



CSIR Synthetic Biology

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Call for PhD students or Post-Docs in Wave Front Engineering, Super-resolution Imaging and Visual Based High-Content Screening:

The Gene expression and Biophysics Unit at CSIR-Synthetic Biology is looking for a number of highly motivated persons with training in biological sciences, engineering, computer sciences and experimental optics.

Our international newly created group is interested in developing novel technologies in microscopy that range from artificial intelligence in image acquisition, stochastic super-resolution quantitative methods and visual based high content screening. We also are actively involved in training students in imaging and microscopy through training workshops see:
<http://microscopy.synbio.csir.co.za>

Open projects and positions:

Adaptive Sampling Microscopy and Wave Front Engineering (1 or 2 positions preferably Post doc):

Recently microscopy as been able to become parallel with Moore's law, technology developments have allowed us to achieve single molecule imaging in living cells and a macro-to-nano overview of how biology works. Although these amazing features can be achieved, most decisions based on hardware control are still carried out by humans. This project aims to create data driven computer assisted or artificial intelligence based microscope hardware control with the goal of creating an imaging system with optimal performance able to adapt to sample characteristics and through it minimize sample damage.

The candidate will be in charge of:

- Developing novel light microscopy set-ups able to spatially adapt the excitation illumination, sampling and sample environment
- Implement and develop new data driven microscope control and analysis methods

Dynamic Resolution in High Content Screening (2 positions preferably post doc):

Through high content screening microscopy, it is possible to overview the dynamic behavior of a large population of cells. This project aims to merge this technique with super-resolution light microscopy (PALM and STORM) by creating a dynamic decision scheme where the microscope creates a low magnification survey of target events that will trigger the super-resolution imaging of regions of interest. Especially in genome-wide approaches, such as siRNA screens.

The candidate will be in charge of:

- Developing image analysis, image quantification and hardware control methods
- Developing imaging assays amenable to genome-wide screening approaches, and drug screening approaches.

What we expect from the candidate(s):

We expect a strong interest in learning new experimental techniques and computational tools, and the ability to work in a highly collaborative environment. The following characteristics will be taken into account:

- Hands-On experience in Optical Microscopy
- Scientific programming in the languages Python or Matlab
- Basic knowledge of C, C++
- Experience in biology (preferable but not required)
- A keen interest in our research themes
- A true commitment to learn, explore, innovate & develop new skills
- A strong wish to share and synergize your expertise with all members of the group

We offer a position in a multi-disciplinary group and the possibility to work with state of the art microscopy hardware and data analysis resources like the Blue Gene cluster.

Research in our newly established and multi-national group spans the disciplines of "super" resolution imaging and image analysis/signal processing, the study and

imaging of gene expression, the development of cell-based bioassays for screening, and molecular genetics. Of particular interest are candidates with extensive and advanced training in biology as well as training in electrical engineering and automation/robotics.

What you should expect from us:

- Team work
- Acquire a profound understanding of Cellular Imaging, Quantitative Biology and High throughput biology
- Exposure and training in scientific writing, manuscript review and editing, and writing grant proposals
- Training in how to interpret, organise, present you data in lab meetings, seminars and international conferences. As well as extensive international exposure.
- Training to become independent
- Lots of hard work and fun

Candidates should be communicative, thoughtful scientists who are highly motivated, have good communication skills (both written and verbal), and have the desire to work with a dynamic, multi-disciplinary and international group. Interested candidates should contact Dr. Musa Mhlanga, mmhlanga@csir.co.za, for more information. The positions will remain open until they are filled.