

# **Seminarium Astrofizyczne**

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## **Sandor Kruk**

(ESA)

### **From galaxies to asteroids: exploring data archives with citizen science and deep learning**

Citizen science projects such as Galaxy Zoo have shown that thousands of volunteers can make a significant contribution to research, allowing scientists to study the morphological distribution and evolution of galaxies and leading to serendipitous discoveries. I will review some of the significant contributions of the project, covering studies of large populations of barred galaxies and discoveries of unusual objects and will present how human and machine intelligence can be combined for the classification of galaxies in the era of Big Data, and applied to future missions such as Euclid.

Additionally, I will highlight results from one of the first citizen science projects with ESA space science data, Hubble Asteroid Hunter ([www.asteroidhunter.org](http://www.asteroidhunter.org)), set up on the Zooniverse platform to explore the rich ESA Hubble Space Telescope archive for serendipitously observed asteroids and artificial satellite trails. Using labels provided by volunteers we trained a Deep Learning Convolutional Neural Network embedded into Google's AutoML Vision API and used it to scan the entire archive, studying the distribution of the observed asteroids and the impact of satellites on observations with Hubble. I will argue that a combination of citizen science and artificial intelligence methods is an efficient way of exploring the increasingly large datasets by taking full advantage of the intuition of the human brain and the processing power of machine learning, thus enhancing the scientific exploitation of data archives.

Serdecznie zapraszam,  
Agnieszka Majczyna