The **research group "Biological Algorithms"** headed by Benjamin Friedrich within the **Cluster of Excellence 'Center for Advancing Electronics Dresden' (cfaed)** offers, subject to granted funds, a

Research Fellow / PhD position in Theoretical Biophysics

(subject to personal qualification employees are remunerated according to salary group E 13 TV-L)

Research area:	**Synchronization of biological oscillators: Collective nonlinear dynamics in polarizable cilia carpets**
cfaed Investigators:	Dr. Benjamin Friedrich
cfaed research path:	Biological Systems Path
Terms:	65% of the fulltime weekly hours, the position starts **as soon as possible** and is fixed-term for a period of 3 years. The period of employment is governed by the Fixed-Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG). The position offers the chance to obtain further academic qualification (e.g. PhD).

About the "Biological Algorithms group"

The mission of our "Biological Algorithms group" is to understand physical principles of self-organization in biological cells and tissues, with a focus on cell motility, robust motility control, and the emergence of self-organized patterns in cells and tissues. We pursue a Quantitative Biological Physics approach that combines dynamical systems theory, statistical physics, and image/data analysis. More information on current research can be found at https://cfaed.tu-dresden.de/friedrich-home.

About the project

We are hiring a PhD student for an innovative project on collective synchronization in cilia carpets, with full funding available from the DFG priority program "Microswimmers" (SPP 1726).

Inside our airways, thousands of hair-like cilia beat with a common rhythm. Yet, there is no master pace maker and synchronization occurs purely by local coupling, providing a striking example of self-organized dynamics. You will develop a theory of robust synchronization in cilia carpets, in order to unveil the complex interplay between cilia alignment (spatial order) and collective synchronization (temporal order). You will have access to state-of-the art hydrodynamic simulation tools, established in our group, and a novel framework of Lagrangian mechanics for active, elastic structures, such as beating cilia. More information: Klindt *et al.* Phys. Rev. Lett. (2016).

Looking beyond this specific biological model system, we will also explore possible applications of biological control designs, e.g. synchronization of noisy electronic oscillators by decentralized control, in tight collaboration with the engineering paths of the cfaed. Dresden unites excellence in information and life sciences. We enjoy the close proximity of collaboration partners at the Max Planck Institute of Molecular Cell Biology and Genetics, the Biotechnology Centre, and the new Center for Systems Biology Dresden, which allows rapid iteration loops between theory and experiment.

Requirements

We are looking for a theoretical physicist or applied mathematician, who is intrigued to discover algorithms of life, who meets the following requirements: excellent university degree

(Master) in Biological Physics, Mathematical Biology, or related field; highly motivated and talented student to work at the interface of physics and biology with a twist towards computer science; strong analytic skills, creativity, efficient problem solving skills; an aptitude for data-driven science and numeric computing (e.g. Matlab, python, C); high motivation to work on inspiring research problems at the interface of physics, biology and computer science; excellent communication skills; especially in cross-disciplinary communication; an independent, result-driven work attitude; fluency in English – oral and written.

What we offer

You will join a team of enthusiastic scientists who pursue creatively their individual research agenda inspired by the cluster's innovative approach and support. Your research will be fostered by the cfaed philosophy to promote young researchers which includes: access to state of the art research of leading academic institutes, individual supervision by a Thesis Advisory Committee, possibility to earn (seed) grants of up to € 10.000, promotion of gender equality and family-friendly work environment.

For informal enquiries, please contact Dr. Benjamin Friedrich at benjamin.m.friedrich@tu-dresden.de.

Applications from women are particularly welcome. The same applies to people with disabilities.

Application Procedure

Your application **(in English only)** should include: a motivation letter, your CV with publication list, the names and contact details of two references, copy of degree certificate, and transcript of grades (i.e. the official list of coursework including your grades). Please include also a link to your Master's thesis. Complete applications should be submitted preferably by e-mail as a single PDF-document quoting the reference number **PhD-1703** in the subject header to **recruiting.cfaed@tu-dresden.de** (Please note: We are currently not able to receive electronically signed and encrypted data) or alternatively by post to: **TU Dresden, cfaed, Frau Dr. P. Grünberg, 01062 Dresden, Germany.** The closing date for applications is **18.04.2017** (stamped arrival date of the university central mail service applies). Please submit copies only, as your application will not be returned to you. Expenses incurred in attending interviews cannot be reimbursed.

About cfaed

cfaed is a cluster of excellence within the German Excellence Initiative. As a central scientific unit of TU Dresden, it brings together 300 researchers from the university and 10 other research institutes in the areas of Electrical and Computer Engineering, Computer Science, Materials Science, Physics, Chemistry, Biology, and Mathematics. cfaed addresses the advancement of electronic information processing systems through exploring new technologies which overcome the limits of today's predominant CMOS technology. For more information please see www.cfaed.tu-dresden.de

About TU Dresden

The TU Dresden is among the top universities in Germany and Europe and one of the eleven German universities that were identified as an 'elite university' in June 2012. As a modern full-status university with 14 departments it offers a wide academic range making it one of a very few in Germany.