

2 PhD positions m/f/d

1. ‘Multisensory in-line PAT in DSP for in-silico model-based process monitoring and control’

2. ‘Investigation into analytical tools and PAT development to analyse integrity and stability of VLP and AAV during processing’

Starting date: 01.01.2025

That’s the project

CAARE - “Characterization and Recovery of Bionanoparticles for Vaccine Delivery and Gene Therapy” is a European Doctoral Networks project. Planned research will investigate the characterization and recovery of bionanoparticles for vaccine delivery and gene therapy. Overall, 14 Doctoral Candidates will be trained at seven institutions in five European countries and will be supported by a network of industrial and academic partners.

At [KIT](#) you will work at the [Institute of Process Engineering in Life Sciences \(BLT\) - Section IV: Molecular Processing of Bioproducts \(MAB\)](#). We pursue research in the field of downstream processing of bioproducts especially of pharmaceuticals. We deal with all aspects of modern purification, formulation and analytics in the biopharmaceutical industry.

The project work within the scope of this job posting is designed for the preparation of two dissertations dealing with separation processes for bionanoparticles in downstream processing with a focus on process analytical technology (PAT). Two PhD positions are available: You could either develop and apply soft sensors, consisting of PAT and mechanistic / data driven modelling **(DC6) ‘Multisensory in-line PAT in DSP for in-silico model-based process monitoring and control’** or else apply analytical tools for PAT with the purpose to monitor the integrity of bionanoparticle during downstream processing: **(DC7) ‘Investigation into analytical tools and PAT development to analyse integrity and stability of VLP and AAV during processing’** The products to be analysed will be in both cases AAVs, VLPs or LNPs.

About the positions, salary, and the research projects

These full-time positions will be available from January 2025, subject to funding, and offered on a fixed-term 36-month contract. Working as a part of an international research team, the successful applicants will complete research projects on:

DC6 ‘Multisensory in-line PAT in DSP for in-silico model-based process monitoring and control’

The objective of this project is the development and application of soft sensors consisting of PAT and mechanistic / data driven modelling allowing process control Steps to be taken will be:

1. Developing a process applicable PAT method (single / multisensory) for AAV / LNP / VLP detection during downstream processing.

2. Selection and validation of models to describe process performance.
3. Combination of PAT and mechanistic / data driven modelling.
4. Application of the produced soft sensor to investigate the feasibility of process control.

DC7 ‘Investigation into analytical tools and PAT development to analyse integrity and stability of VLP and AAV during processing’

The objective of this project is to apply analytical tools for PAT purposes to monitor the integrity of bionanoparticle during downstream processing. Results will be compared with those from single particle analysis as well as MD modelling carried out by DCs at other institutions. Steps to be taken will be:

1. Development of PAT methods (single / multisensoric) to monitor VLP / AAV / LNP aggregation and integrity.
2. Validation of methods with molecular and analytical data.
3. Implementation of developed experimental techniques and PAT tools to individual process steps and bionanoparticle integrity.
4. Data analysis, molecular modelling and development of soft sensors (PAT & model) for the assessment of bionanoparticle integrity.

Both projects will be supervised by Prof. Jürgen Hubbuch and Dr.-Ing. Iris Perner-Nochta. The successful applicant will be enrolled as a doctoral candidate at the Karlsruhe Institute of Technology (KIT) and will work on the above-mentioned topics.

Secondments for these positions are foreseen at:

DC6 – Institute of Experimental Biology and Technology iBET (Oeiras / PT), 1 month and
Viralgen (San Sebastian / ES) 2 months

DC7 – University of Hamburg (Hamburg / DE) 1 month, Roche Diagnostics GmbH
(Penzberg / DE) 2 month

Funding / Salary

The PhD positions are part of the EU-funded Doctoral Network CAARE and funded for 36 months through the EU Research Framework Programme Horizon Europe at the level stipulated by Marie Skłodowska-Curie Actions funding rules. They pay a highly competitive and attractive salary, to which mobility and family allowances may be added. In detail, each of the successful applicants will receive (in 36 months): €120,319.20 + €21,600.00 for Mobility Allowance, plus additional budget for “Family allowance” if the conditions for their request under the project are met. All amounts are to be considered before taxes.

