

Sujet de stage

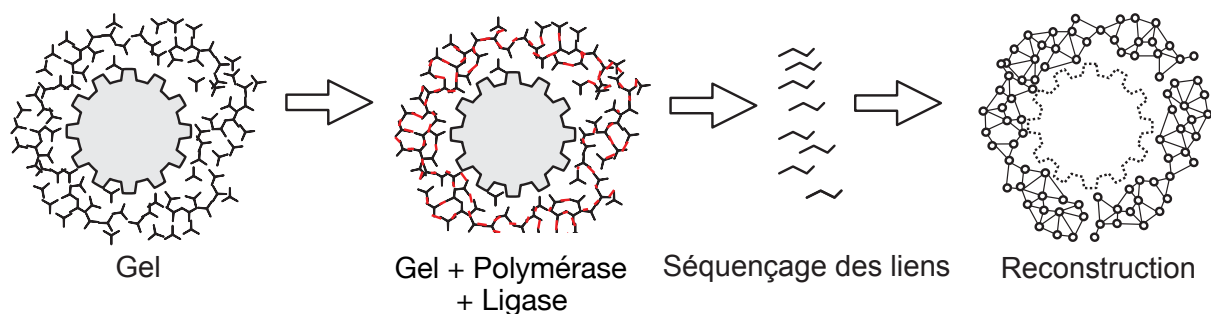
Microscopy by sequencing

Advisors:

Yannick RONDELEZ (Gulliver, ESPCI, Paris)
& Nicolas SCHABANEL (LIP, ENS de Lyon)

Abstract

Recent advances in DNA next generation sequencing technologies (NGS) have been extremely fast. Second or third generation machines can routinely read million of individual strands and produce Gb of sequencing data, enough for example to encode full YouTube videos (). A number of recent research have looked at possible applications for such massive extraction of molecular information. In this project, we want to explore a new possibility, outside of biology: to extract the shape of an unknown microscopic object through the combination of DNA-gels and NGS. The idea is to create a gel around an object of interest using randomly barcoded DNA monomers, and then extract the connectivity of the individual molecular subunit forming the gel by ligation followed by sequencing. This data will then inform a shape-reconstructing algorithm.



This project will be a challenging internship and requires a strongly motivated student with interest for both cutting edge molecular technologies and computer sciences.

Localization

This internship will be bilocated at ESPCI (Paris) and at ENS de Lyon. The intern may choose its main localization at any of the two places.

Please contact us at for more details :

Yannick.Rondelez@espci.fr - www.yannick-rondelez.com - 01 40 79 51 05

Nicolas.Schabanel@cns.fr - <http://perso.ens-lyon.fr/nicolas.schabanel/> - 06 12 84 45 89

Related articles:

- Jay Shendure, Shankar Balasubramanian, George M. Church, Walter Gilbert, Jane Rogers, Jeffery A. Schloss & Robert H. Waterston. *DNA sequencing at 40: past, present and future*. *Nature* volume 550, pages 345–353 (19 October 2017)
- Chikako Kurokawa, Kei Fujiwara, Masamune Morita, Ibuki Kawamata, Yui Kawagishi, Atsushi Sakai, Yoshihiro Murayama, Shinichiro M. Nomura, Satoshi Murata, Masahiro Takinoue and Miho Yanagisawa. *DNA cytoskeleton for stabilizing artificial cells*. *PNAS* vol. 114, no. 28, pages 7228–7233 (July 11, 2017)