

## From Earth to Mars, towards understanding better the red planet habitability

Assessing the habitability of Mars and detecting life, if it was ever there, depends on knowledge of whether the combined environmental stresses experienced on Mars are compatible with life and whether a record of that life could ever be detected. However, our current ability to make these assessments is hampered by a lack of knowledge of how the combined effect of different environmental stresses influence the survival and growth of organisms. In particular, many combinations of stress, such as high radiation conditions combined with high salt and low temperature, relevant for early Mars, have not been investigated.



### > Editorial: finalizing and maximizing MASE impact



After almost 48 months of intense activity, the MASE project will reach its end in December 2017. During the last months, the MASE team has been working to produce the first scientific publications of the project and disseminate its results.

Three MASE publications related to isolation of anaerobic microorganisms in analogue environments, mineralization and preservation of microorganisms from a Mars analog and stress tests affecting the survival rates of anaerobic microbes have just been published. More will come in the following months!

On 8th November, the University of Graz will host the last scientific meeting of the MASE project. During this meeting we will review the whole set of MASE activities during these almost four years, evaluate the progress of ongoing activities and discuss future opportunities to harness the outcomes of the project. The development of provisions to ensure that early career researchers continue to be nurtured is fundamental to move forward the European astrobiology community and the MASE Consortium will work on this direction.

The MASE team will stay committed to the astrobiology community and discussions on potential collaborations are already planned and will continue beyond the project's lifetime.

**Prof. Charles Cockell**  
MASE Coordinator

### > MASE in EANA 2017



Last month, eight members of the MASE consortium attended the meeting of the European Astrobiology Network Association in Aarhus delivering a total of 4 oral presentations and 2 poster communications.

The enthusiasm and interest expressed by our European and international colleagues demonstrated one more time, that the MASE project is relevant and lead to many interactions and collaborations.

Thanks to all our colleagues in Denmark for a great conference!



Participants group photo.

## > Planetary science radio program

Every month, Radio Freiburg in collaboration with MASE associate investigator Dr. Andreas Riedo, stream an hour session about space research and planetary sciences to improve acceptance of space research among the general public and bring space research closer to people through discussions on specific topics. The radio show is called [Universumstag](#) and it is broadcasted in Swiss German!



## > MINAR 5 Boulby Mine field campaign



As part of the forthcoming MINAR 5 field campaign in Boulby Mine, the UK Astrobiology Center will organize online live events on 16th and 18th October to connect with the mine and answer questions about this Mars-like environment where planetary scientists are preparing for the exploration of space. Everyone is welcome. Spread the word about this great educational opportunity for school kids!

## > Connect with the MASE project

**Website**  
[www.mase.esf.org](http://www.mase.esf.org)

The MASE website provides information and updates on the project and its progress. This platform also intends to provide news and information on relevant scientific events.

### Social media platforms

**R<sup>G</sup> Research Gate**  
MASE project is featured on Research Gate, the social networking site for scientists and researchers that allow to share publications and find potential collaborators.

**f Facebook MASE @MarsAnalogues**  
MASE project can be followed on the Facebook platform, where project progress is reported along with relevant information to research on life in extreme environments, scientific events and funding opportunities.

