M1-Molecular and Cellular Biology (MCB)
Internship Proposal Form
Chemistry-Biology Department

(Deadline Friday 18th December 2020)

Laboratory Address and Affiliation:

Institut de Biologie Structurale - CNRS(UMR5075)/CEA/UGA
71, avenue des Martyrs
CS10090
38044 Grenoble Cedex 9, France

Laboratory/Team Research area (Keyword)

Institut de Biologie Structurale - Pneumococcus group (Headed by T. Vernet)

Bacterial division, morphogenesis, cell wall. Fluorescence microscopy (including super-resolution microscopy). Click chemistry. Structural and cellular biology.

Summary of the Proposed Internship Project (10 lines)

Title:
Study of bacterial division using super-resolution fluorescence microscopy
DESCRIPTION:

Bacterial division, morphogenesis and survival are intimately linked to cell wall metabolism. Despite its importance as fundamental knowledge and as a source of antibiotic targets, we still poorly understand how cell wall is synthesized in space and time to ensure proper cell division, shape and integrity. Single-molecule localization microscopy allows observation of cellular processes at resolutions 10 times higher than conventional fluorescence microscopy. Our team has implemented this powerful approach in the human pathogen *Streptococcus pneumoniae* to observe the positioning and architecture of protein machineries (Jacq et al., 2015), as well as their cell wall synthesis activities. During his internship, the student will use these breakthrough nanoscopy techniques to study the role of key division proteins.

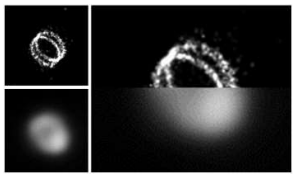

Fig. Cell wall synthesis in a *S. pneumoniae* cell observed with conventional (lower panels) and super-resolution (top panels) microscopy techniques.

- Jacq, ..., Morlot (2015). Remodeling of the Z-ring nanostructure during the *S. pneumoniae* cell cycle revealed by PhotoActivated Localization Microscopy. *mBio* 6(4). Pii: e01108-15

Methodologies and/or Techniques to be used

PhotoActivated Localization Microscopy (PALM), data acquisition and processing
direct STochastic Optical Reconstruction Microscopy (dSTORM), data acquisition and processing
Bioorthogonal click chemistry for metabolic labeling
Microbiology (cell culture, cell immunolabeling, characterization of phenotypes)

Person to contact:

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E-mail: cecile.morlot@ibs.fr

Additional information

We are looking for highly motivated students who would ideally want to continue their studies with a M2 and a thesis. Candidates for this internship should send a CV, a motivation letter, their L3 grades and first M1 grades if available.

Proposal Form send as a PDF fil to: mohamed.benharouga@cea.fr

File has to be named as: name-Internship-M1-MCB-2019.pdf