Dataset for a WP7 proof-of-principle project for superresolution microscopy

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Project outline for a WP7 proof-of-principle project within the Euro-BioImaging context:

1. Research environment
2. Application and selection process
3. Financials
4. General setup of project (phases, duration, visits,…)
5. Projected output and milestones
6. Complementary infrastructure
7. Contact person
8. Potential outcome – experiences from past projects

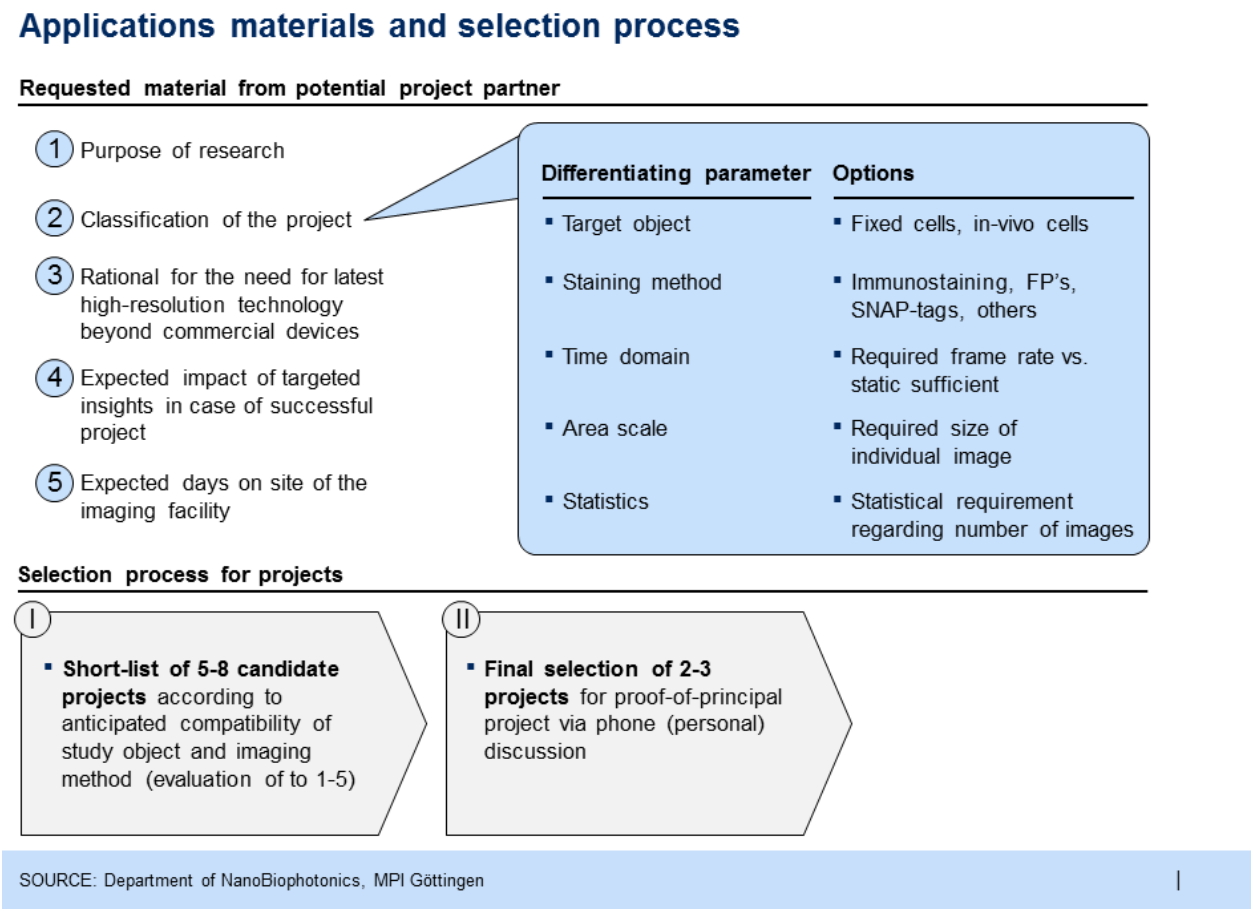
1. Research environment

The research lab of Stefan W. Hell has pioneered STED microscopy, the first superresolution fluorescence microscopy method, and has also made significant contributions to the single-molecule photoswitching (SMS) high-resolution technologies, such as GSDIM microscopy. The lab is equipped with numerous STED and GSDIM instruments which represent the latest stage of development. In addition, the department supervises the affiliated facility for innovative light microscopy (FLIM) which provides access to several commercial confocal microscopes as well as a commercial STED microscope.

