

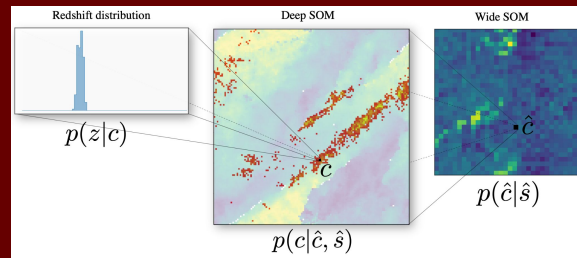
# Chair for Astrophysics, Cosmology, and Artificial Intelligence

We are starting a new research group with these three current highlights.

Visit us or apply for faculty, postdoctoral, and PhD positions! [daniel.gruen@lmu.de](mailto:daniel.gruen@lmu.de)



**Principled AI** architectures for the **accurate calibration** of photometric galaxy surveys



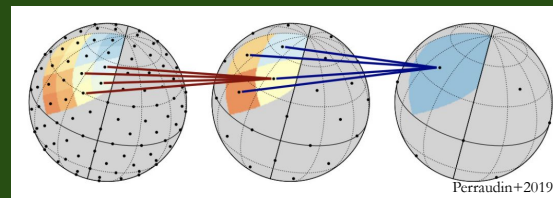
Buchs & Davis+ 2020; Myles & Alarcon+ 2021:

**Photometric redshift calibration** of the Dark Energy Survey Y3 data with a scheme to two self-organizing maps

Gruen+2010; MacCrann+2021; McCullough in prep.

**Shape measurement calibration** supported by machine learning

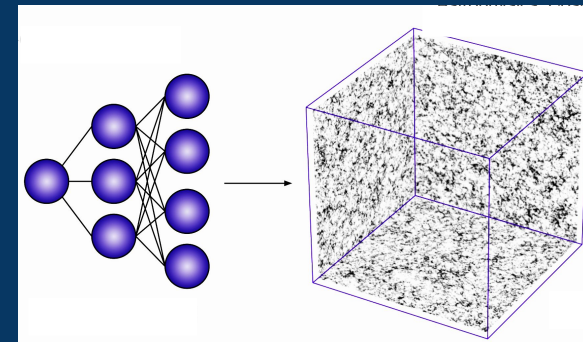
AI as a tool for exploring and using the **full information content** of cosmological data



Ongoing work by Adirayu; Nayak; Friedrich  
**Information content** of non-Gaussian features in cosmic density maps

Gruen+2017; ongoing work by Myles, McCullough  
Estimating and reducing **sample variance and bias** in redshift calibration

**Generative models** for e.g. small scale density field, galaxy population, transfer function



Ongoing work on the generation of density fields (Homer), galaxy positions (Britt), galaxy populations (Tortorelli), photometric data (Gebhardt), galaxy clusters (Capasso) for mock challenges and Bayesian analysis of data