## Many fire-ant systems: Force chains, waves and effective attractions

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We are all familiar with how gravity affects the equilibrium state of a fluid inside a container, be it atomic or colloidal. If we use grains instead of thermal particles, friction dramatically changes the behavior, and if these are additionally active, it is not obvious whether the behavior will resemble that of atoms or colloids, with activity playing the role of some sort of temperature, or whether it will be better thought in terms of granular packings subjected to fluctuations. In this talk, we will address these and related questions using fire-ant collectives [1-3]. We will show that force chains, ant waves and effective attractions all seem to play a role depending on the physical situation under consideration.

## Referencias

[1] C. J. Anderson, P. A. Gibson, A. Fernandez-Nieves, Janssen effect in columns of fire ants, Physical Review E 106, L012604 (2022).

[2] C. J. Anderson, A. Fernandez-Nieves, Social Interactions Lead to Motility-Induced Phase Separation in Fire Ants, Nature Communications 13, 6710 (2022).

[3] C. J. Anderson, G. Goldsztein, A. Fernandez-Nieves, Ant Waves – Spontaneous activity waves in fireant columns, Science Advances 9, eadd063 (2023).