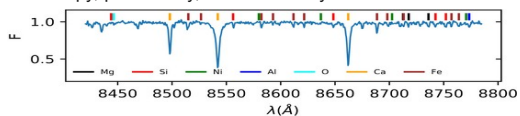




Unifying large-scale Spectroscopy, Astrometry, and Photometry with Convolutional Neural-Networks

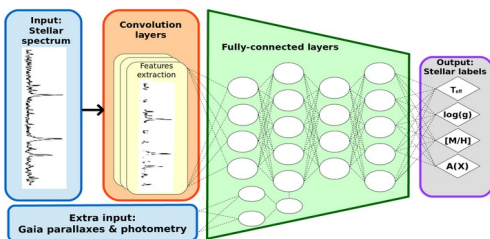
Goals & Motivations

- Parametrize RAVE spectra with Convolutional Neural-Network (CNN) and a training set based on APOGEE labels
- Prepare the ML ground for Gaia-RVS
- To show that neural-network can smoothly combine spectroscopy, photometry, and astrometry.



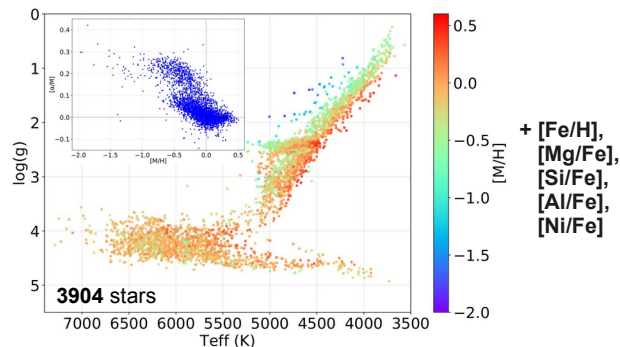
→ 420,000 RAVE DR6 spectrum, R~7400 (Steinmetz et al. 2020)

A Convolutional Neural-Network approach



The training set: Spectroscopy, Photometry and Astrometry

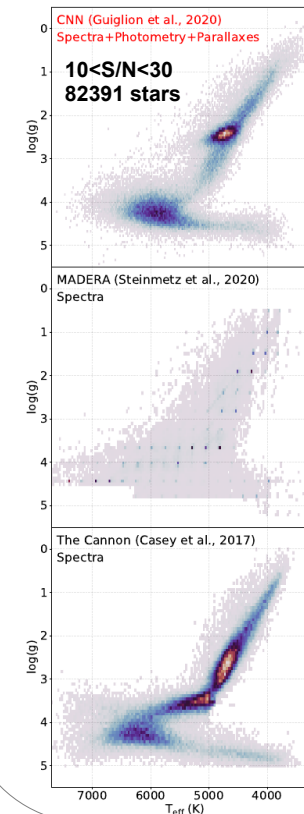
- APOGEE DR16 stellar labels (Ahumada et al. 2019)



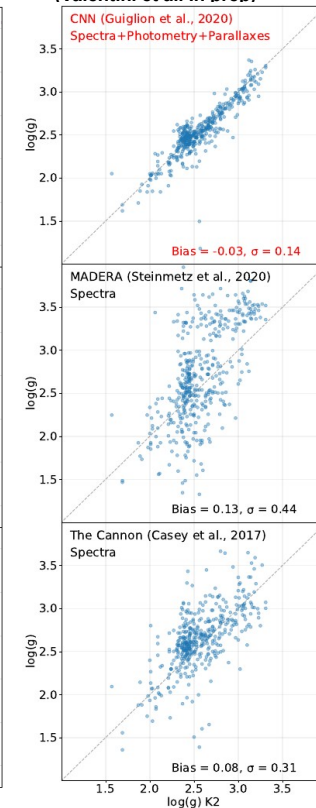
- + Gaia DR2 parallaxes (Lindegren et al. 2018)
- + 2MASS JHK, ALL_WISE 1&2, G, Bp, Rp photometry

Breaking RAVE spectral degeneracies

- Kiel diagram for low-snr stars



- Comparison with Kepler2 log(g) (Valentini et al. In prep)



Probing the Milky Way galactic disc and halo

- Numerous abundances over a larger galactic volume than RAVE
- Consistent picture with Queiroz et al. 2020.
- Good insights for Gaia-RVS, that will provide millions of intermediate resolution spectra, similar to RAVE.

G. Guiglion et al. 2020, A&A, 644, A168