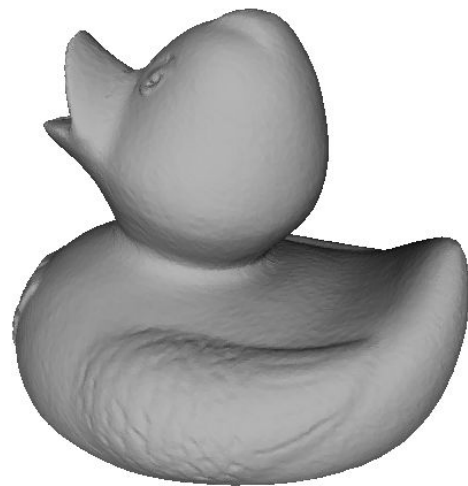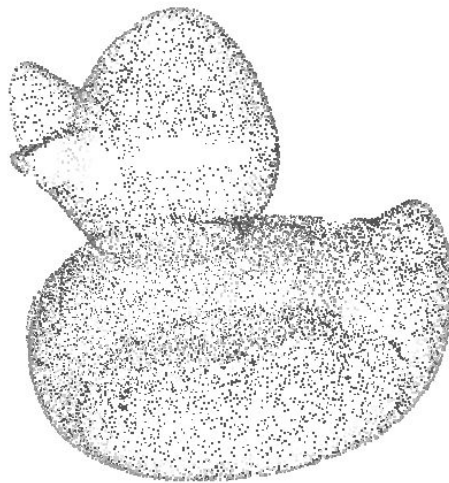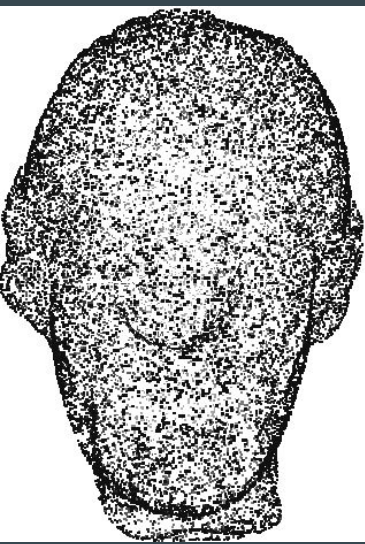# Tensor Field Networks

