Moon, Mars here we come!

Supporting life in space: Bacterial production of Oxygen

Baptiste Leroy
Associate Professor
Proteomic and Microbiology, UMONS

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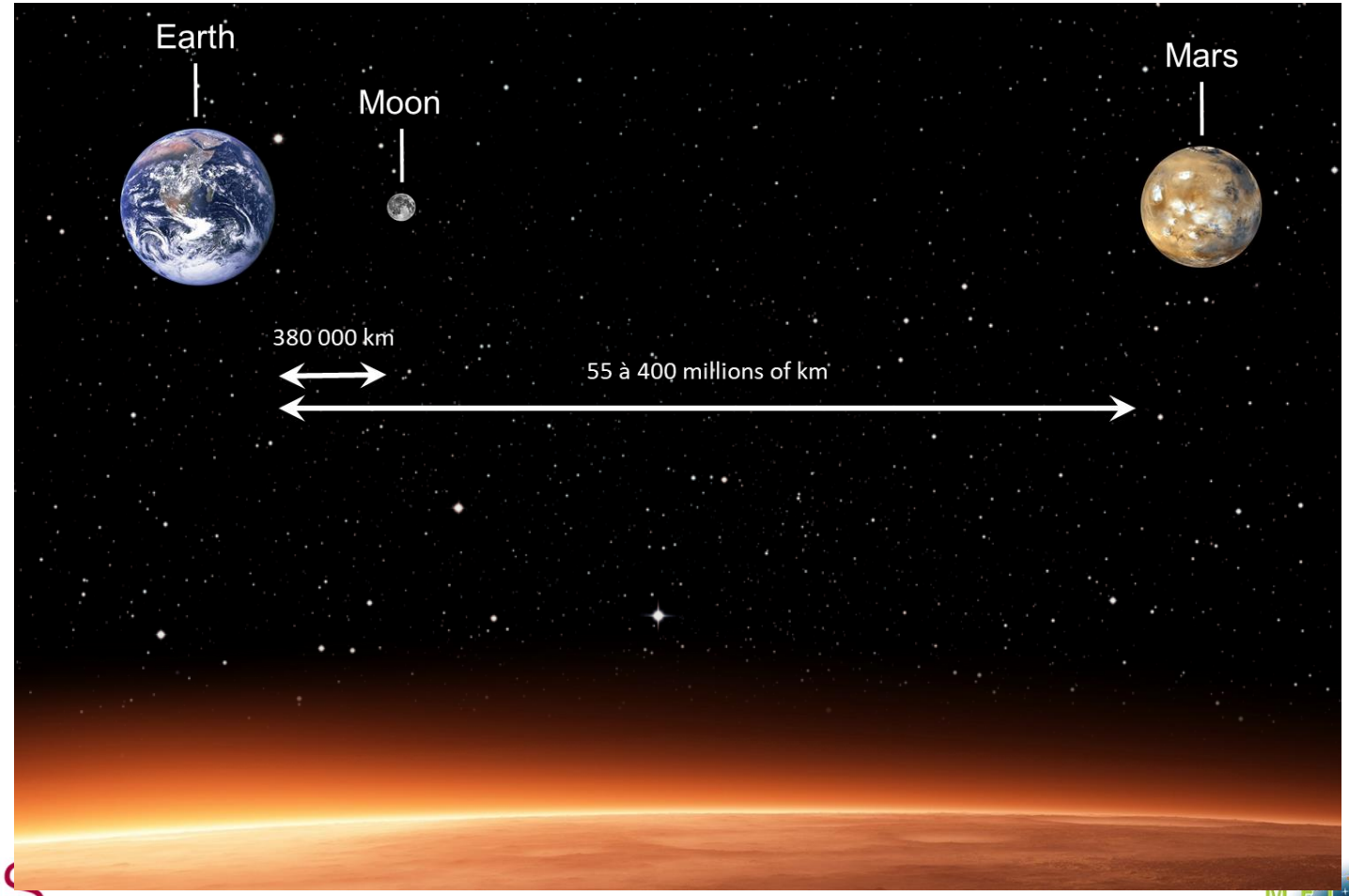
Moon, Mars here we come!

