

CAS-Fraunhofer joint training program for UCAS doctoral students in Germany 2025-2026

The Fraunhofer-Gesellschaft

The Fraunhofer-Gesellschaft, based in Germany, is a leading applied research organization. It plays a crucial role in the innovation process by prioritizing research in key future technologies and transferring its research findings to industry in order to strengthen Germany as an economic hub as well as for the benefit of society.

As an important customer group, small- and medium-sized companies in particular tap into Fraunhofer's expertise and resources to develop new technologies and maintain their competitiveness. For years, Fraunhofer has been one of the most active patent applicants in Germany and Europe. The research organization is therefore developing an extensive, international patent portfolio in various technology sectors, primarily as a basis for transferring technology through research projects, spin-offs and licensing. In this way, Fraunhofer experts support industry partners from ideation to market launch, and Fraunhofer's interdisciplinary and international collaboration in specific market environments addresses social objectives in important technology areas. Fraunhofer also promotes research into key technologies that are vital for society as a whole by applying specific, interdisciplinary and international collaboration geared to the needs of the market. Examples include technologies for the energy transition, cybersecurity and underlying models for generative artificial intelligence. Fraunhofer is an attractive and established party for public-private partnerships and also makes a significant contribution to strengthening Germany as a hub for innovation and ensuring its viability in the future. Its activities create jobs in Germany, boost investment effects in the private sector and increase the social acceptance of new technology. International collaboration projects with excellent research partners and companies across the globe ensure that the Fraunhofer-Gesellschaft remains in direct contact with the most prominent scientific communities and economic areas.

Founded in 1949, the Fraunhofer-Gesellschaft currently operates 76 institutes and research units throughout Germany. Its nearly 32,000 employees, predominantly scientists and engineers, work with an annual business volume of 3.4 billion euros; 3.0 billion euros of this stems from contract research, which is divided into three funding pillars. Fraunhofer generates a share of this from industry and license-fee revenue to a sum of 836 million euros. This high proportion of industrial revenue is Fraunhofer's unique selling point in the German research landscape. The importance of direct collaboration with industry and the private sector that this requires ensures a constant push for innovation in the economy.

Another share of contract research revenue comes from publicly funded research projects. The final share is base funding that is supplied by the German federal and state governments and enables our institutes to develop solutions now that will become relevant to the private sector and society in a few years.

The Fraunhofer-Gesellschaft is a recognized nonprofit named after the Munich scholar Joseph von Fraunhofer (1787–1826), who enjoyed equal success as a scientist, inventor and entrepreneur.

Fraunhofer CAS Joint Doctoral Program

The joint training program for doctoral students has been running since 2008. So far over 115 CAS–PhD-students have been invited to conduct research for their PhD-theses at one of the Fraunhofer Institutes. The aim of the joint doctoral program is to promote the scientific exchange between Germany and China.

Initially the duration of the fellowship is limited to 12 months. Yet should the hosting Fraunhofer Institute, the Fraunhofer Executive Board as well as the CAS home institution agree, the stay may be prolonged for the duration of 12 or 24 months after the first year. In case of a prolongation the stipend will be provided by Fraunhofer. Students can apply for different institutes depending on their research fields and the willingness of the Fraunhofer Institute to participate in the program.

The participating students will get familiar with the scientific work of the world’s leading applied research organization, and they will experience the different way of life in Germany and German culture.

The following Fraunhofer Institutes do currently not participate in the program and must not be chosen as guest institutes:

- [Fraunhofer Institute for Applied Solid State Physics IAF](#)
- [Fraunhofer Institute for Chemical Technology ICT](#)
- [Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE](#)
- [Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR](#)
- [Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut EMI](#)
- [Fraunhofer Institute for Optronics, System Technologies and Image Exploitation IOSB](#)
- [Fraunhofer Institute for Technological Trend Analysis INT](#)
- [Fraunhofer Institute for Transportation and Infrastructure Systems IVI](#)
- [Fraunhofer Institute for Applied Optics and Precision Engineering IOF](#)
- [Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT](#)
- [Fraunhofer Institute for Material and Beam Technology IWS](#)
- [Fraunhofer Institute for Computer Graphics Research IGD](#)
- [Fraunhofer Institute for Process Engineering and Packaging IVV](#)
- [Fraunhofer Institute for Digital Media Technology IDMT](#)

Application process

If you are interested in this program, please have a look at the [Chinese homepage of the Fraunhofer-Gesellschaft](#). Click on the Chinese name of an institute and you will get more information like the research areas, ongoing research projects and contact details. It might be of interest as well to consult the research topics which were handed in by Fraunhofer (please refer to the attachment).

