Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,500 employees in one of Europe's biggest research centres and help us to shape change!

Are you eager to pursue a four-year doctoral project that bridges scientific disciplines? Are you excited by complex societal challenges that demand interdisciplinary solutions? Then the Program for Collaborative Doctoral Projects is the perfect opportunity for you. Many of today's most pressing problems can only be tackled through interdisciplinary collaboration. That's why our projects are designed specifically to connect diverse scientific fields and foster cross-institutional collaboration, enabling you to benefit from the combined expertise and supervision of experienced researchers from multiple institutes at Forschungszentrum Jülich. As one of Europe's largest and most multidisciplinary research centres, Forschungszentrum Jülich offers access to state-of-the-art infrastructure and a vibrant scientific community. Join us in developing solutions for a rapidly changing world and help shape the future by working in an international environment. For more information about the Program for Collaborative Doctoral Projects please visit: https://go.fzj.de/Collaborative-Doctoral-Projects

We are offering an interesting

Collaborative Doctoral Project (PhD Position) - AI-guided design of scaffold-free DNA nanostructures

Your Job:

The field of structural DNA nanotechnology holds a great promise for the realization of all-DNA building blocks with arbitrary complexity and shape at the sub-nanometer scale. Such structures can be used to construct artificial cell mimics and new materials. A scaffold-free DNA tile assembly is a programmable method for the formation of two- and three-dimensional DNA structures which self-assemble from a number of interacting single-stranded DNA molecules. An accurate prediction of DNA structures still remains difficult, which significantly slows down the development of new desirable nano-structures.

In this project, we will combine numerical models, experiments, and artificial intelligence

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application via our **Online-Recruitment-System!**

Questions about the vacancy?

Get in touch with us by using **our contact form.**

Please note that for technical reasons we cannot accept applications via email.

www.fz-juelich.de

(AI) to guide the design of specific DNA nanoconstructs. The primary goal is to build an AI-based digital twin, which can predict the assortment and sequence of two-dimensional all-DNA motifs required for the engineering desired tessellation patterns at the nanometer scale. We will use available DNA thermodynamic database, coarse-grained simulations of DNA motifs, and existing experimental data to establish an AI model that is able to guide the construction of desired secondary structures. Experimental validation of the established AI model is also expected to be a part of this project.

Specifically, your tasks will be:

- Running numerical simulations to generate training data
- Building transformer-like AI models which can predict DNA structures
- Performing experiments for validation
- Participation in conferences in Germany and abroad (incl. presenting your research results)
- Preparing scientific publications and project reports

Your Profile:

- Strong motivation for an interdisciplinary project that combines numerical models, experiments, and artificial intelligence
- A master`s degree or diploma in physics, applied mathematics, or a relevant engineering discipline
- Good programming skills and experience with numerical modeling
- Interest in performing experiments
- Excellent written and spoken English skills
- High degree of independence and commitment
- Experience with machine learning and high-performance computing is advantageous, but not necessary

Our Offer:

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! We offer ideal conditions for you to complete your doctoral degree:

- A large research campus in a green setting, offering excellent opportunities for networking with colleagues and for sports and recreation alongside your work
- Experienced and friendly international research team with a strong background in biophysics and soft matter
- Cutting-edge computational facilities including the on-site top European supercomputers
- Excellent scientific and technical infrastructure
- Opportunity to participate in (international) conferences and project meetings
- Continuous professional support from your scientific supervisors
- 30 days of annual leave
- The option of flexible working arrangements
- A structured doctoral program for you and your supervisors with a comprehensive range of training and networking opportunities via the JuDocs doctoral platform: https://www.fz-juelich.de/judocs
- Targeted services for international employees, e.g. through our International Advisory Service

In addition to exciting tasks and a collaborative working atmosphere at Jülich, we have a lot more to offer: https://go.fzj.de/benefits

We offer a 4-year PhD position. Salary and social benefits in conformity with the

provisions of the Collective Agreement for the Civil Service (TVöD). Depending on your qualifications and the precise nature of the tasks, salary grade 13 TVöD-Bund (up to 100%) and additionally 60 % of a monthly salary as special payment („Christmas bonus“). The monthly salaries in euro can be found on the BMI website: https://go.fzj.de/bmi.tvoed.entgelt

Further information on doctoral degrees at Forschungszentrum Jülich (including its various branch offices) is available at https://www.fz-juelich.de/en/careers/phd

We welcome applications from people with diverse backgrounds, e.g. in terms of age, gender, disability, sexual orientation / identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.

Further information on diversity and equal opportunities: https://go.fzj.de/equality