- How long would take a journey to Mars



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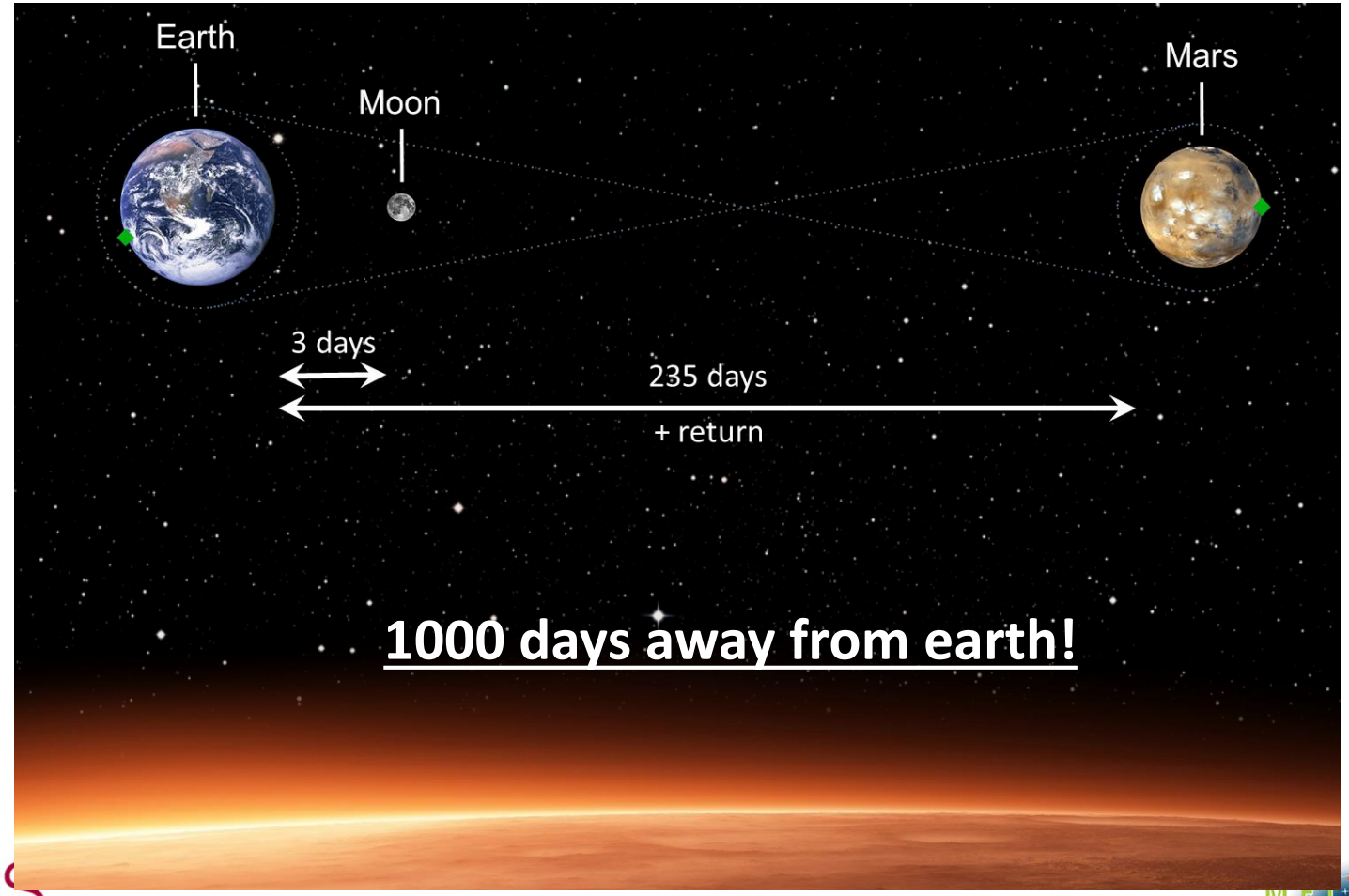
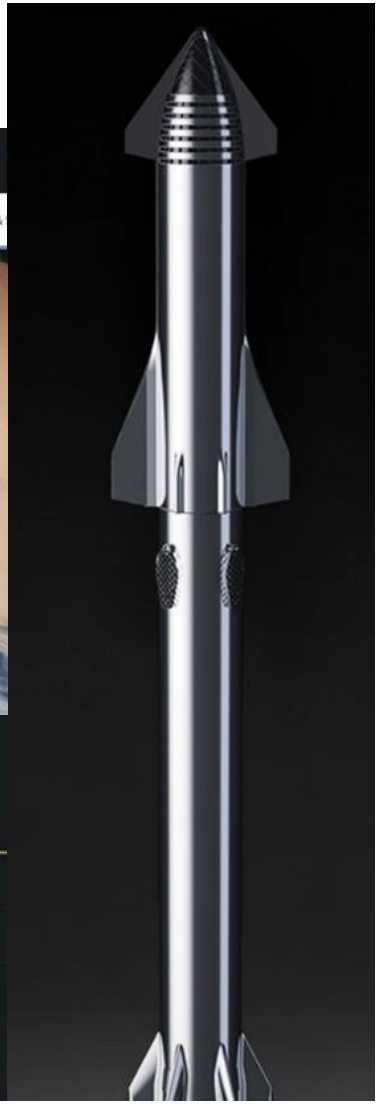


Moon, Mars here we come!

