

Science talk title: Unraveling the journey of interstellar carbon – from molecular clouds to solar systems

Abstract:

Less than a hundred years ago astronomers believed that molecules could not survive in the harsh environments found in interstellar space. However, advancements in radio astronomy completely changed our picture of the molecular universe. Today, over 300 molecules have been detected in the interstellar medium, including exotic and unstable species as well as many “terrestrial” organic molecules. Some of these interstellar molecules have been detected in space without ever being created on Earth.

Dense molecular clouds are the earliest stage of star formation and provide the molecular ingredients that will make up new planets and solar systems. I will present some of our recent observations of molecules in a molecular cloud in Taurus, TMC-1. In particular, I will highlight our detections of carbon-bearing molecules, including the largest identified yet using radio astronomy. In order to understand how these molecules can form in TMC-1, laboratory experiments can be used to simulate interstellar reactions and quantify their kinetics. I will discuss how we implement laboratory astrophysics tools to unravel interstellar pathways to organic molecules.