Postdoctoral Position
Extremal values of spatial branching processes

Institut de Mathématiques de Toulouse, Université Toulouse 3 Paul Sabatier

We are opening a two-years postdoctoral position at the Mathematical Institute of Toulouse (France) funded by the ANR project MBAP-P on the study of Branching Markov Additive processes, in particular the asymptotic properties of their extremal values. Applicants should have a PhD in Probability or closely related areas, with a strong mathematical background and a keen interest in the study of branching processes.

- Applications will start to be evaluated on January 15th 2025, but later applications will be considered on a rolling basis until the position is filled.
- The starting date is negotiable, and is expected to be in 2025. The total duration will not exceed tow years (24 months).
- The salary is based on a grid taking into account previous postdoctoral experience, but should not be less than 2600€ per month gross. Health insurance and other social benefits are included. The position comes with additional funding for travel.
- The application should consist in a scientific curriculum vitae including a list of publications and a motivation letter including a list of two people who may be contacted for reference letters. This application should be sent by email to Bastien Mallein (bastien.mallein@math.univ-toulouse.fr). Any request for further information can be sent to the same address.
- Qualified candidates with a previous research record in branching random walks, branching Brownian motion and/or large deviations will be particularly appreciated.
- The successful candidate will be involved in a number of projects related to the study of spatial branching processes led by Bastien Mallein and the members of ANR MBAP-P. See the page of the project for more details.

Potential research project.

- Precise large deviations for persistent random walks.
- Study of martingales associated to branching processes in which particles move according to independent Markov Additive Processes.
- Description of the extrema of a branching process with persistent motion.
- Characterization of the class of Markov Branching Additive Processes.

References

[1] E. Bouin et al. Large-scale asymptotics of velocity-jump processes and non-local Hamilton-Jacobi equations. *J. Lond. Math. Soc., II. Ser.*, 108(1):141–189, 2023.

[2] P. Dyszewski and N. Gantert. The extremal point process for branching random walk with stretched exponential displacements, 2024.

[3] E. Horton and A. E. Kyprianou. *Stochastic neutron transport. And non-local branching Markov processes.* Probab. Appl. Cham: Birkhäuser, 2023.

[4] H. Hou, Y.-X. Ren, and R. Song. Extremal process for irreducible multitype branching brownian motion, 2023.

[5] Y. H. Kim, E. Lubetzky, and O. Zeitouni. The maximum of branching Brownian motion in $\mathbb{R}^d$. *Ann. Appl. Probab.*, 33(2):1515–1568, 2023.