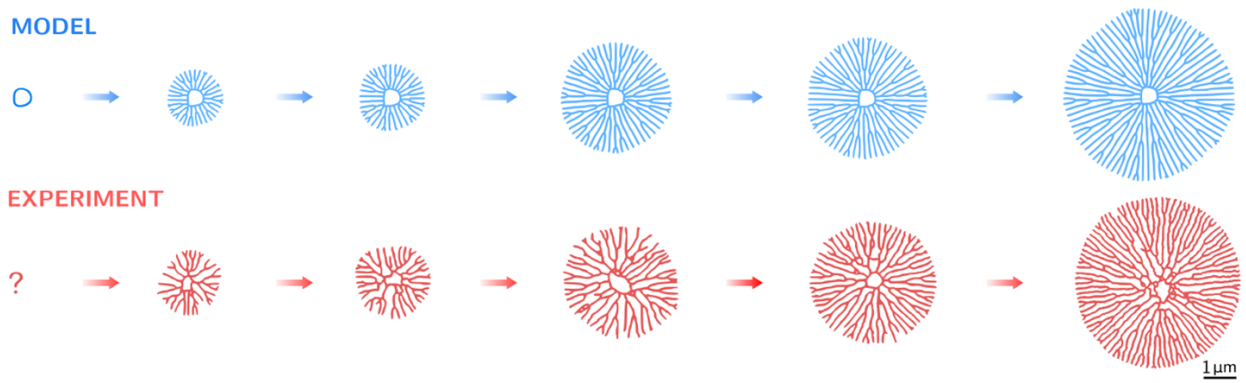
TUD Dresden University of Technology, as a University of Excellence, is one of the leading and most dynamic research institutions in the country. Founded in 1828, today it is a globally oriented, regionally anchored top university as it focuses on the grand challenges of the 21st century. It develops innovative solutions for the world's most pressing issues. In research and academic programs, the university unites the natural and engineering sciences with the humanities, social sciences and medicine. This wide range of disciplines is a special feature, facilitating interdisciplinarity and transfer of science to society. As a modern employer, it offers attractive working conditions to all employees in teaching, research, technology and administration. The goal is to promote and develop their individual abilities while empowering everyone to reach their full potential. TUD embodies a university culture that is characterized by cosmopolitanism, mutual appreciation, thriving innovation and active participation. For TUD diversity is an essential feature and a quality criterion of an excellent university. Accordingly, we welcome all applicants who would like to commit themselves, their achievements and productivity to the success of the whole institution.

At the **Cluster of Excellence „Physics of Life" (PoL),** the **Heisenberg Chair of Biological Algorithms** (Prof. Benjamin Friedrich) offers a position as

Research Associate / PhD student (m/f/x)
in Theoretical Biological Physics
(subject to personal qualification employees are remunerated according to salary group E 13 TV-L)

starting **as soon as possible.** The position entails 65% of the fulltime weekly hours and is limited to 36 months (with the option of extension subject to the availability of resources). 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 (usually PhD).

Tasks: How do physical mechanisms shape biological patterns? How can the same mechanisms generate diverse morphologies? We theoretically address these fundamental questions using the intricate silica patterns of the diatom cell wall as model system. The physical and chemical principles that guide the self-organization of biosilica patterns with regularly spaced ribs and nano-pores are not understood, nor are structures of similar complexity accessible through material synthesis today. To identify general principles of biosilica pattern formation, we develop mathematical models that quantitatively account the time-course of developing patterns, in a tight theory-experiment collaboration with the Kröger laboratory (B CUBE & PoL, Dresden). Interested candidates are highly encouraged to consult our first study on this topic, Iaroslav Babenko et al. PNAS, *in press*; preprint: https://www.biorxiv.org/content/10.1101/2023.07.03.547407v1.



Your task will be to enlarge this model to describe the intricate interplay of multiple pattern features (ribs, pores, transverse connections) in a comparative approach across centric diatom species, with the aim to identify conserved physical mechanisms. You will be the main driver of the theory part of this project, working in a close tandem with an experimental PhD student in the Kröger laboratory,

who will, e.g., provide TEM image data on the time-course of silica valve morphogenesis for different species and different perturbation conditions.

Your tasks include mathematical modeling (e.g., using reaction-diffusion type models in 2D and 3D, liquid-liquid phase separation models), numerical simulations, e.g., of PDEs, custom-made data and image analysis of valve patterns to quantify pattern features, drafting scientific publications for high-profile, peer-reviewd journals. You will be conducting detailed literature searches, writing regular interim reports, participation in professional conferences to present your research; support of the group, e.g., for applications for third-party funding.

Requirements:

- outstanding university degree in physics, applied mathematics or related fields,
- experience and competence in mathematical modeling
- programming skills and experience in data and image analysis
- ideally, first exposure to biological physics and willingness to learn biology *en route*
- excellent communication and presentation skills in English,
- high self-motivation and independent, target- and solution-driven work attitude.

What we offer: We offer the opportunity to shape an exciting research project in Theoretical Biological Physics, while developing your academic or professional career. You will be imbedded within the highly interactive and interdisciplinary research environment of PoL and the wider Dresden Campus, which includes other high-quality scientific institutions. You will be exposed to world-class research on diverse topics through regular scientific seminars and occasional retreats. Employment conditions include a comprehensive package with full social benefits. Dresden offers a high-quality of life with a relatively low cost-of-living.

TUD strives to employ more women in academia and research. We therefore expressly encourage women to apply. The University is a certified family-friendly university and offers a Dual Career Service. We welcome applications from candidates with disabilities. If multiple candidates prove to be equally qualified, those with disabilities or with equivalent status pursuant to the German Social Code IX (SGB IX) will receive priority for employment.

Please submit your detailed application with the usual documents by **March 15, 2024** (stamped arrival date or the time stamp on the email server of TUD applies), preferably via the TUD SecureMail Portal https://securemail.tu-dresden.de by sending it as a single pdf file to **philipp.naumann1@tu-dresden.de** or to: **TU Dresden**, **PoL, Heisenberg-Professur für Biologische Algorithmen, Herrn Prof. Dr. Benjamin Friedrich, Arnoldstraße 18, 01307 Dresden, Germany**. Please submit copies only, as your application will not be returned to you. Expenses incurred in attending interviews cannot be reimbursed.