Compare also further information on: <https://euraxess.ec.europa.eu/jobs/252559>

Personal qualification

You have an excellent master's degree in the field of biotechnology, bio-/chemical engineering, (bio) process engineering, biophysics or biomathematics.

Ideally you have

- Knowledge of biopharmaceutical process development; process analytical technologies (PAT) and common analytical methods for biopharmaceuticals;
- Previous experience with downstream processing, purification of proteins / biopharmaceuticals or bionanoparticles, mechanistic modelling is an advantage;
- Programming skills and knowledge on machine learning and statistical data evaluation, creation of scientific programme codes using common software packages (MATLAB, Python, R) will be an advantage;
- Very good communication skills in English both written and verbal;
- An ability to and commitment to producing scientific outputs for publication in peer-reviewed journals;
- Evidence of ability to work independently and collaboratively within an international team;
- A willingness to take on responsibility;
- At least a basic knowledge of the German language.

You are

- Highly motivated, with excellent organisation skills and with strong attention to detail and quality;
- willing to travel to attend secondments, training and academic events.

Specific Requirements / Eligibility criteria

- Master's concerning the scientific disciplinary area of relevance obtained in Germany or the equivalent title obtained abroad (Biotechnology, Bio-/ Chemical Engineering, (Bio) Process Engineering, Biophysics, Biomathematics)
- An excellent track record of academic achievement.
- At the effective starting date of this contract, applicants must not have been awarded with a PhD;
- At the effective starting date of this contract, applicants must not have resided in Germany for more than 12 months in the 36 months immediately before the appointment;
- For more information on the eligibility criteria for European Doctoral Network, please check <https://marie-sklodowska-curie-actions.ec.europa.eu/actions/doctoral-networks>

Benefits

Become a member of staff of the only German University of Excellence that conducts large-scale research on the national level. Work under excellent working conditions in an international environment. Benefit from specific training when starting your job and from a wide range of further qualification offers. Use our flexible working time models (flexitime, work from home), our sports and leisure offers, as well as our child and holiday care services. We also pay a share of EUR 25/month in the Job Ticket Baden-Württemberg. Enjoy a large variety of dishes, snacks, and beverages at our canteens.

Karlsruhe Institute of Technology (KIT) – The Research University in the Helmholtz Association creates and imparts knowledge for the society and the environment. It is our goal to make significant contributions to mastering the global challenges of mankind in the fields of energy, mobility, and information. For this, around 9800 employees of KIT cooperate in a broad range of disciplines in research, academic education, and innovation.

We prefer to balance the number of employees (f/m/d). Therefore, we kindly ask female applicants to apply for this job.

Recognized severely disabled persons will be preferred if they are equally qualified.

<https://www.kit.edu/career/26984.php>

Application / Selection process

Please apply here: <https://www.pse.kit.edu/english/karriere/joboffer.php?id=164177>

Admission Procedure:

Assessment of qualifications and oral exam: during the oral test, knowledge of the English language will be tested.

Assessable Qualification:

The candidates must attach to their applications:

1. All relevant documents (application or motivation letter, curriculum vitae, certificates of Bachelor's and Master's Degree, training measures);
2. A Research project.

How to write the research project? Depending on the position(s) you are applying for, i.e. DC6 or DC7, please start from the specific objectives of each research proposals, which are described in the section “About the positions, salary, and the research projects”, and write down how you think to carry out your research to reach these objectives. No page limit applies.

Additional comments

For further information or doubts about the positions and the related application procedures please contact Prof. Jürgen Hubbuch (juergen.hubbuch@kit.edu) and/or Dr.-Ing. Iris Perner-Nochta (iris.perner-nochta@kit.edu), who will be happy to provide more details about the project and also to provide further details about the project and how to apply for the DC6 and DC7 positions at Karlsruhe Institute of Technology.

Organizational unit: Karlsruhe Institute of Technology
Institute of Process Engineering in Life Sciences
Section IV: Biomolecular Separation Engineering
<https://mab.blt.kit.edu/english>

Starting date: 01.01.2025

Contract duration: 36 months

Application up to: August 15, 2024

Contact person: for further information [Prof. Hubbuch](#) and/or [Dr. Perner-Nochta](#)