

# Statistical physics group

2<sup>nd</sup> floor, Building 210

Cécile Appert-Rolland

université  
PARIS-SACLAY

 IJCLab  
Irène Joliot-Curie  
Laboratoire de Physique  
des 2 Infinis

# Group members

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- Permanent, ATER, Ph.D., Emeritus
  - Gatien Verley → Stochastic processes and thermodynamics
  - ~~Paul Raux → ATER Paris Saclay~~ → Postdoc Stuttgart
  - Henk Hilhorst → Stoch. processes, exact methods
  - Cécile Appert-Rolland → Transport modeling
  - Konstantinos Koutsomitis → Pedestrian modeling (with LPTMS)

# Stat. Mech. and Complex systems: Overview

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- Top Down / Bottom up approaches
- **Classical** / Quantum
- Equilibrium / **Non-equilibrium**
- Linear / Non-linear theory
- Applications (Chemistry, Crowds, Biology, ...)

# Henk Hilhorst

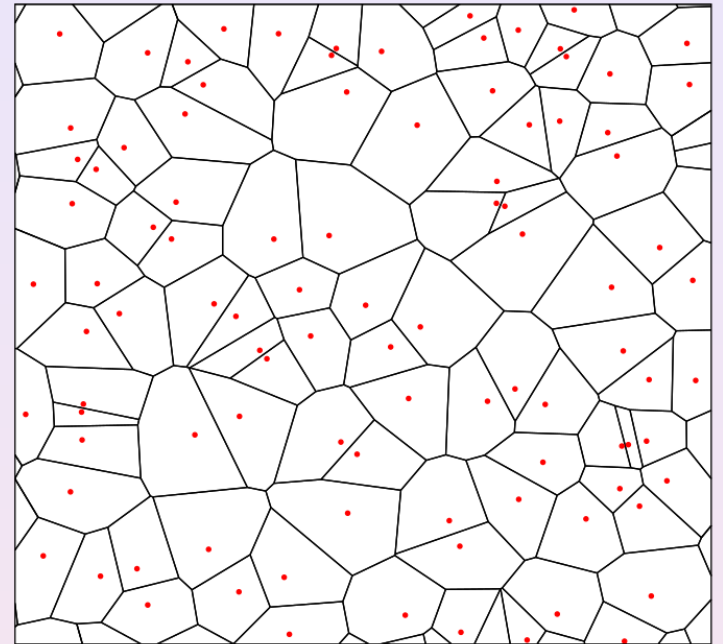
- Stochastic processes

- Application to Voronoi cells
- Application to interacting active particles (in progress)

- Exact methods for models of ferromagnetism (Ising, ... )

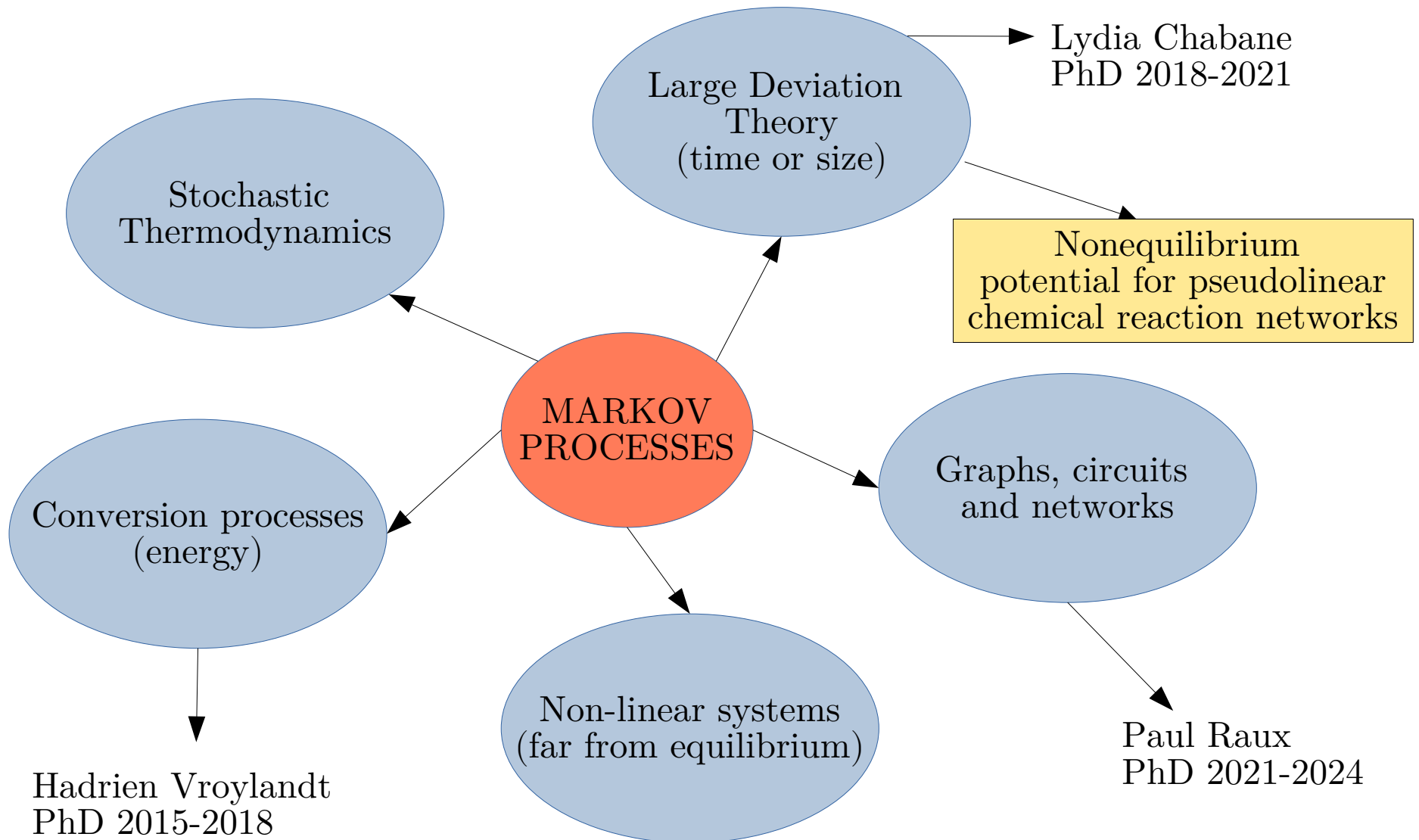
- Collab. with C.A-R on toys models for biology / crowds

