

## Tuesday Oct 27th 14:00-17:30

Introduction			
14:00	14:15	Welcome & Logistic	TBD
14:15	14:30	Scopo del workshop	Negri/Mascetti
ASI's perspective of topics relevant to astrobiology			
14:30	14:50	Ground activities	Pacelli
14:50	15:10	International Space Station and LEO satellites	Crisconio
15:10	15:40	Solar System Exploration & Sample Return	Mugnuolo/ Ammannito
15:40	15:50	Break	
15:50	16:10	Exoplanets	Salatti
16:10	16:30	SSDC activities	Polenta
16:30	17:30	Domande/Commenti/Approfondimenti	All

## Wednesday Oct 28th 9:30-18:00

Poster session			
09:30	10:10	poster presentations by authors (11 posters, max 3 minutes each + intro) Avitabile & Pantaleo, Bastoni, Bonaventura, Cobucci-Ponzano, Contursi, Curci, Filippini, Galiazzo, Mognato, Rinaldi, Saija.	
Thematic session: Extremophiles and extreme environments			
10:10	10:20	Session introduction	<b>Onofri / Moracci</b>
10:20	10:35	Genome flexibility and limits of life: the recoded alpha-L-fucosidase from the archaeon <i>Saccharolobus solfataricus</i>	F. De Lise et al.
10:35	10:50	Spatial metagenomics of three geothermal sites in Pisciarelli hot spring focusing on the biochemical resources of the microbial consortia.	R. Iacono et al.
10:50	11:05	Studying photosynthesis under Far-Red light and simulated M-dwarf star light: new experimental tools and suitable eukaryotic organisms with different positions in the tree of life.	<b>M. Battistuzzi et al.</b>
11:05	11:20	Subsurface biosphere can modify volatile cycling on a planetary scale	D. Giovannelli
11:20	11:30	break	
Thematic session: Prebiotic chemistry			
11:30	11:40	Session introduction	<b>Di Mauro</b>
11:40	11:55	Plasma kinetics and prebiotic chemistry: a new way to look at the Miller-Urey experience	V. Laporta et al.
11:55	12:10	Implication of poly-glycosylated nucleoside species in the prebiotic transglycosylation	L. Botta et al.
12:10	12:25	Sustainability and chaos in the abiotic polymerization of 3',5' cyclic guanosine monophosphate	G. Costanzo et al.
12:25	12:40	Anomalous fluctuations and selective extinction in primordial replicators: a struggle for life at the origin of biological homochirality	S. Longo & G. Micca Longo
12:40	12:55	Modelling of the atmospheric entry and chemical decomposition of micrometeoroids in the context of organic matter delivery	G. Micca Longo & S. Longo
12:55	13:55	lunch	
Thematic session: Experiments in LEO			
13:55	14:05	Session introduction	<b>Billi / Saladino</b>
14:05	14:20	Space hardware for astro and exo biology experiments	M. Balsamo et al.
14:20	14:35	Microbe-mineral interaction and biomineralization on the International Space Station: the BioRock experiment	R. Santomartino et al.
14:35	14:50	Planetary simulation facilities and exposure platforms aboard the ISS: a way for life detection	A. Cassaro et al.
14:50	15:05	Solar wind polymerization/oxygenation of hydroxynaphthalenes on Meteorites as a novel probe for the Origin of Insoluble Organic Matter	B.M. Bizzarri et al.

