University of Basel

Department of
Biomedical Engineering

University of Basel, Department of Biomedical Engineering, Hegenheimermattweg 167c, 4123 Allschwil

Master of Science – Biomedical Engineering
Thesis Proposal

Computer vision to automate bacterial single-cell analysis

Our lab recently developed Antimicrobial Single-Cell Testing (ASCT) – a platform that follows millions of individual bacteria across hundreds of conditions in a single experiment (http://bit.ly/3AePvnL). ASCT has already been used to predict infection outcomes in mice and humans, and provides information that conventional *in vitro* testing misses.

- The thesis project aims to optimise automated image analysis for *Pseudomonas aeruginosa*, including segmentation of overlapping objects, object tracking, and classification of bacterial viability states.
- This analytical pipely should be applicable to millions of images to accurately assess antibiotic activity, in *Pseudomonas aeruginosa* and potentially other gram negative pathogens.

Nature of the Thesis
Experimental: High-content live-cell imaging, 20%
Programming: Python and R for image and data analyses, 80%
Duration: 6 months
Location: Department of Biomedicine, University of Basel

Specific Requirements
- Strong motivation to tackle antibiotic resistance.
- High self-motivation and capacity to thrive in a multidisciplinary setting.
- Coding experience, and experience with machine learning is required.
- All applicants need to be fluent in English.

What we offer
- A potentially highly impactful research project which addresses antibiotic activity in an unprecedented resolution (single-cell) and scale (millions of cells).
- Cutting-edge infrastructure for imaging and high-performance computing.
- An interdisciplinary, international team committed to open science and mentorship.
- Direct pathway to a PhD position for outstanding MSc graduates.

Group Leader / Supervisor
PD Dr Lucas Boeck

Collaborators
Andres Floto, Cambridge, UK
Tingying Peng, Helmholtz Munich, Germany

Contact
Email one PDF containing your motivation letter, CV and transcripts to lucas.boeck@unibas.ch.
Applications are reviewed on a rolling basis. Early submission is encouraged.