

# Invited: Travelling through the galactic potential

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Molecular clouds are the result of the interchange and evolution of gas as it travels through the galaxy through a wide range of conditions, densities and scales. It is therefore essential that we understand the galactic journey of the molecular gas, if we want to determine the global galactic processes which regulate how molecular clouds are formed, shaped, and able to form stars. In this talk, I will focus on a particularly striking type of clouds, the so-called giant molecular filaments, which are extremely elongated clouds, some reaching more than 100pc in length. Giant molecular filaments have been observed in both the Milky Way and nearby spiral galaxies, and are thought to be tightly linked to the larger-scale motions of spiral galaxies. It is not clear, however, if these extreme clouds trace any particular region in spiral galaxies and/or if they represent an important step on the evolution of molecular clouds in general. Here I will follow the formation and evolution of giant molecular filaments within our galaxy-scale simulations, and explore how different galactic environments can affect the observable properties of clouds, by following them as they travel from the shear-dominated inter-arm regions into and through spiral arms. I will explore our findings and their consequences in light of both Galactic and extragalactic observations.

*Galactic Scale*