2. Application and selection process

The applications process requests material and information from potential collaborators along five different topics – see Fig. 1. The submitted material is then evaluated with regard to the overall question whether the suggested project is compatible with the

imaging methods offered in the group of Prof. Hell and whether the project can most likely be completed within the given timeframe of 6 months starting from January 2012.



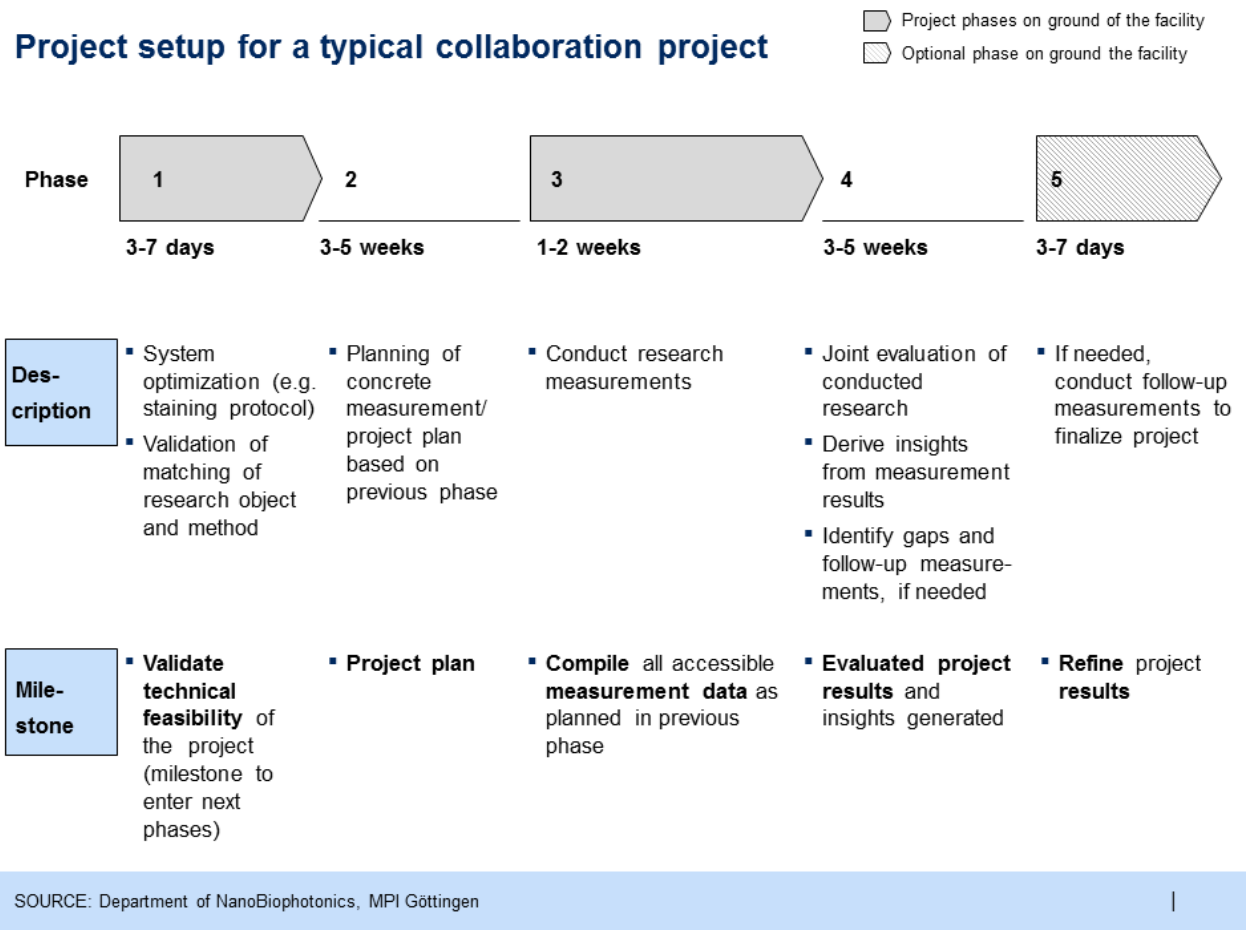
After short listing of 5-8 projects the final 2 to 3 projects are then selected via personal or phone discussions to select the most promising projects for the proof-of-principle phase.

