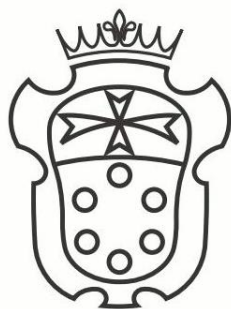


Annual report, 1st year

PhD Nanoscience

NEST



SCUOLA
NORMALE
SUPERIORE
PISA

Student: Nardi Gabriele
Supervisor: Gian Michele Ratto

October 17, 2019

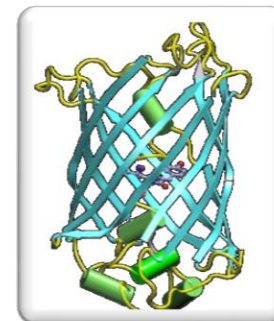
Courses

- Introductory Quantum Mechanics



- Computational Models for Complex Systems (UniPi)

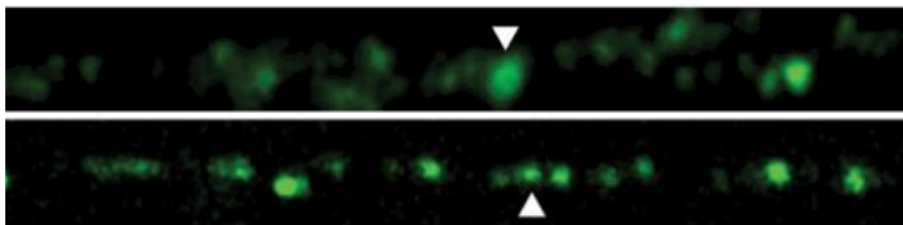
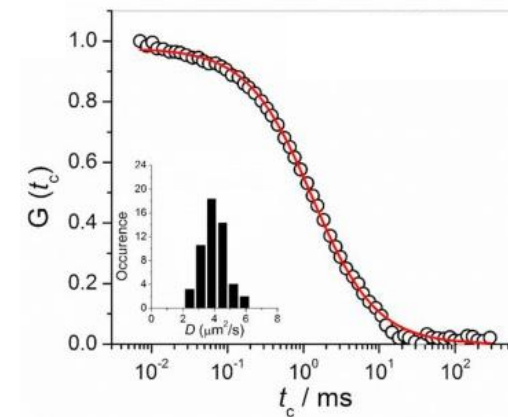
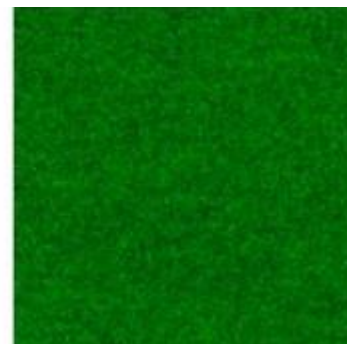
- Fundamentals of Biophysics at the Nanoscale





Stages

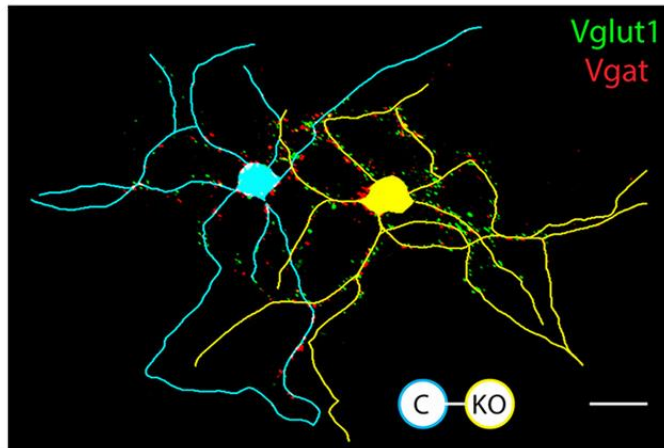
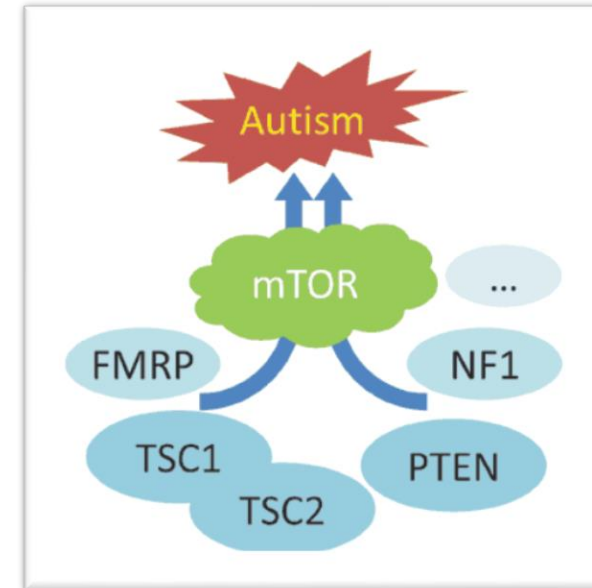
- **ImmunoHistoFluorescence** on histopathological samples and **Fluorescence Correlation Spectroscopy** on living cells (prof. Bizzarri)



