

# New Horizons Solvay Lectures



## Professor Aleksandra Walczak LPT ENS, Paris, France

### BIO:

Aleksandra Walczak received her PhD in physics at the University of California (US), working on models of stochastic gene expression. After a graduate fellowship at the Kavli Institute for Theoretical Physics (California), she worked on applying information theory to signal processing in small gene regulatory networks at the Princeton Center for Theoretical Science (US). Currently based at the École Normale Supérieure as a CNRS researcher, she studies the effects of selection on population genealogies, collective behaviour of bird flocks and statistical descriptions of the immune system. Dr Walczak was awarded the "Grand Prix Jacques Herbrand de l'Académie des sciences" in 2014 and the bronze medal of CNRS in 2016. Her starting ERC project 'RECOGNIZE' focused on the self-organization of the immune repertoire at the molecular and evolutionary level, by using a combination of data analysis and statistical mechanics modelling. Her current consolidator ERC project 'STRUGGLE' explores the statistical physics of immune-viral co-evolution.

## PREDICTION IN IMMUNE REPERTOIRES

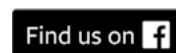
**ABSTRACT:** Our adaptive immune system protects us against a wide variety of different pathogens – many of which were not around when we were born. How can our immune system be prepared for the many unknown pathogens that we will encounter throughout our lives? To make the job harder, the pathogens keep changing and evolving, forcing the immune system to change. In this talk, I will use statistical inference to quantify how nature uses statistics to generate diversity and be prepared to respond to many challenges. I will also describe stochastic prediction strategies that are consistent with our vision of this self-organised protection system.

**Tuesday 30 April 2019 at 4.00 P.M.**

**Drinks will be served at 5:00 p.m. in front of the Solvay Room**

SOLVAY ROOM

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