

18th Call for proposals for interdisciplinary Seed Fund Projects – thematic call: Synthesizing Life-Like Material Systems

Background

The **Exploratory Research Space @ RWTH Aachen (ERS)** is the central instrument of RWTH to foster interdisciplinary research and to develop emerging fields with the potential to shape the University's research profile. ERS comprises activities which give a leeway for creativity to both senior and junior researchers and which foster interdisciplinary exchange and discussion. One activity is the funding of **Seed Fund Projects**. The typical duration of a Seed Fund Project is 6 to 12 months.

1. Description of the research field

Cells are the fundamental "building blocks" of living organisms. Yet, despite the fact that we have a considerable knowledge about most molecular constituents of natural cells, the mechanisms that govern self-organization of these components into functional cellular structures remain majorly out of reach so far. In fact, even though it is possible nowadays to mix molecules together with a goal to build synthetic cells, they hardly attain even a small fraction of the functionality of natural cells. The motivation for building artificial cells is manifold:

- Today's breathtaking possibilities in data collection and processing, modelling of complex systems, and bottom-up or top-down approaches in nanotechnology open the way to radically new, more integrative approaches, which enable a controlled assembly of individual molecular components into artificial cell-mimicking systems with functions that are usually considered to be "biological".
- Building an artificial system with cell-mimicking functionalities provides a controlled and systematic path toward understanding self-organization mechanisms of living cells. In fact, the successful establishment of an artificial functional system is the most rigorous test of scientific understanding. We must be prepared for the uncovering of novel scientific challenges with corresponding chances for significant scientific progress.
- It should be possible to construct "cells" with improved properties or even new functionalities by using newly synthesized molecules, which enable unprecedented design options. These can be artificial membrane components, synthetic proteins, or DNA-polymer hybrids.
- Starting from single cells, the realization of fully understood, lineage agnostic organisms is the future of biotechnology.
- The design and construction of soft robots for a variety of medical and technical applications.

Building cells is highly challenging. Worldwide, several initiatives have sprung up to engage on this endeavor, see, for example

- Build-a-cell: <https://www.buildacell.org/>
- Max-Syn-Bio: <https://www.maxsynbio.mpg.de/>

2. Type and aim of projects

The proposed projects should have the goal to establish tailored compartmentalized micro-systems, which can perform selected tasks essential for living organisms like protein synthesis, spatial mobility, or signal transduction. The activities should be original, creative and can be of high risk. They must not already be addressed by national or international public funding programs.

Projects can also be submitted as **International Research Space@RWTH Aachen (IRS)** proposals. This entails additional funding for collaboration with international partners, who are expected to contribute to the project through matching funds (except in case of capacity building proposals). IRS proposals should elaborate the specific added value of the international cooperation.

3. Selection and evaluation criteria:

The projects will be selected and evaluated by an evaluation group. The selection process may involve external experts.

The selection criteria for submitted proposals will be

- Originality (new, creative, explorative),
- Interdisciplinarity (participation of researchers from different faculties and disciplines with strongly differing research topics),
- Subsidiarity (funding through other sources is not yet possible),
- Team structure (senior and/or high-potential young researchers),
- Potential impact on the research strategy and structure of RWTH Aachen,
- Adequateness of research approach,
- Adequateness of research data management plan.

Specifically for IRS:

- Coherent implementation of internationalization in line with [RWTH internationalization strategy](#),
- Adequate matching funds from the partner (except for projects on capacity building),
- Added scientific value of the international cooperation.

Major evaluation criteria after project completion will be the quality of obtained research results and the future perspectives of the research topic as described in a final report which has to be provided 18 months after project closure:

- A promising proposed third-party funded follow-up project (DFG, BMBF, EU, ...),
- Publications in peer reviewed journals,
- Granted patents or promising patent applications.

4. Funding

The budget for a Seed Fund Project is provided by the Excellence Strategy of the German Federal and State Governments and makes allowances to the allocation model aiming for 30 % share of females. The total budget for all new Seed Fund projects is at most 300.000 €. At least 200.000 € of the funding must be spent in 2021, the rest afterwards. This will require two separate accounts. Funds from 2021 cannot be transferred into 2022.

Eligible costs are: Staff expenses including student assistants, travel and subsistence costs, support for workshops and conferences, consumables and equipment.

5. General conditions

Research Partners: typically 2-3 researchers from different faculties and disciplines, ideally involving different departments.
We encourage the participation of young scientists (junior professor, group leader, research fellow, etc.) who are scientifically independent and are leading a research group.

The researchers should not be part of the same institute.

Joint Proposals with partners from Forschungszentrum Jülich (FZJ) are welcome. The research topics and the expertise of the FZJ partners must be different from those of the RWTH partners and they have to complement each other. The expenses of the partners from FZJ will not be covered by ERS funding.

Each research team (professor with his/her group) can participate in a maximum of 3 Seed Fund Project Proposals.

Progress evaluation: final report

6. Proposal structure and content

Length of proposal: 10 pages **max.**, type size: Arial 11, line spacing: 1.5

- Project partners and principal investigators
- Summary
- Current State-of-the-Art
- Relevant preliminary work of the applicants
- Goals and approach (methodology)
- Working plan
- Financial plan
- Expected long term impact (targeted third party funding, implementation of new scientific infrastructure, new significantly visible, interdisciplinary competences, action plan to achieve these strategic goals)
- Research data management plan
- References

Language: English or German

Please note: Proposals that do not comply with the formal criteria will be excluded from the reviewing process.

7. Deadline for submission: June 15, 2021

8. Project start: October 2021

9. Project duration: 6 to 12 months



10. Please apply at: <http://portal.ers.rwth-aachen.de>

Call: Seed Fund 2021 – Synthesizing Life-Like Material Systems

For additional information on the selection process, please refer to our website:

<http://www.rwth-aachen.de/ers>

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