Choose up to **three** institutes, which match exactly your research focus (kindly consider the list of institutes which do not participate in the program). The Fraunhofer Institutes which might function as a hosting unit

has to be selected with care. A good match of your research focus with the research area of the Fraunhofer Institute increases your chances of success.

In the first phase of your application, you should prepare the documents, which are required by UCAS. Please refer to the UCAS website <https://www.ucas.ac.cn> to download the application documents. Kindly add the duly signed Fraunhofer Privacy Policy as well as a detailed CV which depicts all the colleges/universities attended, your academic degrees and your employment history. Your application must be submitted to Ms. Maoli Li of UCAS till December 25, 2024.

After UCAS has completed its selection process the Fraunhofer Representative Office in Beijing and the Fraunhofer Headquarters will conduct a pre-selection and will invite all the shortlisted candidates for an (online) interview in March/April 2025. Based on this interview the Fraunhofer Representative Office Beijing/Fraunhofer Headquarters will select the candidates who are eligible to apply at the Fraunhofer Institute of their choice. Please do not contact the Fraunhofer Institutes before the interview.

After the pre-selection of candidates by the Fraunhofer Representative Office Beijing and the Fraunhofer Headquarters the application phase at the Fraunhofer institutes will start in the mid of May 2025 and selected candidates will send their applications to the Fraunhofer Institutes.

Q&A

1. Who will sponsor the students?

CAS is responsible for funding the costs of the first year. In case Fraunhofer agrees to prolong the stay for another 12 to 24 months the scholarship will be provided by Fraunhofer.

2. Where can I find more information on Fraunhofer and the research topics of the Fraunhofer institutes:

- Online info session on Fraunhofer and the joint program for doctoral students on November 25, 2024, 8.30 am CET. Please send an E-mail to Mrs. Maoli Li (李茂力 limaoli@ucas.edu.cn) to register for the workshop.
- Website of Fraunhofer Office Beijing: [德国弗劳恩霍夫应用研究促进协会-北京代表处 \(fraunhofer.cn\)](http://fraunhofer.cn) (in Chinese)
- Website of Fraunhofer Germany: <https://www.fraunhofer.de/en.html> (in English)
- List of institutes and research establishments in Germany: <https://www.fraunhofer.de/en/institutes/institutes-and-research-establishments-in-germany.html> (in English)
- Fraunhofer Magazine: <https://www.fraunhofer.de/en/media-center/publications/fraunhofer-magazine.html> (depicts research topics of Fraunhofer, in English)
- Fraunhofer Annual Report 2023, [Annual Report 2023](#)
- Thematic brochures (e.g., AI, biological transformation): <https://www.fraunhofer.de/en/media-center/publications/brochures.html> (in English)
- Films about current research topics: <https://www.fraunhofer.de/en/media-center/videos/videos-2021.html> (in English)

3. Which documents do I need to hand in?

Please hand in the following documents:

- Duly filled in and signed application form, take special care to describe the research proposal in detail
- Detailed CV including academic and employment history
- Duly signed Fraunhofer data protection policy

4. How many institutes can each student choose?

Each student may apply for up to three institutes.

5. How to choose a suitable contact person?

Find a contact person on the Fraunhofer Institutes' websites (a list of all the institutes is available on the official website: <https://www.fraunhofer.de/en/institutes/institutes-and-research-establishments-in-germany.html>) according to your own research area or ask the Representative Office in Beijing for support. In general, your contact person must be a head of a department/research group and must be actively involved in research.