• • •
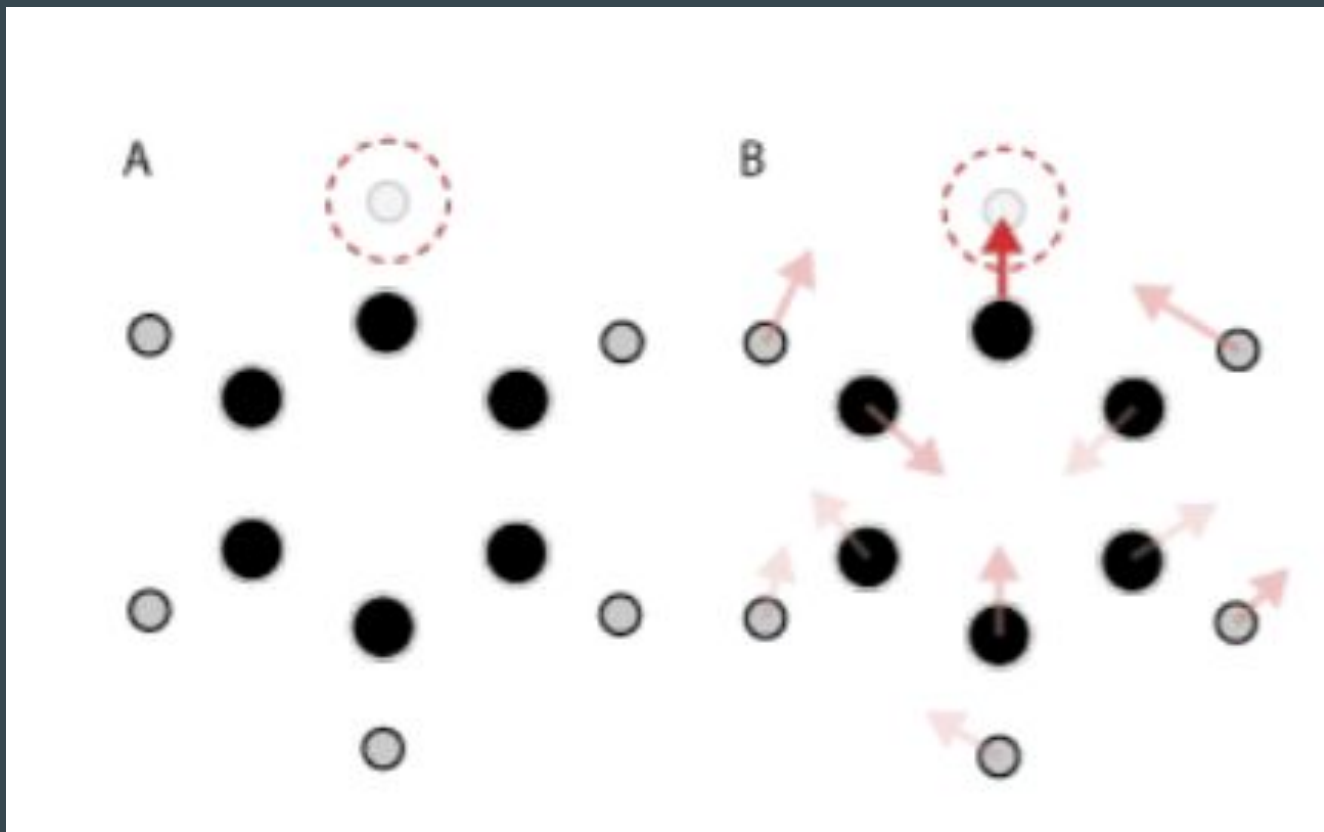
Chris Dryden, Peng Cheng

Point Cloud Networks
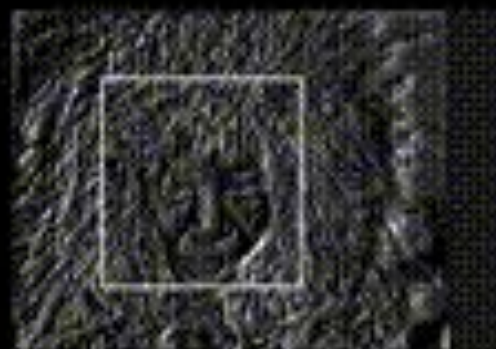
Chemical Point Cloud