15:05	15:20	Unravelling the molecular basis of an anhydrobiotic cyanobacterium revival after exposure to extreme dryness, Mars-like UV flux and space vacuum: Implications for future missions beyond low Earth orbit	C. Fagliarone et al.
15:20	15:30	Break	
<b>Thematic session: Astrobiology beyond the Solar System</b>			
15:30	15:40	Session introduction	<b>Vladilo</b>
15:40	15:55	Search for High Energy emission from Stellar Flares with Fermi/LAT	F.Longo et al.
15:55	16:10	ExoplAn3T: a new way of exploring large exoplanetary databases and its applications to astrobiology	A. Zinzi et al.
16:10	16:25	Theory Meets Experiment for Elucidating Chemical Evolution in Space	C. Puzzarini & V. Barone
16:25	16:40	Advanced computational approaches in astrochemistry	G. Cassone & F. Saija
16:40	16:55	Far-infrared laboratory spectroscopy of aminoacetonitrile and first interstellar detection of its vibrationally excited transitions	L. Dore et al.
16:55	17:10	Laboratory rotational spectroscopy of organosulfur compounds for their detection in space	S. Melandri et al.
<b>Thematic session: Solar System sciences &amp; Exploration</b>			
17:10	17:20	Session introduction	<b>Capaccioni / Esposito</b>
17:20	17:35	Strategic Advice for Planetary Protection for ExoMars 2016 and ExoMars 2022 missions (ESA-ROSCOSMOS )	A. Pacifici & G.G. Ori
<b>Thursday Oct 29th 9:40-16:30</b>			
09:40	09:55	How much prebiotic material is out there?	D. Perna et al.
09:55	10:10	Ceres: a new important Astrobiological Target	M.C. De Sanctis et al.
10:10	10:25	Fractal chaotic analysis on Mars: signs of life?	G. Bianciardi & T.Nicolò
10:25	10:40	The global search for liquid water on Mars from orbit: Current and future perspectives	R. Orosei et al.
10:40	10:55	Mars Human Exploration: landing in the Vernal crater proximity (Arabia Terra)	M. Pajola et al.
10:55	11:10	Access to the Martian subsurface: Ma_MISS on ExoMars	M.C. De Sanctis et al.
11:10	11:20	Break	
<b>Thematic session: Analysis of Extraterrestrial and analog materials</b>			
11:20	11:30	Session introduction	<b>Brucato / Cavalazzi</b>
11:30	11:45	The Astrobiology Laboratory in Arcetri: past and present activities to search for signs of life in space	G. Poggiali et al.
11:45	12:00	Astrobiology studies and extraterrestrial sample analyses at Laboratory for Experimental Astrophysics (Catania)	G.A. Baratta et al.
12:00	12:15	Chemical characterization of extraterrestrial sample-return material	M. Crucianelli & A. Lazzarini
12:15	12:30	Astrobiology vs Geology investigations: good practices in the framework of planetary missions	M. Pondrelli et al.
12:30	12:45	Integrated fieldwork for astrobiological studies in Italy	A. Frigeri et al.
12:45	14:00	Lunch	
14:00	14:15	Communicating Astrobiology: the role of Italian planetariums	A. Ricchiuti & F. Pagan
<b>Workshop synthesis and closing</b>			
14:15	15:15	Synthesis from the Thematic Sessions (10 min with a summary chart for each session)	Sessions' chairs
15:15	16:00	Domande/Commenti/Approfondimenti	All
16:00	16:30	Concluding remarks and steps forward	

**Studying photosynthesis under Far-Red light and simulated M-dwarf star light: new experimental tools and suitable eukaryotic organisms with different positions in the tree of life.**

**Mariano Battistuzzi, Lorenzo Cocola, Caterina Pozzer, Diana Simionato, Anna Segalla, Tomas Morosinotto, Luca Poletto, Riccardo Claudi, Nicoletta La Rocca**

Several recently discovered Earth-like exoplanets are orbiting the Habitable Zone of M-dwarf stars. These are the most abundant and long-lived stars known in the Milky Way, making them ideal to potentially harbour life. However, such stars have different spectral characteristics respect to the Sun. They are less luminous and generate a light spectrum with far-red and infrared as major components, while emitting at very low level in the visible. These characteristics do not seem suitable for most oxygenic photosynthetic organisms we know from Earth, that evolved to absorb only visible light. Many researchers discussed the possibility of oxygenic photosynthesis in these worlds so far, but no experimental research has been done testing organisms under simulated M-dwarf spectra. At the university of Padova, a collaboration between the Department of Biology, the Astronomical Observatory (INAF) and the Institute of Photonics and Nanotechnology (IFN-CNR) led to the construction and the development of a new experimental tool. The setup is composed by three main parts: 1) a Star Light Simulator, able to generate different light intensities and spectra, including those of nonsolar stars; 2) an Atmosphere Simulator Chamber where cultures of photosynthetic microorganisms can be exposed to different gas compositions; 3) a reflectivity detection system to measure from remote the Normalized Difference Vegetation Indexes (NDVI). Such a setup allows us to monitor photosynthetic microorganism's growth and gas exchange performances under selected conditions of light quality and intensity, temperature, and atmospheres simulating non-terrestrial environments. All parameters are detected by remote sensing techniques, thus without interfering with the experiments and altering the environmental conditions set. We initially focused on cyanobacteria as target microorganisms, due to their extraordinary capacities to withstand every kind of environment on the Earth as well as their ability to acclimate to Far-Red light. We are now selecting suitable eukaryotic photosynthetic organisms by testing at first their ability to acclimate to Far-Red light. The possibility of photosynthesis for prokaryotic and eukaryotic photosynthetic organisms under M-dwarfs light will be discussed.