It might be of interest as well to consult the research topics which were handed in by Fraunhofer (please refer to the attachment).

6. How to prepare for the interview?

You should prepare some brief information about yourself, your academic background, your PhD-project, a study proposal for your stay at Fraunhofer, the reason why you wish to work at a Fraunhofer Institute and your expectations for living and working in Germany. The interview will be conducted in English.

7. I have not yet received a reply by the Fraunhofer Institute. Should I send another enquiry?

Since your potential hosts are quite busy their response might take up to one months. Please be patient and refrain from frequent enquiries regarding the status of your application.

8. How can I get a visa after receiving an offer?

You will receive an invitation letter by e-mail, which will be issued by the Fraunhofer Headquarters. You are responsible for the visa application process. Kindly check the current visa guidelines on the homepage of the German embassy. To prove the adequate financial resources for your research stay in Germany a blocked account might be required.

9. When can I move to Germany?

The time of departure varies according to your personal schedule and the waiting time for the granting of the visa. Currently the waiting time for a visa is quite long and we assume that you will start your research stay in the end of 2025 at earliest.

10. What is the working language in the institutes?

English and German. Proficiency in German as well as a German language test are not required.

11. Which certificates will be accepted as proof of my English language skills?

Fraunhofer accepts the following certificates: GRE, IELTS, TOEFL, CET6.

12. Will I get support to settle in?

The administration as well as the colleagues in the hosting guest institute will support you to get familiar with everyday life in Germany. Moreover, Fraunhofer headquarters offers counselling in English as well as Chinese in case of any problems and will invite you to an online platform on which you receive information on everyday life in Germany. Moreover, an intercultural training for Germany will be offered.

Contact details:

Fraunhofer Representative Office Beijing

Ms. Lin Zhu

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lin.zhu@fraunhofer.cn

Fraunhofer Headquarters

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PhD student in the Division of Plastics at Fraunhofer LBF

The ***Fraunhofer Institute for Structural Durability and System Reliability LBF*** in Darmstadt works together with industry and research at a top national and international level. The institute's main research activities focus on specific issues in the areas of structural durability, system reliability, smart structures and plastics.

The transition to renewable energies is one of the key contributors to achieving a sustainable and carbon neutral economy. Lighthouse projects and centers of excellence combine a range of expertise from various Fraunhofer Institutes in order to tackle socially relevant and scientifically challenging tasks. The center of excellence for hydrogen, a joint institution between the Fraunhofer institutes IWKS and LBF, is committed to master the technical challenges on the roadmap towards a hydrogen-based economy. Plastics are playing a key role in the future infrastructure for a hydrogen-based economy. They are a key player in many aspects, from O-rings over housings, pipes, vessel liners to membranes for the H₂ to energy conversion.

As part of the team, we are in demand of a PhD student with the focus on the investigation of the interaction between polymers and hydrogen. This project will include the optimization of analytical methods (hydrogen gas sorption at high pressure and temperature), aging under hydrogen of high pressure, development of material models to describe the interaction between mechanical and chemical material properties and hydrogen depending on pressure, temperature, and time (aging) as well as identifying hidden challenges along the way.

What you will do

- Work on scientific research and development projects in cooperation with partners from both the private and public sector
- Develop, validate, and implement scientific methods, procedures, and tools
- Use of a gas sorption balance and developing new methods to determine gas diffusion coefficients
- Investigation of aging mechanisms under hydrogen pressure and cyclic pressure loads.
- Detailed Evaluation of influence of hydrogen environments on the mechanical behaviour of plastics in relation to aging procedures and the respective physical and chemical mechanisms. The investigations shall take into account complex multiaxial stressing and consider different time frames, encompassing longterm creep, static and fatigue loads. Optimizing the analytical tools towards the scientific challenge
- Support project planning and the preparation of proposals and offers in the acquisition of new projects
- Contribute to the publication and presentation of scientific research results in journals and at national and international conferences and conventions

