Report (SPARC-GIANT 2025)
Arun Mambra

I spent three months at the University of Würzburg, Germany, as part of a SPARC-GIANT exchange program, during which I worked in the Nano-Optics group under the supervision of Prof. Bert Hecht. This research stay was a highly enriching experience for me, both academically and personally, and it closely complemented my doctoral research interests.

My primary research focus was on epsilon-near-zero (ENZ) nanostructures for optical antenna applications. During my stay, I was involved in the design, fabrication, and optical characterization of ENZ and plasmonic nano-antennas based on titanium nitride (TiN) and Ag–Au alloy systems. I gained valuable hands-on experience in cleanroom fabrication and was trained in focused ion beam (FIB) lithography, which significantly enhanced my practical understanding of nanofabrication workflows and experimental limitations. I also worked extensively with a confocal scattering microscopy setup to study ENZ and plasmonic modes in the fabricated nano-antennas. This experimental exposure allowed me to better understand light–matter interaction at the nanoscale. In parallel, I learned to use Lumerical FDTD simulation software for wave-optics simulations, which helped me connect theoretical modeling with experimental observations and strengthened my computational skills.

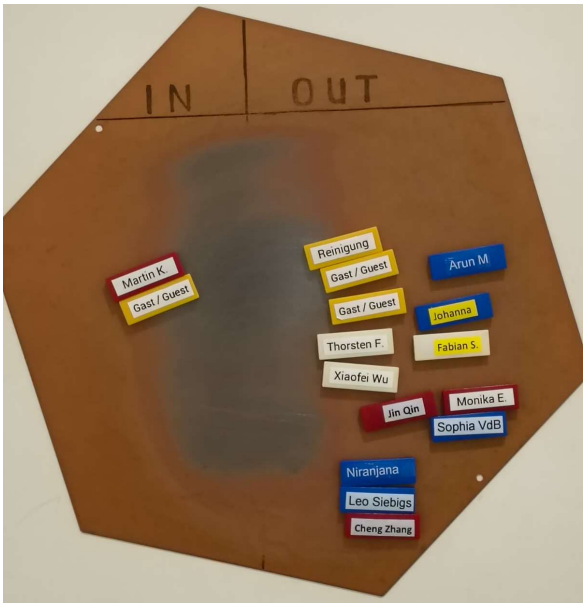
The research environment at Würzburg was extremely supportive and welcoming. The host group was always willing to help, discuss ideas, and share their expertise, making my integration into the laboratory both smooth and enjoyable. This collaborative atmosphere played a major role in making my research stay productive and motivating. Beyond research, the exchange program offered several memorable academic and cultural experiences. On 17th October 2025, I attended a cross-cultural workshop focused on German culture and its differences compared to the Indian way of academic and professional life. This workshop helped me better understand cultural perspectives, work ethics, and communication styles, and greatly enriched my intercultural awareness.

Another highlight was a field trip to the Zollhof Tech Incubator in Nuremberg on 4th December 2025. During this visit, we learned about startup ecosystems in Germany, funding mechanisms, and entrepreneurial opportunities. Discussions also covered postdoctoral and PhD opportunities, providing valuable insights into alternative career paths in academia and industry. The stay concluded with a memorable Christmas celebration organized by the group, which included a treasure hunt puzzle exploring the history of Würzburg. This event was both engaging and culturally enriching, and it left a lasting impression on me.

Overall, my exchange visit to the University of Würzburg was a deeply rewarding experience that contributed significantly to my scientific growth, cultural understanding, and personal development.

Photos:


WILLKOMMEN IN DER FAKULTÄT FÜR PHYSIK UND ASTRONOMIE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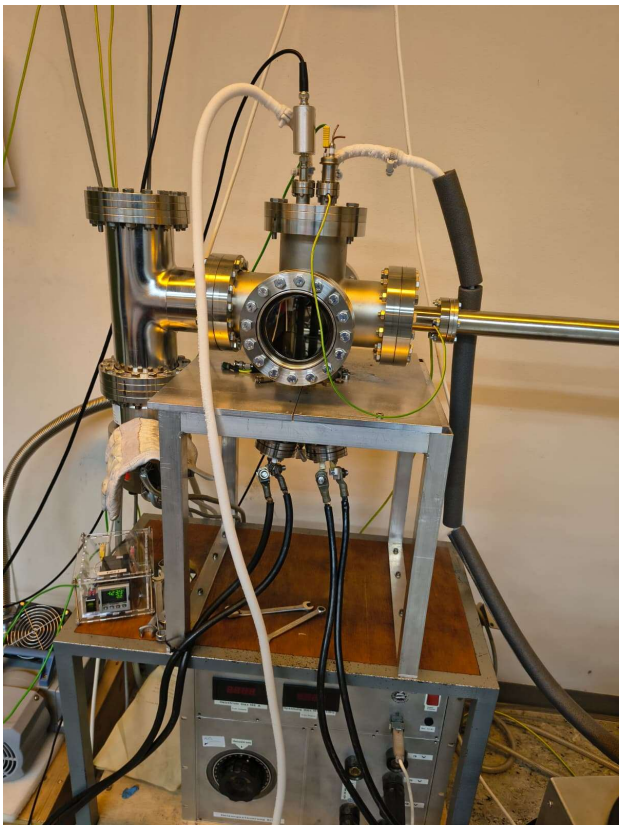

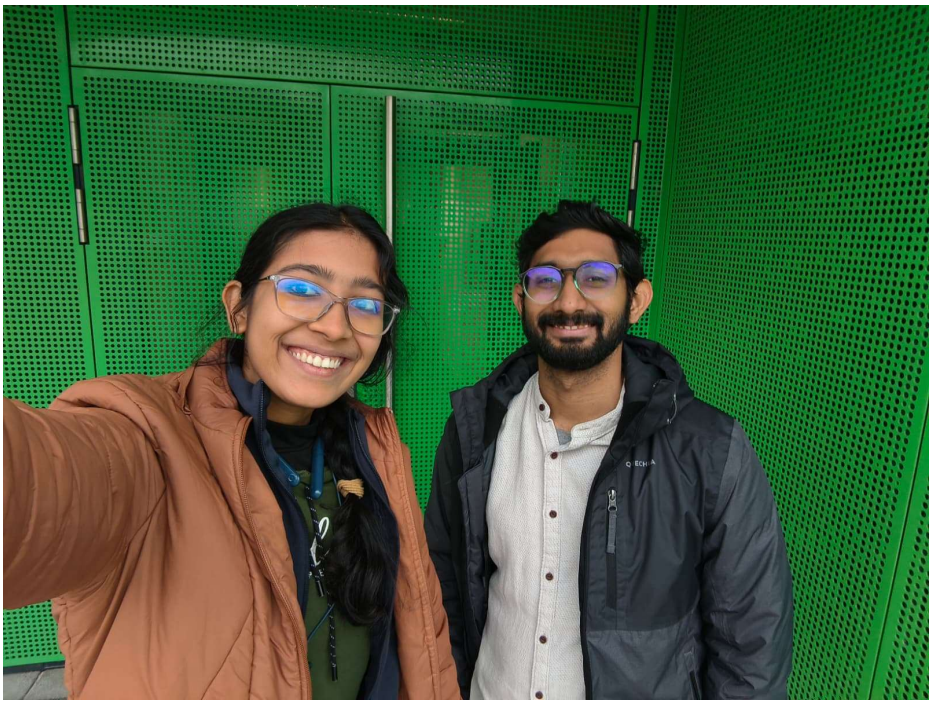


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