Existing CNNs: Translation Equivariance

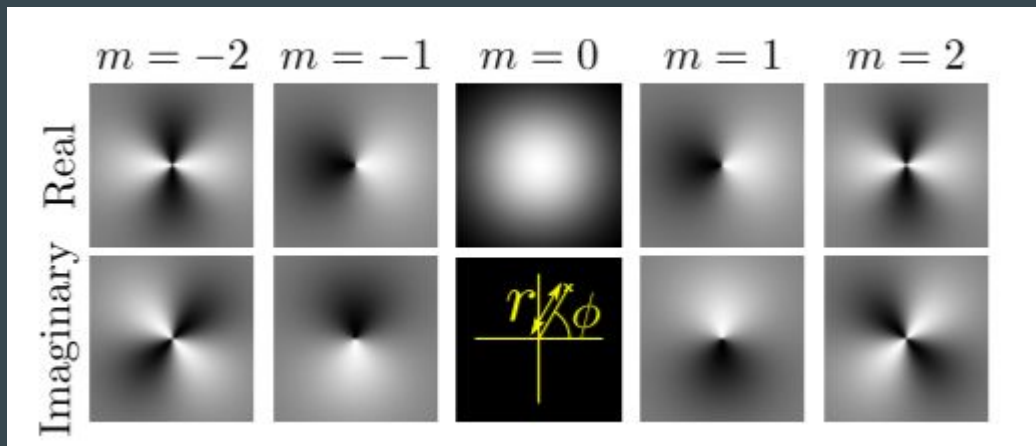Input

Features

Windowed view
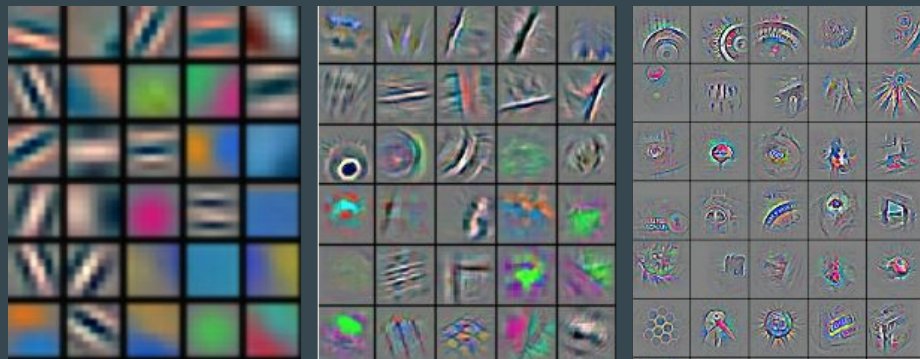
Harmonic Networks

Spatial Domain

Frequency Domain

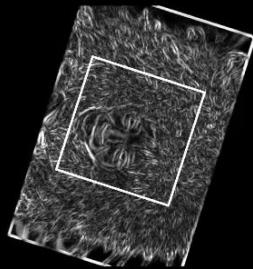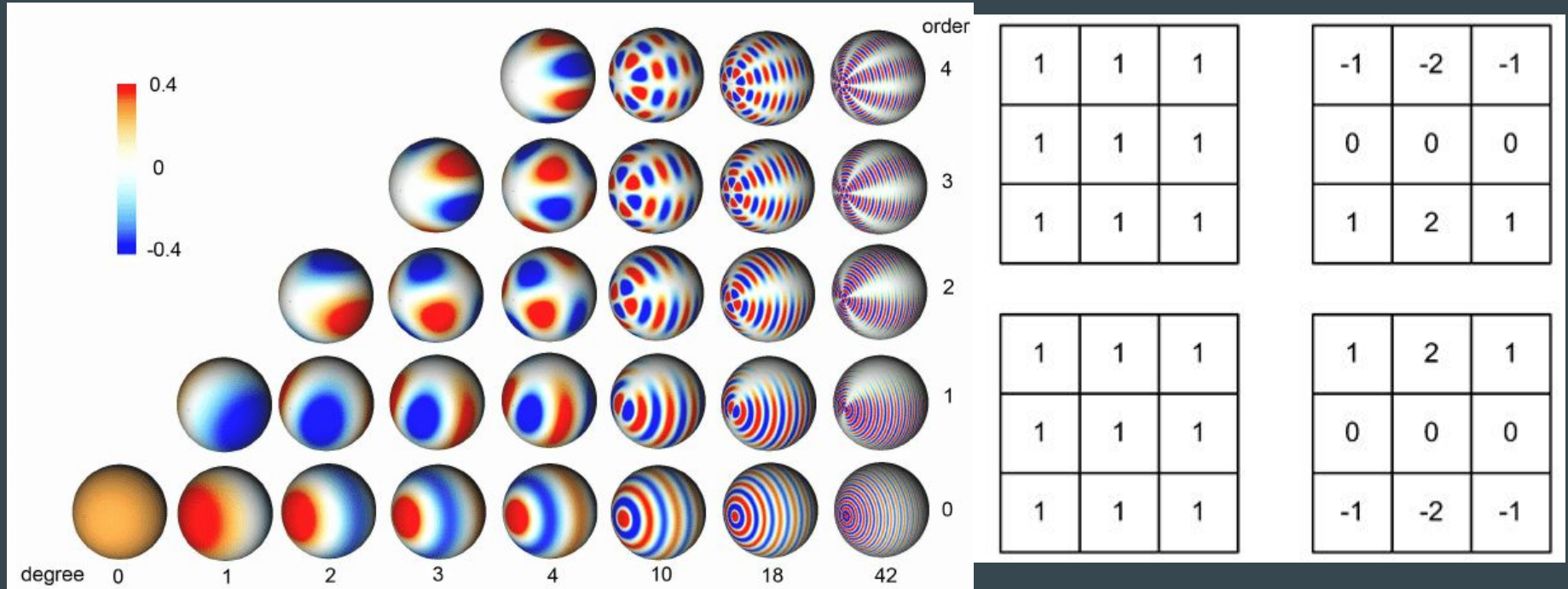# Harmonic Networks - Rotation Equivariance
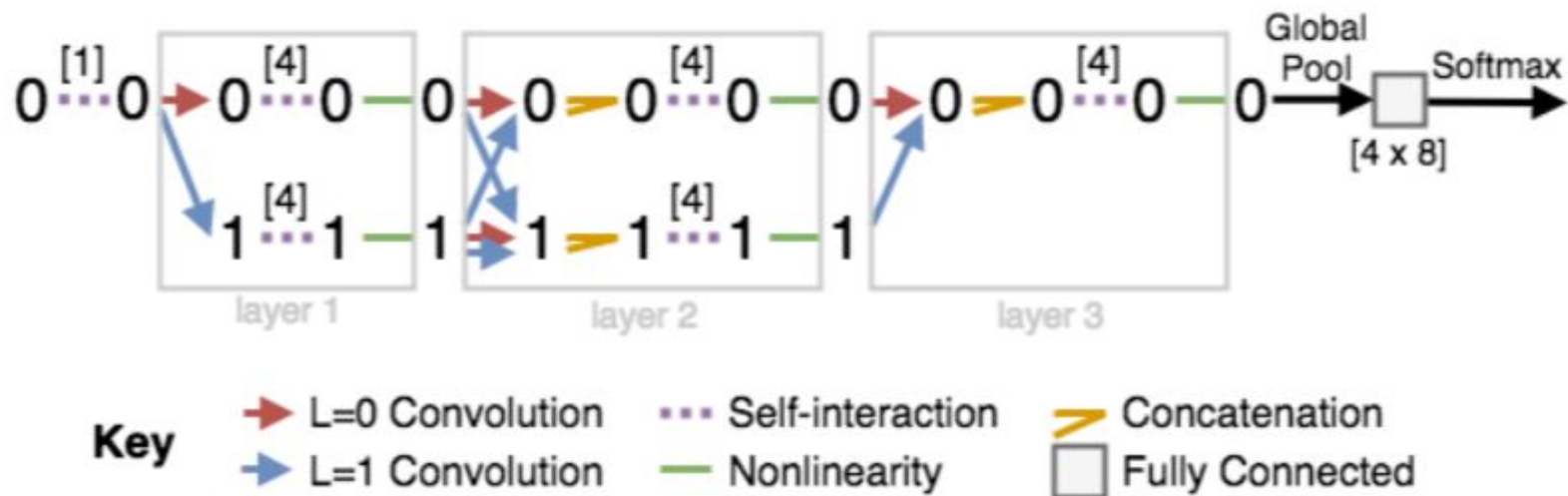
Frequency Domain