- Tracking of internalized vesicles containing labeled **NGF** undergoing **retrograde axonal transport** on neuronal cultures (prof. Luin)

Project: introduction

- **PTEN** and mTOR pathway in neurons: hyperexcitability and **autism**



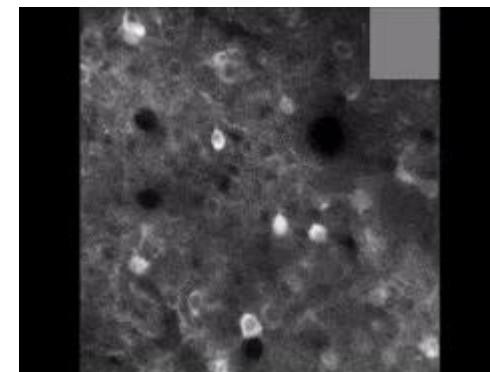
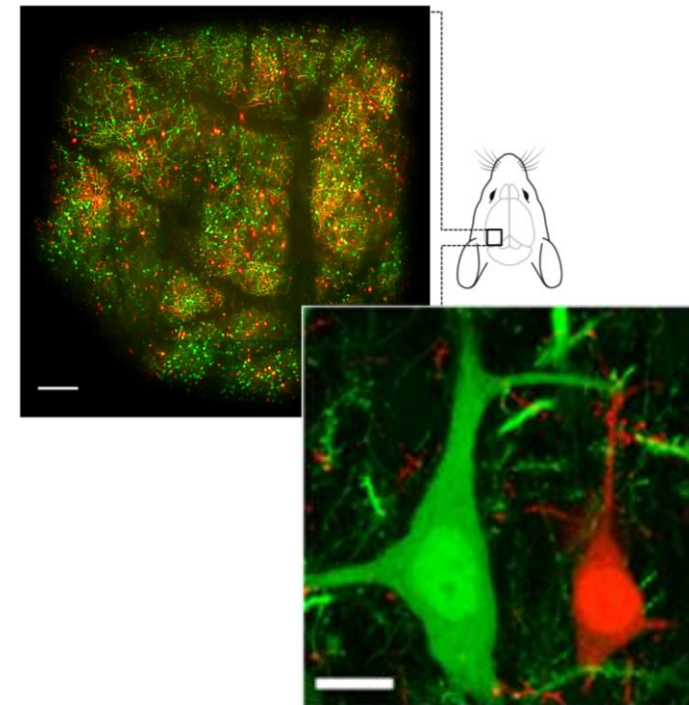
- “The changes in functional connectivity and synchrony involve the **entire network**, not just Pten-KO neurons”

Project: so far

- **Beatrix**: a tool for obtaining tunable mosaics of KO and WT cells

→ **Beatrix 5.0**: Cre amplification and controlled “switching off”

→ Include **GECIs** for simultaneous functional imaging of KO and WT populations





Project: perspectives

- Tell apart **cell autonomous effects** of PTEN loss from non-cell autonomous ones
- Dissect **developmental effects** of PTEN loss from effects on adult neurons computation
- Clarify PTEN loss effect on cortical **connectivity** and **computation**



Thank you for your attention