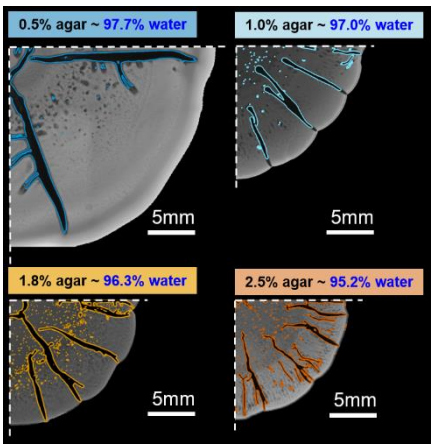
MAX PLANCK INSTITUTE
OF COLLOIDS
AND INTERFACES

PhD position (m/f/d) on **the Mechanobiology of Biofilms, starting early 2023**, 65% TVöD E13 (3 years)

Project description: Biofilms are complex 3D structures, which form as bacteria get embedded in a matrix of self-produced fibers (protein and polysaccharide). As bio-sourced materials are raising interest for their sustainability, using the ability of bacteria to produce biofilms has become a new strategy to make "engineered living materials" with various functionalities. Our group aims at contributing to this emerging field of research by clarifying how bacteria adapt biofilms to their environment, and at using this knowledge to engineer the materials properties of these microbial tissues. The proposed project aims at studying how bacterial biofilms adapt to mechanical cues of their environment. For this, the PhD student will establish a protocol to culture bacteria under different mechanical conditions, monitor the growth of the resulting biofilms by live fluorescence microscopy, and use/adapt computational tools to extract biofilm morphological features. Further structural, mechanical and chemical properties will be analyzed with characterization methods including X-Ray scattering, nanoindentation and spectroscopy. Ultimately, the results should allow to program the properties of the biofilm-based material by tuning the mechanical environment of the bacteria.



E. coli biofilm morphology on nutritive substrates with various agar concentrations after 90 h of growth. Colored contours outline delaminated buckles (Ziege et al., 2022).

Research environment: The PhD student will join the team Biofilm-Based Materials, an international group offering a highly cooperative working environment with access to cutting-edge experimental facilities. The Max Planck Institute of Colloids and Interfaces in Potsdam is a world-renowned research institution that offers interdisciplinary and collaborative research environment at national and international levels. The project will involve collaborations inside and outside of the institute.

Requirements: You studied materials science, biophysics or biotechnology and you are curious, open to new methods and interdisciplinary interactions. You like engineering, instrumentation and computational work applied to biological questions. Being familiar with bacteria or cell culture and microscopy would be a plus. Motivation, autonomy, team spirit and pro-active communication (mainly in English) will be the main motors for a successful project.

Application: Submit your application by 31.10.2022 via email to cecile.bidan@mpikg.mpg.de with the subject: Cand-PhD – [Name, Surname]. It should include:

- a motivation letter: why do you apply for this position? what are your research interests? how do you fit? (1 page max)
- a detailed CV
- your university grades transcripts (BSc, MSc)
- the names and email addresses of 2 reference persons ready to give feedback

The candidate's application will be evaluated internally according to the project and the best candidates will be invited for an online interview. After the online interview the interviewed candidates will receive an email with the final decision. The position should start sometime early 2023.

The Max Planck Society strives to ensure a workplace that embraces diversity and provides equal opportunities irrespective of the applicants' gender, nationality or disabilities. The Max Planck Society is committed to increasing the number of individuals with disabilities in its workforce and therefore encourages applications from such qualified individuals