3. Financials

Running costs, instrumentation and staff are a kind contribution from the hosting group (in this case Stefan W. Hells department). The costs for travel and accommodation are to be financed by the collaborator. The MPI for Biophysical Chemistry runs a guest house, where collaborators will be given a booking priority.

4. General setup of the project

The general setup of a typical collaboration can be divided into 4 to 5 phases, out of which at least 2 phases are co-working at the facility site (in the department of NanoBiophotonics in Göttingen) – on average these phases sum up to 2-3 weeks of total time being allocated in the facility. For details please see Fig. 2.



SOURCE: Department of NanoBiophotonics, MPI Göttingen

5. Projected output and milestones

Each of the described phases in the previous section has a defined milestone in order to guide the cooperation towards a fruitful scientific result for both sides (also see Fig. 2). Besides the scientific output the collaboration projects have to deliver output relevant to the Euro-BioImaging project. The project will be closely monitored under these main aspects:

- What are **unique requirements** for a collaboration regarding innovative microscopy technologies?

- What are **key success factors** (KSFs) to make a project collaboration with cutting edge microcopy technology successful
- What **pitfalls** have been observed that can threaten the success of a project

6. Complementary infrastructure

The MPI for Biophysical Chemistry in Göttingen also offers this complementary infrastructure that will also be accessible throughout the project:

- NMR measurement site
- Electron microscopy facility
- Mass spectrometry facility

7. Contact person

The contact person for running the collaboration project depends on the selection of projects and microscopy technologies. The project will be coordinated and the report be generated by Gerald Donnert, group member of the NanoBiophotonics department.

8. Potential outcome – learnings from past projects

There has already been conducted a broad portfolio of similar projects within the last years between collaboration partners and Stefan W. Hell's lab. Based on this experience there can right away be assembled a list of major KSFs regarding the setup of such collaborations (see Fig. 3).

A similar, more comprehensive outcome is expected from the described proof-of-principle setup within the framework of the Euro-BioImaging project.

KSFs for super-resolution projects from past collaboration experience

Topic	Key success factors (KSF's)
Knowledge	▪ **Both partners need to familiarize** and understand the **technology/methods** of the other side as detailed as possible **prior to planning a joint project**
Optimization	▪ **Preparation phase** (phase1) is essentially important to **exclusively** focus on system (i.e. biological system and imaging device) **optimization and adaptation**
Feasibility milestone	▪ **Jointly formulate milestone** that needs to be met in phase 1 (e.g. requirement on minimal resolution to be achieved, …) **to enter the main phase** of the project (phase 2-4)
Responsi-bilities	▪ **Imaging system** must be **under clear responsibility of one person** (person A), which is usually the person who build/"owns" the microscope setup ▪ **Person A exclusively conducts all measurements** done with the high-resolution device since only person A can judge the device performs within regular working conditions ▪ **Person B** must be prepared to **iteratively optimize/adapt target object** (i.e. staining protocol,…) during project phases **on ground the facility** regarding specific labels, specific coverglass requirements or mounting media
Commitment	▪ **Enough time on ground** of the facility needs to be **ensured** ▪ **Availability and time commitment** of person A and B **are most critical throughout** collaboration **phases on ground** the facility

SOURCE: Department of NanoBiophotonics, MPI Göttingen