- Payload capacity to Mars



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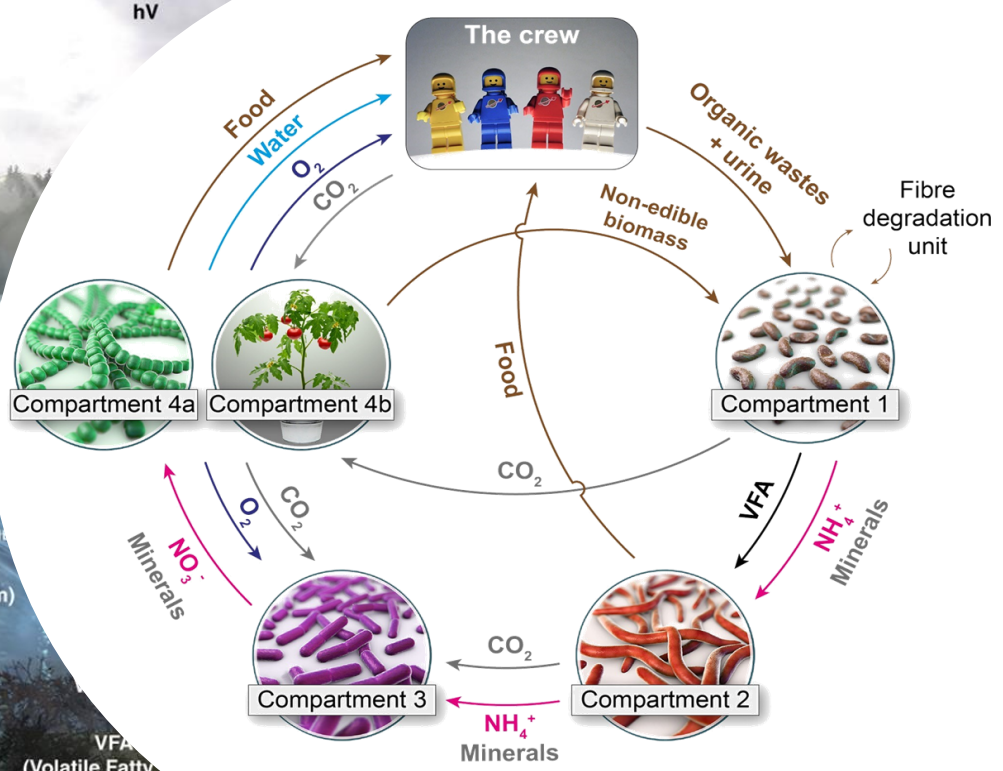
- What about recycling rather than just wasting resources?



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Moon, Mars here we come!

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UAB Universitat Autònoma de Barcelona

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IN COOPERATION WITH esa European Space Agency

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UCA Université Clermont Auvergne