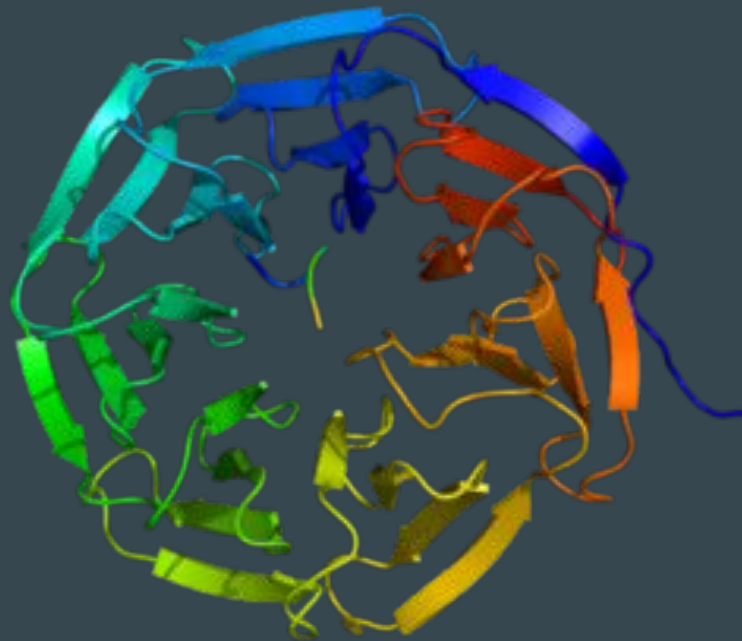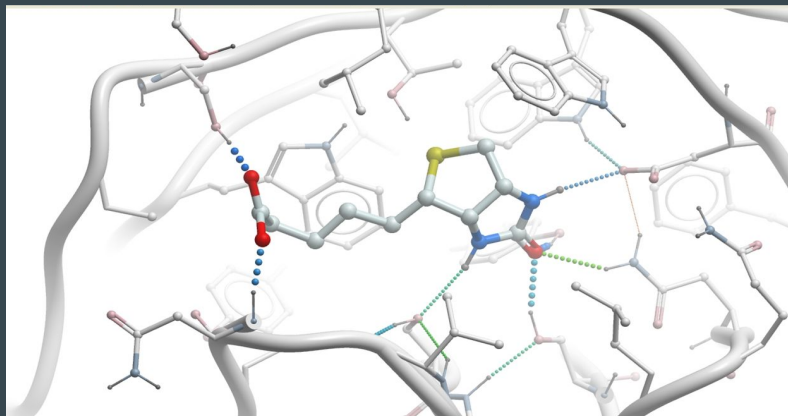# Harmonic Networks - Spherical

Frequency Domain

Tensor-Field Model

Current Applications

Scalable to size of a protein

WDR5

Discussion Points -

- Paper did not go in depth about the information stored in the points
    - More applications are possible. Would the chemical dataset work with chemical properties.
- Can it be applied to more traditional 3d-image sets?
    - Eg: Autonomous Driving
- Can we incorporate in this architecture other types of symmetries?
    - Ex: Mirror Symmetries, R-L Enantiomers
- Can this be applied to Neural-ODE's?