PAUL FRANCOIS, McGill University
Information in cytokine dynamics : robotic mapping and machine learning

An immune response is by essence a collective computation. Starting with the initial activations of few T cells, a complex dance of immune actors self-organize over long time scales. Understanding how and why immune cells communicate with one another to perform this response could be key to a better understanding of personalized medecine and immunotherapy. In collaboration with Gregoire Altan-Bonnet (NIH), we have developped a pipeline to study, decode and model cytokine communications between T cells. I will show how simple machine learning allows to project the complex immune response into a 2D latent space, where immune parameters can be simple deconvolved. Remarkably, this suggests a simple model of collective communication and computation, highly reproducible and universal. I will show how our approach can be used to predict quality of unknown antigen, and how it can potentially help to better estimate success of immunotherapy.