The dynamics and propagation of riots

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In this lecture, I will report on a model aiming at studying the dynamics and spreading of riots. It involves an epidemiological approach for the dynamics with a diffusion interaction term. I will discuss this model in the setting of the French riots of 2005 and compare its outcome with a rather detailed set of data for these riots. I will also describe a more general class of reaction-diffusion systems that are relevant in this context.

Henri Berestycki is a professor at EHESS (École des Hautes Études en Sciences Sociales – School of Higher Studies in Social Sciences), PSL University, Paris, where he holds the chair of Mathematical analysis and modelling since 2001. His previous positions included the University of Chicago (first as a post-doc, and then as a regular visiting professor), Professor at Sorbonne Université Paris, Ecole Normale Supérieure in Paris, and in Stanford University where he was the Poincaré Distinguished Visiting Professor in the first half of 2019. He was the director of the Master Program in financial mathematics at the University of Chicago (2010 - 2012) and the Dean of Research of PSL University in Paris (2015 -2017). He was a student at Ecole normale supérieure in Paris. The recipient of several awards, Henri Berestycki received in particular the Sophie Germain Prize (2004) of Académie des Sciences Paris and the Humboldt Prize, Humboldt Foundation, Germany (2004). He is a Knight of the French Legion of Honor (2010) and a Fellow of the American Mathematical Society (2012). Since 2013, he is Foreign Honorary Member of the American Academy of Arts and Sciences. He supervised over 30 PhD theses. Henri Berestycki is the author of over 150 articles published in international scientific journals. Among other grants, he was awarded a European ERC advanced grant 2013-2019, for the "ReaDi" project on “Reaction-Diffusion Equations, Propagation and Modelling”. A specialist of non-linear partial differential equations, Henri Berestycki has contributed to the mathematical theories of elliptic and parabolic partial differential equations, non-linear analysis, and reaction-diffusion equations. In modelling, his work interacts with a variety of fields. Several of his works were motivated by physics, in particular combustion theory. His current interests lie mostly in modelling in biology, ecology and social sciences. In particular he recently devoted series of works to propagation in non-homogeneous media, dynamics of riots, territory formation by predators and influence of transport lines with fast diffusions on biological invasions.