

# Women and Space

## Accademia Nazionale dei Lincei

### Rome, 28 May 2024

#### SPEAKERS:

Marica Branchesi (GSSI)

Francesca Cipollini (ESA-ESRIN)

Francoise Combes (College de France/Obs. Paris)

Susanna Terracini (Università di Torino)

Giovanna Tinetti (University College London)

Ersilia Vaudo Scarpetta (ESA)

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REGISTRATION AT:

<https://www.mat.uniroma2.it/~womenspace2/>

**WOMEN AND SPACE**  
**Accademia Nazionale dei Lincei – Rome, 28 May 2024**

**PROGRAM**

|               |                         |
|---------------|-------------------------|
| 9:50 – 10:00  | Opening                 |
| 10:00 – 10:50 | Françoise Combes        |
| 10:50 – 11:20 | Coffee break            |
| 11:20 – 12:10 | Francesca Cipollini     |
| 12:10 – 13:00 | Susanna Terracini       |
| 13:00 – 14:20 | Lunch                   |
| 14:20 – 15:10 | Marica Branchesi        |
| 15:10 – 16:00 | Giovanna Tinetti        |
| 16:00 – 16:20 | Coffee break            |
| 16:20 – 17:10 | Ersilia Vaudo Scarpetta |
| 17:10 – 17:15 | Closing remarks         |

- For more information, see  
<https://www.mat.uniroma2.it/~womenspace2>

**Author: Marica Branchesi**

GSSI (Gran Sasso Science Institute)

**Title:** *“A new exploration of the Universe through gravitational waves and multi-messenger observations”*

**Abstract.** On September 14, 2015, gravitational waves were detected for the first time by Advanced LIGO detectors, making binary coalescence of black holes, previously invisible to electromagnetic observations, accessible. This momentous discovery marked the beginning of gravitational wave astronomy, which in just a few years is revealing the mysteries of stellar-mass black holes and the death of massive stars. On Aug. 17, 2017, the first observation of gravitational waves from the coalescence of a binary system of neutron stars by the Advanced LIGO and Virgo network, followed 1.7 s later by a gamma-ray burst detected by the Fermi and INTEGRAL satellites, initiated most extensive worldwide observing campaign in the human being that has detected the multi-wavelength counterparts of this event. Multi-messenger discoveries have the power to unveil the enigmas of the most energetic transients of the sky, probing neutron star physics, relativistic astrophysics, nuclear physics, nucleosynthesis, and cosmology. The talk will provide an overview of the astrophysical implications of these discoveries, and then focus on the majestic prospects of future gravitational wave detectors on the ground and in space.

**Author: Francesca Cipollini**

ESA - ESRIN

(European Space Agency - European Space Research INstitute)

**Title:** *“The European Space Agency and the contribution of space activities to the climate crisis and environmental sustainability”*

**Abstract.** The European Space Agency (ESA) is Europe’s gateway to Space. Its mission is to forge the development of European space capabilities in collaboration with national space agencies and international partners. Its activities are at the forefront of innovation, scientific excellence and benefits for citizens and the space economy.

ESA’s Earth Observation missions and available data contribute to supporting the climate crisis and environmental sustainability challenges. The scientific, meteorological satellites with EUMETSAT, and Copernicus with the European Union provide essential data and information to monitor climate variables in the context of the United Nations, to support the Global Stocktake and monitoring of climate and environmental legislation such as the implementation of the United Nations Conventions on the Environment (Convention on Climate Change), the European Green Agenda, and decarbonisation for 2050 . The data obtained and the scientific models help us to better understand the state of health of the planet on issues such as sea rise, ice melting, deforestation and greenhouse gases. The integration of available digital technologies, such as artificial intelligence, also allow us to develop evolutionary models of the Earth and facilitate the development of solutions for climate action.

The European Space Agency hosts its Earth Observation Centre ESRIN, a European and global reference on climate and sustainability issues in Italy in Frascati, near Rome.

**Author: Françoise Combes**

Collège de France & Observatoire de Paris

**Title:** *“Black Holes and Active galaxy Nuclei”*

**Abstract.** Super-massive black holes are the central engine of Active Galactic Nuclei (AGN) and quasars, the most energetic and compact objects in the Universe. Since their identification in the 1960's, much has been learned about their nature and formation, from multi-wavelength (radio to gamma-rays) and multi-messenger observations (neutrinos, cosmic rays, gravitational waves). Recent works at high spatial resolution have revealed the shadow of the black holes, their accretion disk, and how the relativistic jets are launched. I will describe the mechanisms to feed the black holes, and how, when they are too greedy, the black holes can reject their food, and push the gas out of galaxies, preventing star formation.

**Author: Susanna Terracini**

Università di Torino

**Title:** *“Chaotic behaviours in Celestial Mechanics”*

**Abstract.** We show some examples of controlled chaotic trajectories in relevant models of Celestial Mechanics, investigating the mathematical mechanisms that lead to trajectories that are indeed complex, but visit given sets of configurations in a prescribed manner.

**Author: Giovanna Tinetti**

University College London

**Title:** *“Planetary science across light-years”*

**Abstract.** The search for exoplanets has often been driven by the goal to discover life in the Universe. We know today there are billions of worlds out there, and small planets are the most numerous... So there is hope! We have come a long way from the prejudice that only an Earth's twin can host life: our galactic cousins appear more diverse, complex and interesting than we ever thought, and perhaps for this reason, many of the great exoplanetary discoveries have been obtained serendipitously and with modest facilities.

While the role of flagship missions to advance the study of habitable worlds is unquestioned, alone they risk creating a scientific ecosystem based on a monoculture. To foster a diverse, rich and sustainable approach, which will also enable the best use of the flagships, we are pursuing dedicated, moderate size missions that will provide a much needed scientific complement to the largest facilities. A keystone of this approach is the Ariel Space Telescope, to be launched in 2029 by ESA. Ariel is the first mission dedicated to the determination of the chemical composition of hundreds of exoplanets, enabling planetary science far beyond the boundaries of the Solar System.

We are at the same time pursuing an innovative, commercial approach to the delivery of high-performance, small-size scientific satellites through the company Blue Skies Space Ltd, that will further contribute to a thriving, diverse and sustainable scientific ecosystem.

**Author: Ersilia Vaudo Scarpetta**

ESA (European Space Agency)

**Title:** *“Space Science: the attraction of cosmic mysteries”*

**Abstract.** Scientific space missions offer unique opportunities to give a close look at the universe's mysteries, from exploring new worlds to investigating cosmic phenomena. They inspire wonder, drive innovation, and pave the way for humanity's continued quest for understanding the world around us and the reality to which we belong.