



Caius Science Network

## The Lent 2025

### *CSN informal talks*

21:00, March 10<sup>th</sup>, Senior Parlour

#### **Mor Rozner** – Correlation between planet formation rate and gas surface density: an analog of Kennicutt Schmidt law for planet formation

The efficiency of planet formation is a fundamental question in planetary science, gaining increasing significance as observational data from planet-forming disks accumulates. Here we derive from first principles a correlation between the planet formation rate (PFR) and the gas surface density, i.e.  $PFR \sim (\Sigma_g)^n$ . This relation serves as an analog for the well-established Kennicutt-Schmidt law for star-forming galaxies. We study the different planet formation mechanisms and the density dependence in each one of them, to finally formulate a simple relation. We find that the power law,  $n$ , ranges between (approximately)  $4/3$  and  $2$ , depending on the type of the forming planet, when we carry out different analyses for the formation rates of terrestrial planets, gas giants, and also planets formed by gravitational instability. We then compare our results with the available observational data. The relation we derive here aims to shed more light on the interpretation of observational data as well as analytical models, and give a new perspective on the properties of planet formation and its connection to gas.

#### **Yizhou Yu** – Developing safe and affordable therapies for Alzheimer's through AI and probiotics

Alzheimer's disease affects over 60 million people worldwide, yet treatments remain costly and limited. In this talk, I will discuss how we combined machine learning, laboratory validation and probiotics to develop a novel, affordable therapy targeting mitochondrial health to improve brain resilience. Our evolved bacterial strains show neuro-protection in preclinical models, paving the way for affordable, safe and effective solutions for millions with AD.

\* For more details on the CSN meetings, including previous talks, visit: <https://rafi.blumenfeld.co.uk/CSN/CSN.html>