**t Twitter @MarsAnalogues**  
MASE related events can be followed in Twitter in real time.

## > ÖGMBT Life Science PhD Award Austria 2017 to MASE PhD student



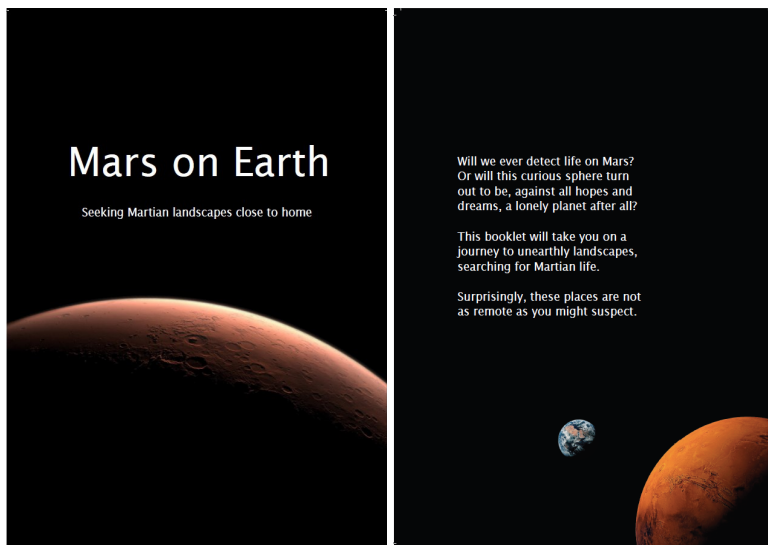
We are delighted to communicate that MASE PhD student, Alex Perras, has been awarded the ÖGMBT Life Science PhD Award Austria 2017 in the category of Application-oriented research for her PhD dissertation "Grappling extremes: Molecular methods combined with cultivation reveal the composition and biology of space-relevant microbial communities". Congratulations Alex!

## > Upcoming astrobiology events

- **Habitable Worlds 2017 - A System Science Workshop.** 13-17 November 2017 at Laramie, Wyoming. [Further information.](#)
- **IAU Astrobiology Meeting.** 26 November - 1 December 2017 at Coyhaique, Chile. [Further information.](#)
- **Origins of Life - Gordon Research Conference: The Prebiotic Milieu Building the Evolution of Early Life.** 14-19 January 2018 at Galveston, Texas. [Further information.](#)
- **SoCIA 2018: Social and Conceptual Issues in Astrobiology.** 13-15 April 2018 at University of Nevada, Reno. [Further information.](#)

## > MASE outreach

### Mars on Earth: Seeking Martian landscapes close to home



The [Science Communication and Society MSc Programme](#) at Leiden University in collaboration with the MASE consortium have elaborated an educational booklet about how astrobiology research on Earth can help us to search for Martian life.

MASE postdoctoral researcher Euan Monaghan and Assistant Professor in Astronomy & Society at the Leiden Observatory Pedro Russo, supervised the work of Liza van Kapel, Lotte Scholten and Eva Smidt. Thanks to everyone for doing a great job!

Download the booklet [here](#).

## > MASE Publications

Check out the first publications of the MASE project and follow us on [Research Gate](#) to get access to all of them.



Cockell CS, Schwendner P, Perras AK, Rettberg P, Beblo-Vranesevic K, Bohmeier M, Rabbow E, Moissl-Eichinger C, Wink L, Marteinson V, Vannier P, Gomez F, Garcia-Descalzo L, Ehrenfreund P, Monaghan EP, Westall F, Gaboyer F, Amils R, Malki M, Pukall R, Cabezas P, Walter N. **Anaerobic microorganisms in astrobiological analogue environments: from field site to culture collection.** *International Journal of Astrobiology*, 1-15. Download it [here](#).



Gaboyer F, Le Milbeau C, Bohmeier M, Schwendner P, Vannier P, Beblo-Vranesevic K, Rabbow E, Foucher F, Gautret P, Guegan R, Richard A, Sauldubois A, Richmann P, Perras AK, Moissl-Eichinger C, Cockell CS, Rettberg P, Marteinson V, Monaghan E, Ehrenfreund P, Garcia-Descalzo L, Gomez F, Malki M, Amils R, Cabezas P, Walter N, Westall F. **Mineralization and preservation of an extremotolerant bacterium isolated from an early Mars analog environment.** *Scientific Reports*, 7: 8775. Download it [here](#).



Beblo-Vranesevic K, Bohmeier M, Perras AK, Schwendner P, Rabbow E, Moissl-Eichinger C, Cockell CS, Pukall R, Vannier P, Marteinson V, Monaghan E, Ehrenfreund P, Garcia-Descalzo L, Gomez F, Malki M, Amils R, Gaboyer F, Westall F, Cabezas P, Walter N, Rettberg P. ***Yersinia intermedia* MASE-LG-1, a facultative anaerobic microbe from a Mars analogue environment survives diverse individual and combined simulated Martian stresses.** *Plos One* (accepted)

## > The MASE growing medium – Why Astrobiology?



### Dr. Frédéric Gaboyer - Centre de Biophysique Moléculaire

#### **What is it your university background?**

First, I obtained a Licence in Biochemistry and Molecular Biology in Orleans, which ended with a first trainee that aimed at studying the ecological history of the Bourget Lake, via lipidic biomarkers and GC-MS analyses. This was followed by a Master degree in Microbial Genomics (Evolutionary, Structural and Comparative Genomics) at the Paris-Sud-11 University, with a final Master trainee on "Metagenomics of photosynthetic picoeukaryotes from the Pacific Ocean" (supervised by Daniel Vaultot).