What you bring to the table

- Completed university degree in physics, physical chemistry, chemistry, material science, materials engineering or similar
- Very good understanding of plastics and/or analytics

- The desire to dive into new challenges
- Confidence in recording, formulating, and communicating complex technical issues
- Very good knowledge of written and spoken English
- Flexibility, as well as the ability to work both in a team and independently

What you can expect

- A diverse range of highly relevant projects
- A creative environment and technology at the highest level
- A springboard into the industry
- Flexible working hours and family-friendly opportunities for a healthy work-life balance

We value and promote the diversity of our employees' skills and therefore welcome all applications — regardless of age, gender, nationality, ethnic and social origin, religion, ideology, disability, sexual orientation and identity.

If you have any questions, please do not hesitate to contact:

Dr. Robert Brüll
Head of Material Analytics and Characterization
Phone: +49 6151 705-8639 / M: +49 1715404314

Ph.D. student in the Polymer Characterization at Fraunhofer LBF

The ***Fraunhofer Institute for Structural Durability and System Reliability LBF*** in Darmstadt works together with industry and research at a top national and international level. The institute's main research activities focus on specific issues in structural durability, system reliability, smart structures, and plastics.

The *Department of Material Analytics and Characterization* develops analytical solutions for industrially relevant challenges. Strong ties exist with research groups around the globe. Worldwide unique facilities for the instrumental analysis of polymers are available, with liquid chromatography and spectroscopy being major research focus.

The development of domestically available renewable resources is a key step on the way to a sustainable plastics economy. Lead projects combine the expertise of several Fraunhofer Institutes to tackle socially relevant and scientifically challenging tasks. The SuBi2MA lighthouse project aims to use ingredients from previously unused biogenic sources as a starting material for new thermoplastics. This requires well-founded expertise, from the synthesis of new additives and their formulation into compounds to comprehensive analysis and characterization. The scientifically demanding developments required for this are to be carried out as part of a doctoral thesis.

As part of the team, we are in demand of a PhD student with a focus on investigating the molecular structure of biobased polymers and their formulations. This project will include the development of innovative analytical tools using a range of advanced spectroscopic and liquid chromatographic techniques. The analytical fingerprint will then be used as a basis for deriving material properties relevant to specific applications. This will be done by programming suitable algorithms using available software tools.

What you will do

- Work on scientific research and development projects in cooperation with partners from both the private and public sectors
- Develop novel molecular analytical methods for the comprehensive characterization of biobased polymers
- Work with one- and two-dimensional chromatography and NMR to characterize the molecular structures of biobased polymers in detail
- Develop methods (GC-FID, HS-GCMS and LC-MS) to analyze the low molecular weight components with regard to future regulatory issues.
- Support project planning and the preparation of proposals and offers in the acquisition of new projects
- Contribute to the publication and presentation of scientific research results in journals and at national and international conferences and conventions
- Supervise student assistants as well as bachelor's and master's theses

What you bring to the table

- Completed university degree in Chemistry or Physics

- Very good understanding of plastics and/or analytics
- Confidence in recording, formulating, and communicating complex technical issues
- Very good knowledge of written and spoken English and German
- Flexibility as well as the ability to work both in a team and independently

What you can expect

- A diverse range of highly relevant projects
- Room to grow in both research and personal development through continued training (e.g. career programs, advanced training, and education)
- A creative environment and technology at the highest level
- A jump board into the industry
- Flexible working hours and family-friendly opportunities for a healthy work-life balance
- A springboard into the industry

We value and promote the diversity of our employees' skills and therefore welcome all applications — regardless of age, gender, nationality, ethnic and social origin, religion, ideology, disability, sexual orientation, and identity.

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The *Department of Material Analytics and Characterization* develops analytical solutions for industrially relevant challenges. Strong ties exist with research groups around the globe. Worldwide unique facilities for the instrumental analysis of polymers are available, with liquid chromatography, spectroscopy, and imaging techniques being major research foci.

Polyolefins are commercially the most relevant polymers. Modern chromatographic analytics, which has been driven by scientific discoveries at LBF, have fostered the development of new polymer grades and enhanced the economy of production. The circular plastics economy has now brought new challenges to the entire value chain of polyolefins.

