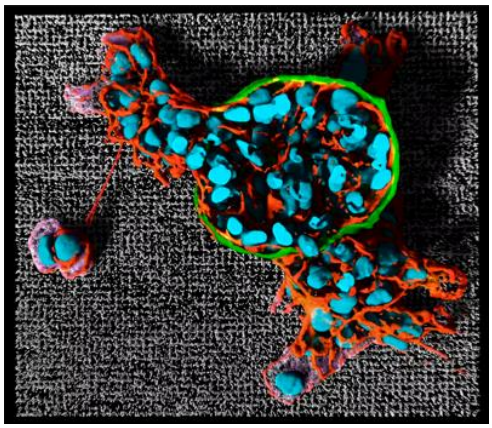

Picture caption: Immunofluorescent micrograph (3D rendered) of an invasive breast cell spheroid. The BM-invasion is triggered by a tumor resembling EGFR activation and ECM stiffening. Green: BM scaffold, red; actin cytoskeleton, cyan: nuclei, grey: an elastomeric substrate 12 kPa).

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 7,100 employees in one of Europe's biggest research centres and help us to shape change!

The institute of Biological Information Processing – Mechanobiology (IBI-2) – uses and develops cutting-edge tools from molecular cell biology and biophysics to apply defined mechanical stimuli to cells and tissues cultured in mechanically defined environments and quantify the ensuing cell responses. To this end, we apply advanced live-cell microscopy and immunofluorescence imaging, cell force microscopy, and state-of-the-art techniques from molecular biology. We are an interdisciplinary group of biologists, physicists, and chemists who work hand in hand to accomplish challenging scientific tasks in the fascinating field of mechanobiology. We greatly value teamwork and strive for excellent supervision.

We offer you an exciting **Master Thesis: "Shear strain-induced invasive transition of breast epithelium after oncogene activation"**

Your project hypothesizes that tissue-transmitted mechanical shear strain induces the invasive transition of HRas oncogene-activated breast spheroids. In contrast, non-activated breast epithelium remains in a homeostatic polarized healthy tissue state. For this task, you will use a newly developed mechanical shear strain device that allows to apply physiologically relevant tissue strain on living human breast cell spheroids. Thereby, you investigate strain-induced mechanoresponse mechanisms of these advanced 3D cell culture models. Together, your project will shed light on the still unknown interplay of oncogene overactivation and mechanical tissue strain on the onset of breast cancer invasion. A better understanding of these processes is key to develop efficient anti-cancer therapies.

Your tasks in detail will be:

- 3D-cell culture of MCF10A-derived cell spheroids with inducible HRas activation
- Apply nature-like tissue shear strain on living breast spheroids and analyze strain-induced mechanoadaptation mechanisms using state-of-the-art microscopical analyses such as 4D live-cell imaging and confocal microscopy

- Study proto-oncogene activity as a modulator of strain-induced cell invasion
- Investigate basement membrane integrity, shear strain-induced opening of ion channels and the reorganization of force-sensing actin cytoskeleton and cell junctions
- Present your research results in our regular seminar series
- Collaborate with local project partners

Your Profile:

- You have completed your biology, biomedicine, biotechnology or biophysics studies very successfully with a B. Sc. degree, with an overall grade of at least "gut" (or equivalent, e.g. cum laude)
- Beneficially, you have expertise in the field of biophysics or molecular cell biology
- You should have experience in standard techniques such as light microscopy and cell culture
- Good communication skills in English and German
- Commitment to science and a very reliable, conscientious style of working
- Willingness to familiarize with new methods
- Excellent ability to cooperate and work in an interdisciplinary team

Our Offer:

We work on cutting-edge research in a highly relevant field of science. We offer ideal conditions for you to complete your master thesis:

- Significant expertise in state-of-the-art techniques and strategies in molecular cell biology and mechanobiology
- Excellent scientific mentoring and regular scientific discussions
- A highly motivated group in an international and interdisciplinary working environment at one of Europe's most renowned research centres

We would welcome it if the Master's thesis could commence with a project internship.

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.

Please send your **application with CV, transcript of records, and bachelor's degree certificate** to:

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