Imaging through turbulence: a long quest of innovative computational photography in astronomy

Abstract:

The astronomical community's largest technical challenge is coping with the earth's atmosphere. In this talk, I will present the popular methods for performing scientific measurement from the ground, coping with the time-dependent distortions generated by the earth's atmosphere. We will talk about the following topics:

1) Scientific motivation for eliminating the effect of the atmosphere.

2) The statistics of turbulence - the basis for all methods is in deep understanding of the atmospheric turbulence

3) Wave-front sensing + adaptive optics - A way to correct it in hardware.

4) Lucky imaging + speckle interferometry - Ways to computationally extract scientifically valuable data despite the turbulent atmosphere.