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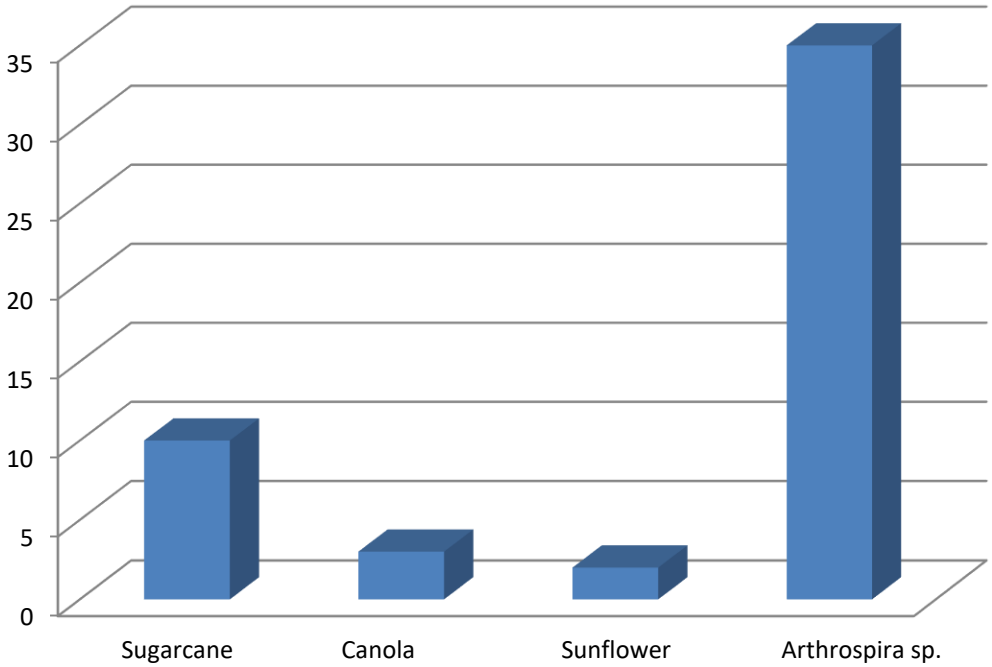
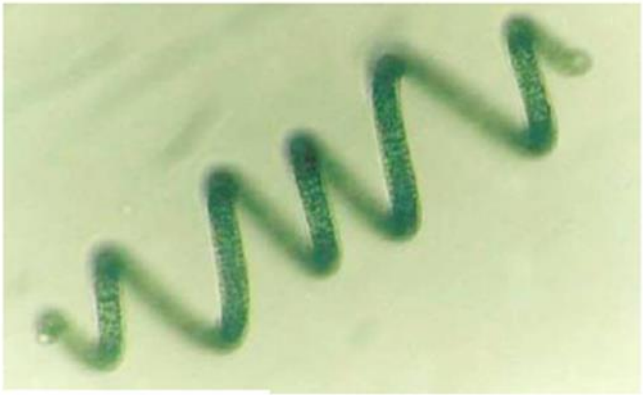
O2 production and CO2 removal

- Cyanobacteria selected for their very high productivity





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MELiSSA biological/knowledge requirements

- High level of integration at MELiSSA Pilot Plant

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Biologist want to open the black boxes

✓ **Omics: our molecular toolbox**

- **Do we really care?**
- **Couldn't we just predict process outcome based on previous experiment?**

Let's have a short video…

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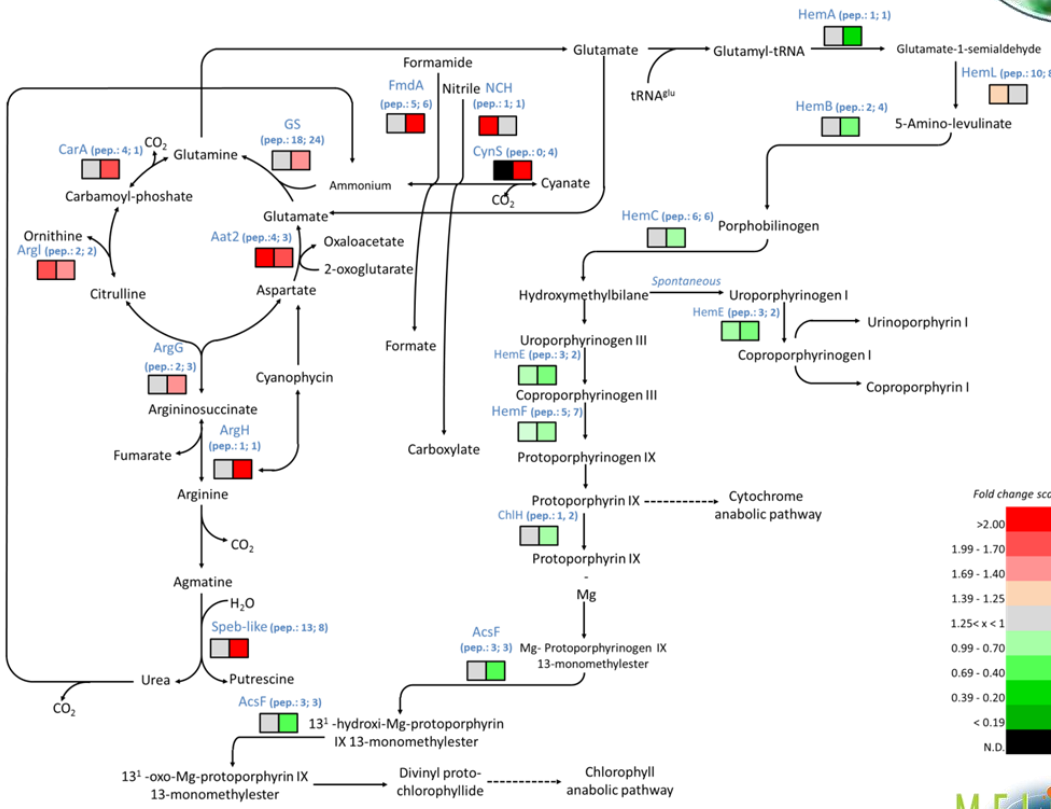
sina

