



Spring Retreat 2023

Monday 27th March (Faculty Attending: Pietro Siorpaes, Blanka Horvath, Ben Hambly)

12:00	Welcome & Lunch	
1:30	Faculty Talk: Ben Hambly <i>Particle systems and systemic risk</i>	
2:30	Break	
3:00	Adam Jones	Deep Hedging
3:30	Timothy Kang	Quasimartingales, Riesz spaces and singularity
4:00	Nicholas Daultry Ball	Deep Learning for the BGK equation
4:30	Break	
7:30	Dinner	



Tuesday 28th March (Faculty Attending: Jeroen Lamb, Cristopher Salvi)

10:00	Tianyi Liu	Stochastic Resonance
10:30	Samuel Lam	ODE methods for convergence of multiple stochastic gradient descents algorithms
11:00	Break	
11:30	Vincent Govere	Random Billiards
12:00	Nicola Muca Cirone	Signature Kernel Hedging
12:30	Lunch	
2:00	Jacob Mercer	Topics on Branching Brownian Motion
2:30	Sarah-Jean Meyer	A Forward-Backward Approach to the sine-Gordon model
3:00	Break	
3:30	Faculty Talk: Cristopher Salvi <i>Recent developments in signature kernel methods</i>	
4:30	Break	
7:30	Dinner	

Title: ϕ -signature kernels as infinite-width limits of neural controlled differential equations.

Abstract: Motivated by the paradigm of reservoir computing, I will consider randomly initialized neural controlled differential equations and show that in the infinite-width limit and under proper rescaling of the neural vector fields, these architectures converge weakly to Gaussian processes indexed on pathspace and with covariances satisfying certain PDEs varying according to the choice of activation function. In the special case where the activation is the identity, the equation reduces to a linear PDE and the limiting kernel agrees with the original signature kernel. This is based on joint work with Nicola Mica Cirone and Maud Lemerrier.



Wednesday 29th March (Faculty Attending: Jeroen Lamb, Christoph Reisinger)

9:30	David Villringer	The Stochastic Burgers Equation
10:00	Jullius Villar	Smooth Gaussian Fields and Percolation
10:30	Holly Chambers	Modelling Biological Systems with Hidden Variables
11:00	Break	
11:30	Faculty Talk: Jeroen Lamb	
12:30	Lunch	
2:00	Local walk for 2-3 hours at leisurely pace.	
5:00	Break	
7:30	Dinner	



Thursday 30th March (Faculty Attending: Christoph Reisinger)

9:30	Zihao Shen	Some new methods on vorticity estimates of fluid dynamics
10:00	Luca Marino	Optimal feedback law recovery by gradient-augmented sparse polynomial regression and possible extensions
10:30	Break	
11:00	Jad Hamdan	The Gaussian Marchenko-Pastur Ensemble
11:30	Break	
12:30	Lunch	
2:00	Depart	