Further needs arise from strict regulatory legislation like REACH. The scientifically demanding developments required for this are to be carried out as part of a doctoral thesis.

As part of the polyolefins expert team, we are looking for a PhD student with a focus on advancing liquid chromatographic techniques for the needs of a circular use of polyolefins. Starting at the latest level of separation protocols these will be adapted to the challenges of post-consumer recyclates. The final goal is comprehensive high throughput protocols, which enable a robust and rapid assessment of material quality. The analytical fingerprint thus obtained shall then be translated into application properties using methods of machine learning. This will be done by programming suitable algorithms using available software tools.

What you will do

- Work on scientific research and development projects in cooperation with partners from both the private and public sector
- Develop novel molecular analytical tools for the comprehensive characterization of polyolefins
- Work with one- and two-dimensional high-temperature chromatography and high-temperature NMR to characterize polyolefins in detail
- Develop and optimize fast extraction methods for the detection of low molecular weight components such as additives and flame retardants
- Develop GC-SOPs to analyze low molecular weight components for regulatory issues
- Support project planning and the preparation of proposals and offers for the acquisition of new projects
- Contribute to the publication and presentation of scientific research results in journals and at national and international conferences and conventions
- Supervise student assistants as well as bachelor's and master's theses

What you bring to the table

- Completed university degree in chemistry or material analytics
- Very good understanding of plastics and/or material analytics
- Confidence in recording, formulating, and communicating complex technical issues
- Very good knowledge of written and spoken English
- Flexibility as well as the ability to work both in a team and independently

What you can expect

- A diverse range of highly relevant projects
- A creative environment and technology at the highest level
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We value and promote the diversity of our employees' skills and therefore welcome all applications — regardless of age, gender, nationality, ethnic and social origin, religion, ideology, disability, sexual orientation, and identity.

With its focus on developing key technologies that are vital for the future and enabling the commercial utilization of this work by business and industry, Fraunhofer plays a central role in the innovation process. As a pioneer and catalyst for groundbreaking developments and scientific excellence, Fraunhofer helps shape society now and in the future.

If you have any questions, please do not hesitate to contact:

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The [Fraunhofer WKI](#): Building the future with renewable raw materials

Sustainability has been the central theme at the Fraunhofer WKI since its foundation in 1946. Founder and eponym Dr. Wilhelm Klauditz is considered a pioneer of the modern wood-based materials industry. Today, the Fraunhofer WKI utilizes the entire spectrum of renewable raw resources in order to develop sustainable materials, components and chemical products.

The institute, with locations in Braunschweig, Hanover and Wolfsburg, specializes in process engineering, molding and component production with biomaterials, bio-based binders and coatings, functionalization, fire protection, material and product testing, recycling processes and the utilization of renewable raw materials in buildings and vehicles. Furthermore, the Fraunhofer WKI is one of the leading research institutions in the field of indoor air quality.

Virtually all the processes and products resulting from the institute's research activities are used in industry. Through its research and development activities, the Fraunhofer WKI provides an important contribution towards the development of a bio-based circular economy (circular bioeconomy).

Job profile

- Master degree in the field of chemistry, preferred in Organic or polymer chemistry
- Basic knowledge of chemical synthesis is mandatory.
- Familiar with safe working methods in chemical laboratory
- Evaluation, summary and presentation of research work
- Preparation of scientific reports and publications
- Familiar with common chemical analytical methods e. g. $^1\text{H}/^{13}\text{C}$ -NMR-Spectroscopy, IR-Spectroscopy, Rheology, Differential Scanning Calorimetry, Gel Permeation Chromatography

Topics

- Synthesis of biobased vitrimeric resins/covalent adaptable networks (CANs) for application as
 - matrix polymer for fibre reinforced composites
 - resins for Additive Manufacturing
 - switchable adhesives for reversible joint

If you have any questions, please do not hesitate to contact:

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Switchable adhesives, formaldehyde-free resins, lignin chemistry
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