

MEMORIE DELLA SOCIETÀ ASTRONOMICA ITALIANA

Vol.92 n.2 2021

1st Italian Space Agency workshop on Astrobiology

editors: B. Negri, E. Ammannito, C. Pacelli

TABLE OF CONTENTS

<i>Index</i>	7
<i>Foreword</i>	10
Session I: ASI	
E. Ammannito <i>Astrobiology and the exploration of the Solar System</i>	13
R. Mugnuolo <i>Italian Contribution to NASA/ESA Mars Sample Return Campaign</i>	21
M. Salatti <i>Exoplanets</i>	23
M. Crisconio <i>International Space Station - the Italian scientific utilization</i>	30
C. Pacelli <i>Ground activities on astrobiology in Italy</i>	38
Session II: Extremophiles and extreme environment	
S. Onofri, A. Cassaro <i>Extremophiles eukaryotes for searching life beyond the Earth</i>	42
C. Girardi, C. De Pittà, S. Casara, E. Calura, G. Sales, L. Celotti, M. Mognato <i>Identification of gene and miRNA alterations in irradiated and non-irradiated human peripheral lymphocytes incubated in modeled microgravity</i>	49
A. Strazzulli, F. De Lise, R. Iacono, N. Curci, L. Maurelli, B. Cobucci Ponzano, M. Moracci <i>Extremophilic Archaea in Astrobiology</i>	53
D. Giovannelli, P.H. Barry, D.V. Bekaert, A. Chiodi, A. Cordone, G. Covone, G.L. Jessen, K.G. Lloyd, J.M. de Moor, S.M. Morrison, M.O. Schrenk, A. Vitale Brovarone <i>Subsurface life can modify volatile cycling on a planetary scale</i>	60

A. Cirigliano, F. Mura, A. Quagliarello, R. Negri, T. Rinaldi <i>Calcium carbonate of microbial origin in the Etruscan tombs of Tarquinia</i>	64
--	----

Session III: Prebiotic chemistry

E. Di Mauro <i>Prebiotic chemistry</i>	67
L. Dore <i>Interstellar Detection of vibrationally excited transitions of organic molecules</i>	70
N. Balucani, D. Skouteris <i>Interstellar Detection of vibrationally excited transitions of organic molecules</i>	74
C. Puzzarini, V. Barone <i>Interstellar Detection of vibrationally excited transitions of organic molecules</i>	78
G. Costanzo, A. Cirigliano, E. Di Mauro <i>Interstellar Detection of vibrationally excited transitions of organic molecules</i>	82
V. Laporta, S. Longo, G. Micca Longo <i>Computational Astrobiology in Bari University and ISTP-CNR</i>	86

Session IV: Experiments in LEO

D. Billi, R. Saladino <i>Advances in Low Earth Orbit Experiments</i>	91
C. Faraglione, C. Mosca, A. Napoli, B. G. Fernandez, D. Billi <i>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</i>	94
R. Santomartino, C.S. Cockell and the BioRock Team <i>Microbe-mineral interaction and biomining on the International Space Station: the BioRock experiment</i>	99
A. Cassaro, C. Pacelli, L. Aureli, P. Leo, I. Catanzaro, J-P. P. de Vera, S. Onofri <i>A multi-step astrobiological approach for supporting life-detection</i>	103

Session V: Astrobiology beyond the Solar System

G. Vladilo <i>Astrobiology beyond the Solar System</i>	107
S. L. Ivanovsky, L. Biasotti, E. Bisesi, M. Maris, G. Murante, L. Silva, M. Fulle, S. Monai, P.M. Simonetti, G. Vladilo <i>Steps towards atmospheric and MHD modelling of habitable exoplanets</i>	115
N. La Rocca, R. Claudi, M. Battistuzzi, L. Cocola, C. Pozzer, D. Simionato, A. Segalla, T. Morosinotto, L. Poletto <i>Studying photosynthesis under simulated M-dwarf star light</i>	120

A. Zinzi, D. Turrini, E. Alei, F. Verrecchia <i>ExoplAn3T: a new way of exploring large exoplanetary databases and its applications to astrobiology</i>	124
--	-----

Session VI: Solar System sciences & Exploration

F. Capaccioni, F. Esposito <i>The exploration of the Solar System: recent achievements and future developments</i>	128
G. Bianciardi, L. Bianciardi, T. Nicolò <i>Fractal chaotic analysis on Mars: signs of life?</i>	136
D. Perna, S. Ieva, E. Dotto, E. Mazzotta Epifani, N. Bott, J.D.P. Deshapriya, Z. Kanuchova <i>How much prebiotic material is out there?</i>	140
M.C. De Sanctis, E. Ammannito, M. Raponi, M. Ciarniello, F.G. Carrozzo, A. Frigeri and the VIR Dawn Team <i>Ceres: a new astrobiological target for the future missions</i>	144
M.C. De Sanctis, F. Altieri, E. Ammannito, A. Frigeri, S. De Angelis, M. Ferrari, S. Fonte, M. Formisano, M. Giardino and the Ma_MISS Team <i>Ma_MISS on Exomars rover: access to the Martian sub-surface</i>	148

Session VII: Extraterrestrial and analog materials

B. Cavalazzi, J.R. Brucato <i>Thematic session: Analysis of Extraterrestrial and analogue materials</i>	151
B. Cavalazzi, K. Hickman-Lewis, L. Balotti, M.A. Cardeño Rua, A.V. Ragazzo, A. Tarozzi, R. Martellotti, E. Lo Giudice, G. De Vivo, F. Gragnaniello, R. Barbieri <i>Astrobiology Lab. at the University of Bologna: ongoing projects and perspectives</i>	154
M.E. Palumbo, G.A. Baratta, G. Occhipinti, C. Scirè, G. Strazzulla <i>Astrobiology studies and extraterrestrial sample analysis at the Laboratory for Experimental Astrophysics - Catania</i>	158
M. Pondrelli, L. Marinangeli, B. Cavalazzi <i>Astrobiology vs Geology investigations: good practices in the framework of planetary missions</i>	162
A. Lazzarini, M. Crucianelli <i>Chemical characterization of extraterrestrial sample return: a versatile platform @UnivAQ</i>	166
A. Frigeri, B. Cavalazzi, F. Altieri, E. Ammannito, A. Apuzzo, C. Cardellini, M.C. De Sanctis, M. Ercoli, M. Ferrari, E. Forte, K. Hickman-Lewis, V. Marcheselli, M. Massironi, M. Mazzocca, C. Pacelli, M. Pantaloni, G. Pecoraino, M. Pondrelli <i>Interdisciplinary fieldwork activities for astrobiological studies in Italy</i>	170
J.R. Brucato, T. Fornaro, G. Poggiali, M.A. Corazzi, A. Meneghin, D. Paglialunga <i>The Astrobiology Laboratory in Arcetri: past and present activities to search for signs of life in space</i>	174