

# SEMS: RESEARCH PROJECT DESCRIPTION

## 1. Project Background and Description

### *Design of inherently viricidal surfaces based on polymer brushes*

*A studentship in the chemistry of intrinsically viricidal polymer coatings is available in the group of Prof J. Gautrot at QMUL (<http://biointerfaces.qmul.ac.uk>). Considering the impact of rapid viral transmission during the current pandemics due to SARS-CoV-2, strategies enabling to limit the transmission of viral particles and better protect frontline healthcare workers is essential. Developing surfaces and interfaces that are inherently viricidal is of particular importance for the coating of protective equipment that may become contaminated during surgical procedures or whilst caring for contaminated patients. The development of coatings for masks that are able to better capture and disrupt viral particles in aerosols is another particularly interesting strategy for limiting the spread of viral particles. Such coating would greatly reduce the risk of infections. The research will focus on the development of novel polymer brushes displaying inherently antiviral particles and the characterization of their chemistry and physico-chemistry. This project will explore the mechanism of viral particle disruption and will aim to characterize their efficacy in collaboration with clinicians in the Barts Hospital in London and researchers at EPFL.*

## 2. Project Scope

*Within this project, you will be trained in the growth of polymer brushes and their characterization using techniques such as ellipsometry, FTIR, XPS and AFM. You will develop an exciting range of polymer brush chemistries that aim to display viricidal properties. To understand the mechanism of action of these polymer coatings, you will study how their physico-chemistry impacts on their interaction with proteins implicated in viral particle disruption, using techniques such as surface plasmon resonance, quartz-crystal microbalance and neutron reflectometry. Finally, you will work with collaborators (clinicians and virologists) and be trained in assays aiming to evaluate the antiviral activities of these coatings.*

## 3. Desired Skills from the Student

*Candidates are expected to have a background in chemistry or materials science, with a particular interest in the study and characterization of surface chemistry.*

## 4. Supervisory Team

*Add supervisory team details*

*Primary: Prof. Julien Gautrot.*

*Secondary: Prof. Steffi Krause.*

*Additional: Dr Maria-Teresa Cutino-Moguel (Barts Hospital).*