Finally, I defended a PhD-thesis on the "Physiological and evolutionary potentials of subsurface sediments microbial communities: cultural, genomics and metagenomics approaches" (supervised by Karine Alain). The studied samples, as deep as 2 kms below the seafloor, came from the IODP leg 317 expedition, offshore New-Zealand.

#### **Why did you decide to get a PhD degree?**

I was simply extremely interested and attached to the research of evolutionary and molecular biology, performed in labs, and to new microbiological discoveries. The universe of cells, since the beginning of my studies, just fascinated me. Doing a PhD-thesis after my Master has thus always been an obvious thing for me, I had never wondered if I had to do so, or not.

#### **How did you get into astrobiology – what attracted you to it?**

I first came in Astrobiology pretty early, as early as during my bachelor when I wanted to deeply discover both the worlds of astronomy and cells plus molecules. Astrobiology was the field that really gathered the infinitely small and the infinitely big. My choice of microbial ecology (and thus of infinitely small) was not done at that time, I had to wait discovering the world of extremophiles and of limits of life for that. Thanks Carl Woese!

#### **What does it excite you the most about your research?**

I am really exciting about what relates to the limits for terrestrial life/life in the universe, with all its links to philosophy and to the building of our representation of physical reality. Become aware of what way of life *Ramlibacter tataouinensis* can deploy, an amazing microbial species, not including the uncultured majority from which we know so little, then microbiology, I mean life and molecules, overwhelmed me and surpassed all magical worlds for me. The close involvement in spatial exploration is obviously exciting, and being the member of an international team for that, reinforce this microbial adventure.

#### **What advice would you give someone in high school or university, who is considering a career in the astrobiology field?**

There are so many doors to enter in the field of Astrobiology, at least as numerous as the number of scientific (micro)disciplines (geophysics, microbiology, planetology...). The possible links between non-astrobiological subjects and astrobiological subjects are also numerous and remain to be done. So, if I could give any advice, take your time, there is certainly one or several of these doors/links to Astrobiology that will finally come to you!

### Dr. Alex Perras - Graz University

#### **What is it your university background?**

I studied biology at the University of Regensburg, Germany. The Department of Microbiology focuses on extreme microorganisms and also Archaea, which was the reason why I took microbiology as one of my major subject.

#### **Why did you decide to get a PhD degree?**

Christine Moissl-Eichinger offered me a PhD position and I did not hesitate as I already did my Master in her lab and the topic was highly intriguing.

#### **How did you get into astrobiology – what attracted you to it?**

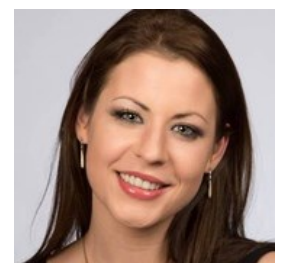
Christine gave me the opportunity to work on this topic. Astrobiology means to work with extreme, terrestrial microbes, which is sometimes highly challenging. Their way of living is highly interesting for me and the study of these extraordinary microbes can be used for other fields as well – let it be medicine or biotechnology.

#### **What does it excite you the most about your research?**

I like the idea that everything somehow is related to Astrobiology. We are studying "odd" microbes, which reveal fascinating features. The studies on these features can be adapted to other fields as well. As a plus; field work in Astrobiology also means to visit really exciting places on Earth.

#### **What advice would you give someone in high school or university, who is considering a career in the astrobiology field?**

If Astrobiology is your passion, go for it!





# MASE - Mars Analogues for Space Exploration Newsletter

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UK Centre for Astrobiology



CENTRO DE ASTROBIOLOGÍA  
ASOCIADO AL NASA ASTROBIOLOGY INSTITUTE



## > The MASE natural fossilisation process



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