student lab wouldn’t have appealed to me at all,” says Milla. Alvin was also looking for “a break from the stress of school.” Until August, the young people will keep practicing their lab skills and scientific thinking under expert guidance.

An Environmentally Friendly Process for Additives

Their projects do indeed deal with sustainability, as the voluntary year demands in its official name. Alvin Leske is helping to extract a plant-based natural product to be used as an additive for modern materials and substances. The experiments conducted as part of the industrial project aim to replace a process that uses an environmentally harmful substance.

The substance Alvin is experimenting with is produced by a species of palm tree to protect itself from drought and heat. “It consists entirely of carbon chains that can vary greatly in length,” Alvin explains. These chains must all be chemically standardized to a uniform length; otherwise, the raw material would be unsuitable for industrial use. And these experiments are precisely aimed at achieving that.

From Polymer to High-Performance Ceramic

Milla Steffens had already gained experience in the “Jugend forscht” competition and decided during her interview to pursue her own project. She is testing catalyst complexes, which she synthesises herself, for their suitability for a reaction known as “dehydrocoupling of amine boranes”. “Ultimately, the aim is to dehydrate amine boranes and link them into polymers,” says Milla, explaining the significance of her work, “but that’s still a long way off.” To be more precise, it is basic research.

These amine-borane polymers have not yet been extensively studied in materials science and can be used to synthesise novel high-performance ceramics. This research is being carried out at LIKAT under the supervision of Dr. Fabian Reiß, Milla’s supervisor in Prof. Torsten Beweries’s group. “I was surprised at how quickly Milla settled into the laboratory work. And how independently she works here.” When the samples from her reaction results come back from NMR analysis, Milla can now read the spectra and tell whether a reaction has worked or not.

The Climate Balance is Also in Good Hands.

LIKAT has been offering young people these opportunities in the laboratory for several years now, says Dr. Bernd Müller, head of the ‘Catalyst Design for Electrosynthesis’ group and supervisor to Alvin Leske. It always takes a bit of effort. But after just a few weeks, the young people give a lot back. This includes them questioning things we take for granted and giving the ‘professionals’ a completely different perspective on their own work.

What Dr. Müller values in Alvin is how seriously and reliably he throws himself into his tasks. And how versatile the young man is. At the start of the year, Alvin calculated LIKAT’s carbon footprint for 2025. Bernd Müller: “The Leibniz Association aims to be climate-neutral by 2035. To achieve this, we need to compile a vast amount of data covering the entire organisation, from procurement to waste disposal, convert it into CO₂ equivalents and document it.” In the process, Alvin even spotted calculation errors in previous figures.

What are Milla and Alvin Taking Away from this Experience?

Both high school graduates feel very comfortable in their teams. They are surprised by the extent of the routine work in the lab. Alvin explains, "We deal with all sorts of equipment here. Everything needs to be prepared and then put back in its place, clean and tidy."

Milla is amazed by how often an experiment must be repeated to reach a conclusion. "15 or 20 times the same thing with only minimal changes to the smallest parameter..." It can be quite frustrating. Their syntheses take place in vessels with a protective gas atmosphere, which requires special handling. This means that the air in the apparatus is replaced by a vacuum or by argon gas. Otherwise, the sensitive substances would immediately react with the oxygen in the air or humidity and become unusable.

Confidence in Career Choice

Both had heard before that researchers need a high tolerance for frustration. Milla says she has "come to terms with it". She is going to study chemistry. The thought that she might succeed here at the workbench in the lab in doing something that no one has ever attempted before fascinates her. As fragile as her substances are, they wouldn't even exist under normal conditions. "And I can make them happen under an inert gas!"

Alchemists searching for the philosopher's stone may well have felt this same fascination. And Alvin, too, thinks what Milla is experiencing is 'cool'. But he admits his patience is somewhat shorter. 'At the end of the day, I want to be able to see what I've been working on.' During his A-levels, he says he took great pleasure in immersing himself in planning tasks, for example in urban development. He was reminded of that here in the lab. And so his choice of degree course is clear: civil engineering.

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