Microbial community analysis using BiofilmQ

Tutors: Hannah Jeckel (jeckel@physik.uni-marburg.de)
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Session 1: 2020-11-30 15:00 UTC – 2020-11-30 19:00 UTC
Session 2: 2020-12-02 08:00 UTC – 2020-12-02 12:00 UTC

Software:

BiofilmQ (open source image analysis tool for spatiotemporal measurements of fluorescence images, optimized for microbial communities)

Tutors:

Hannah Jeckel, Biophysics PhD student, co-developer of BiofilmQ
Eric Jelli, Biophysics PhD student, co-developer of BiofilmQ
Niklas Netter, Master student, maintainer of BiofilmQ

Title:

Microbial community analysis using BiofilmQ

Abstract:

Biofilms are microbial communities that represent a highly abundant form of microbial life on Earth. Inside biofilms, phenotypic and genotypic variations occur in three-dimensional (3D) space and time, so that microscopy and quantitative image analysis are crucial to elucidate their functions. In this tutorial, we will introduce participants to BiofilmQ, a comprehensive image cytometry software tool for the automated high-throughput quantification, analysis and visualization of biofilm-internal and whole-biofilm properties in 3D space and time. Participants will have the opportunity to familiarize themselves with the graphical user interface of BiofilmQ and gain practical experience in analyzing image stacks of microbial communities based on two different quantification tasks. There will further be the possibility to ask general questions about BiofilmQ and its usage as well as to discuss specific quantification tasks depending on the interests of the participants.

Participants and technical requirements:

Groups size of max. 12 participants. Prior to the Tutorial, participants should download and install the latest BiofilmQ version and sample data here:
https://drescherlab.org/data/biofilmQ/docs/usage/installation.html

Participants are required to use a laptop or PC with headset and a browser capable of running Zoom (or other application, depending on the technical setup of the conference). Further, it should fulfil the technical requirements necessary to run BiofilmQ smoothly:

Property	**Optimal**	**Minimal**
CPU	Intel i7	Intel i5
RAM	64 GB	16 GB
Screen resolution	4K	16000 x 1200 px
Operating System	Windows 7 or higher	Windows 7 or higher, Linux, MacOSX

Outline (Times are given corresponding to a starting time of 9:00 am):

During the training, participants will work on sample data, which can be downloaded from the BiofilmQ website. After an introduction and a short "Quickstart", which will familiarize the students with the different functionalities of the tool, participants will be divided into two groups performing segmentation and analysis tasks based on two different research questions. This work will be in breakout rooms (or similar, depending on the technical setup) and assisted by one tutor in each room. Afterwards, the groups will present their results to each other and discuss the image analysis strategy of their group.

Time	Content
9:00 – 9:20	Presentation of BiofilmQ, including motivation, capabilities and limitations of the program as well as real-life examples.
9:20 – 10:10	Short introduction (3-4 min) by each student participant
10:10 – 10:20	Short break
10:20 – 10:50	Quickstart with BiofilmQ: Workflow for a simple segmentation (Trainer-guided training)
10:50 – 12:00	Practical work by students in 2 groups (breakout rooms, 1 trainer present in each room to support and answer questions)
12:00 – 12:30	Presentation of results by participants (15 min each group)
12:30 – 12:50	Q&A
12:50 – 13:00	Summary of resources available to get started and get help when using BiofilmQ (Forum, Documentation, Video Tutorials…)

Availability of tutors:

The tutorial can take place any time throughout the day in the German time zone. Possible times would for example be 9am to 1pm for the morning slot and 4pm to 8pm for the evening slot, but we are flexible and can adapt to other requirements.