Connecting models of thermally-activated screw dislocation motion

This talk will discuss rigorous results for models of thermalised screw dislocation motion obtained in collaboration with Mark Peletier and Patrick van Meurs. Starting from a model for screw dislocation motion as a jump process on a 2D lattice, I will motivate an SDE model for collective motion in the regime where the lattice spacing is small compared with the specimen, and deterministic mean-field approximations in the case where the number of dislocations in the system is large. Using various analytical techniques, I will then explain how we obtained quantitative bounds on the divergence in law between these models, and so provide a rigorous connection between the parameters in the different models.