

# Confirmed keynote speakers for the 4<sup>th</sup> NDPIA/SFM Day 2 October 2018

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## **Professor Sarah Butcher**

Molecular and Integrative Bioscience Research Programme,  
Institute of Biotechnology, University of Helsinki, Finland

### **Research into macromolecular structure and function -Nanoparticle description and tracking in virology and drug delivery**

Our work aims to understand the structure, assembly and function of biological macromolecule complexes. We embed unstained, unfixed specimens in vitreous ice to preserve their structures. Transmission cryo-electron microscopy is then used to visualize the specimens, but the images recorded are difficult to interpret because they are projections of the specimen degraded by noise. Thus we computationally combine images of the specimen viewed from different angles enabling us to reconstruct a three-dimensional model. Any inherent symmetry present in the structure is also used in this averaging. This method is particularly useful for objects that are too large, unstable or variable to be studied by X-ray crystallography or NMR, such as enveloped viruses.

Research Interests: Assembly and structure determination of viruses, drug delivery, lipids in cells, self-assembly of chlorosomes, cryo-electron microscopy, image processing, crystallography.

Additional information: <https://blogs.helsinki.fi/butcher/>,  
[https://tuhat.helsinki.fi/portal/en/persons/sarah-butcher\(19e4e596-5744-423e-9463-b976e6df5f93\).html](https://tuhat.helsinki.fi/portal/en/persons/sarah-butcher(19e4e596-5744-423e-9463-b976e6df5f93).html)

## **Professor Tone Tønjum**

Department of Microbiology  
Institute of Clinical Medicine  
University of Oslo  
Norway

Division of Laboratory Medicine  
Department of Microbiology  
Oslo University Hospital  
Norway

Professor Tone Tønjum leads a research team within Genome Dynamics at Oslo University Hospital.

The **Genome Dynamics** group main focus is studying the mechanisms involved in the changing and maintenance of genomes in both microbes and man, and the effect this has on function and disease. This involves the study of DNA repair mechanism in both man and microbes and the study of horizontal gene transfer in microbes. These mechanisms are essential for the development of antimicrobial drug resistance (AMR). By understanding AMR, novel diagnostics and drugs - and alternatives to drugs – can be developed.

Additional information: <https://www.ous-research.no/tonjum/>

**Professor Guillaume Dumenil**

Pathogenesis of Vascular Infections Unit, INSERM  
Institute Pasteur, Paris, France

We study the **pathogenesis of *Neisseria meningitidis*** (or meningococcus), a Gram-negative bacterium that recapitulates these different pathological effects. This bacterium asymptotically colonizes the human nasopharynx and pathology is initiated when the bacterium crosses the nasopharynx epithelium and reaches the bloodstream where they survive and proliferate.

Outstanding questions in terms of understanding *N. meningitidis* pathogenesis include: how do bacteria cross the epithelium and reach the bloodstream? How do they survive in the blood? How do they damage vessels and reach the cerebrospinal fluid (i.e. cause septic shock and meningitis)?

We have recently identified a mechanism that facilitates the crossing of the epithelium by the bacterium. This mechanism relies on the activity of a bacterial transferase that modifies the major component of type IV pili.

Additional information:

<https://research.pasteur.fr/en/team/pathogenesis-of-vascular-infections/>