The **Junior Research Group "Biological Algorithms"** headed by Benjamin Friedrich within the **Cluster of Excellence 'Center for Advancing Electronics Dresden' (cfaed)** offers a

Research Associate/Postdoc position in Theoretical Biophysics
(subject to personal qualification employees are remunerated according to salary group E 13 TV-L)

Research area: **Chemotaxis and optimal decision making at the physical limit**

cfaed Investigators: Dr. Benjamin Friedrich

cfaed research path: Biological Systems Path

Terms: The position starts **as soon as possible** and is fixed-term until 31.12.2018 (with the possibility for prolongation subject to the availability of third-party funds). 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. habilitation).

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 Postdoc for an on-going project on cellular decision making in the presence of chemo-sensory noise. At the beginning of new life, sperm cells navigate upwards dilute chemical gradients to find the egg. What sounds like a direct implementation of gradient-ascent is challenging at these microscopic scales, because molecular shot noise corrupts concentration measurements. We use sperm chemotaxis as application example to investigate fundamental principles of cellular responses to noisy input signals, right at the physical limit of single molecule detection. We apply game theory, including methods of probabilistic model checking from computer science, to theoretically understand optimal navigation strategies. With this, we directly address the fundamental trade-off choice between exploration (=acquisition of information) and exploitation (=response to information), linking physics, biology, and information theory.
Looking beyond this specific biological model system, we will also explore possible applications of biological control designs, e.g. decision making in artificial cells and next-generation communication systems, 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 an enthusiastic theoretical physicist or applied mathematician, who is intrigued to discover the algorithms of life. Requirements: excellent university and PhD degree in Biological Physics, Mathematical Biology, or related field; motivation and drive 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 nonlinear dynamics, statistical physics; experience in numeric computing (e.g. python, Matlab, C); 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 **PD-1705** 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 **27.06.2017** (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.