Infectious diseases
A global crisis in need of new solutions

Epidemic viruses
- Influenza variants: H5N1, H7N9, H1N1, H1N1, H7N9
- Zika (2015/16)
- Ebola (2014–16)
- SARS-CoV-2 (2019/20)

Antimicrobial resistances on the rise
- EU: 25,000 deaths per year and 2.5m extra hospital days
- USA: 23,000 deaths per year and more than 2.0m illnesses
- India: 58,000 babies died in one year; usually passed on from their mothers

Poverty related diseases
- Tuberculosis – 1.3m deaths per year
- Malaria – 1m deaths per year
- AIDS – 0.75m deaths per year

How to prevent the next pandemic?
Photonic solutions for urgent questions in infection diagnostics

Pathogen
Virus? Bacterium? Fungus?

Antibiotic resistance
Is the pathogen resistant?

Host response
How is the immune system responding?

Best therapy
What is the optimal therapy?

Well-funded research in Photonics enables:
- Efficient & easy sample preparation
- Fast detection of pathogens
- Antibiotic sensitivity testing
- Early sepsis diagnosis
- Online monitoring of therapies

Photonics in infection diagnostics

Sample analytics
- Saliva/Swabs
  - Spectroscopy
  - Fluorescence-based methods

Breathing gas
- FIBS
- Chemiluminescence

BAL
- Spectroscopy
- Fluorescence-based methods

Blood
- Cytometry
- Spectroscopy

Urine/Feces
- Spectroscopy
- Fluorescence-based methods