*Voronoi diagram*



# Gatien Verley

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# Undergoing works

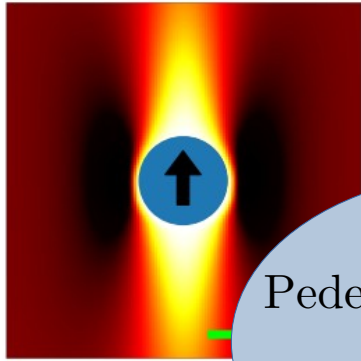
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- **Circuits of thermodynamic devices in NESS**
  - Applications to chemical reactions networks :  
global VS modular approaches  $\Rightarrow$  computational efficiency ?
- **Pseudolinear chemical reaction networks**
  - Large deviation of **currents**, chemostat **activity** & **concentration**  $\Rightarrow$  thanks to pseudo linearity, analog to a former work on Markov jump process
- **Teaching:**
  - L2 Geometric Algebra
  - L3 Electromagnetism & optics
  - L3 & M1 energy conversion
  - Agregation : lab work

# Cécile Appert-Rolland

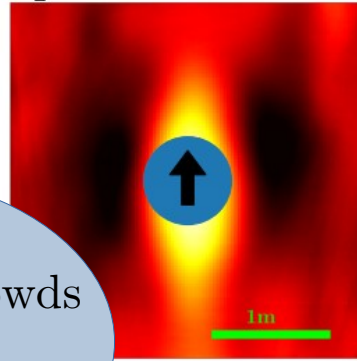


MFG Simulation



see  
Konstantinos  
Koutsomitis

Experimental Data



Pedestrian & Crowds  
Project: PiéCaMP

Collab.  
Ankita Gupta

Toy-models for  
out-of-equilibrium  
systems



TRANSPORT

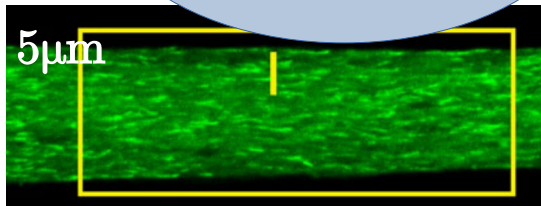
Models

Heat transfer in  
building insulation,  
etc

Intracellular transport

Electrical networks  
Project Gameworks

Anomalous  
diffusion  
(with Henk  
Hilhorst)



polymerizing  
microtubules

# Environment enthusiasts

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- ECOCLIM 2018, 2021, 2022, 2023



- WG environment of IJClab (cf G. Blanc)
- “R f rent environnement” for the Pole Th orie

# Hobbies & interests

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- **Gatien :**
  - 1 girl, 1 boy (3 and 5 years old)
  - Board games fan
  - Dancing & parties !
- **Cécile :**
  - 3 young adults as children
  - Singing (baroque music...)
- **Henk:**
  - Linguistics

