

TSI SEMINARS - FALL 2026

Regulating the Growth of Galaxies Through their Atmospheres

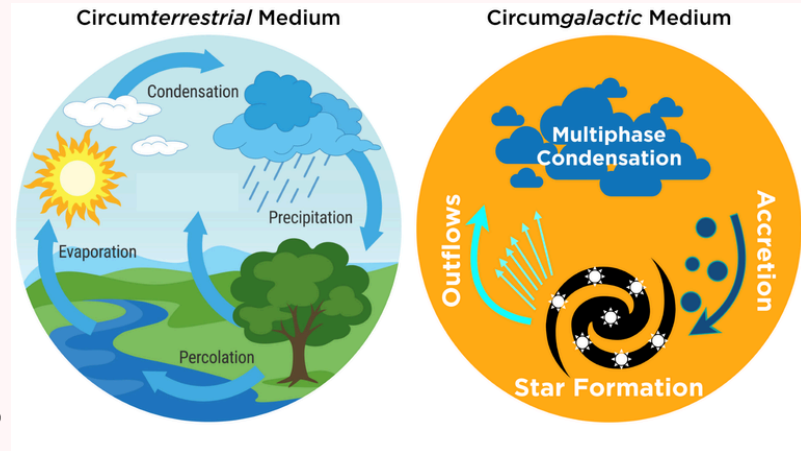


Image Credit: Drummond Fielding at NYU

Dr. Chris Carr, Princeton University

Abstract: The circumgalactic medium (CGM) is the galaxy's atmosphere. This low-density gas surrounding and between galaxies makes up most of the baryonic matter in the universe, yet how it interacts with galaxies — its physical state, its spatial distribution, and how it arrived there — remains deeply uncertain. Through my talk, I will introduce a simplified, one-dimensional analytic model of the CGM-galaxy connection to describe how matter and energy cycle in and out of galaxies, and how these large-scale flows imprint themselves on the physical and chemical makeup of the gas inside galaxies and their atmospheres. I will show how this model self-consistently couples mass and energy outflow rates from galactic winds to the large-scale heating and cooling of the CGM, self-regulating the growth of galaxies consistent with fundamental galaxy scaling relations.

Finally, I will discuss ongoing efforts to extend this framework to the coupled evolution of the CGM and the structure of galaxy disks and conclude with future research directions exploring how CGM energetics interact with feedback in galaxy groups and clusters to redistribute baryons on cosmic scales.



**October 27,
3:30 PM**



**Bell Room
(Rutherford 103)**