Biologist want to open the black boxes

✓Omics: our molecular toolbox



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Biologist want to open the black boxes

- ✓Advanced space flight experiment Artemiss project

Compartment 4a

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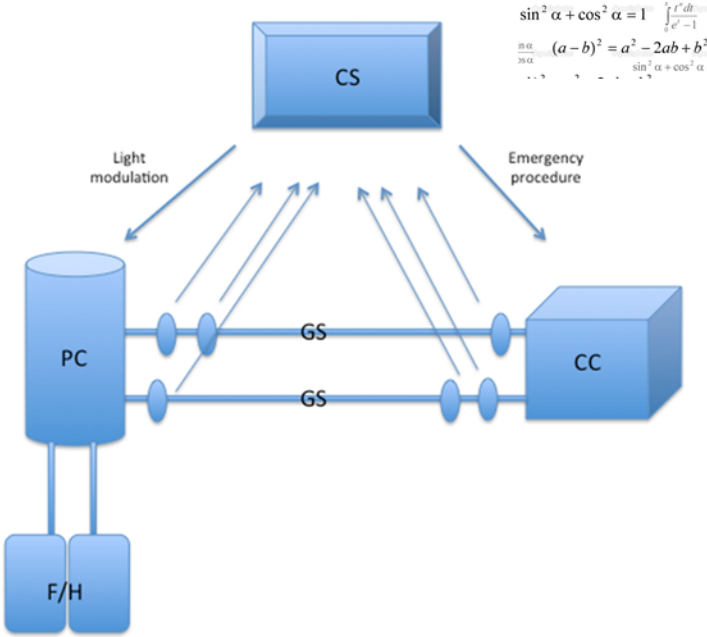
Biologist want to open the black boxes

- ✓ Biorat2 project



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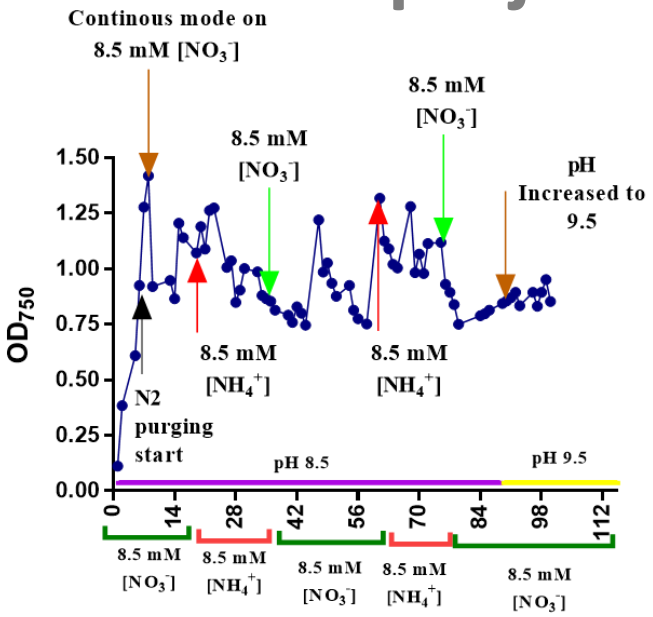
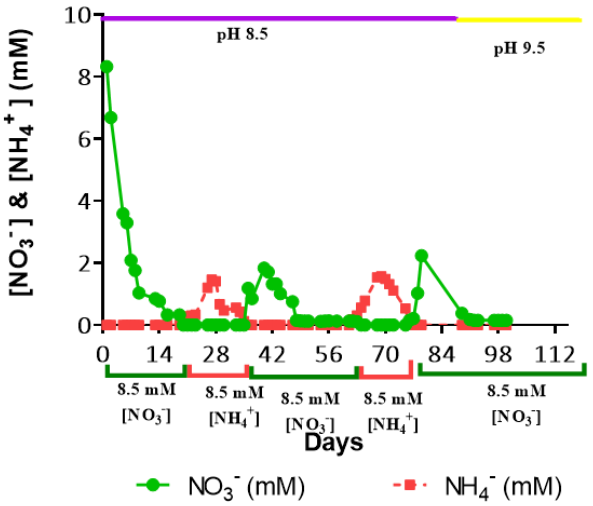
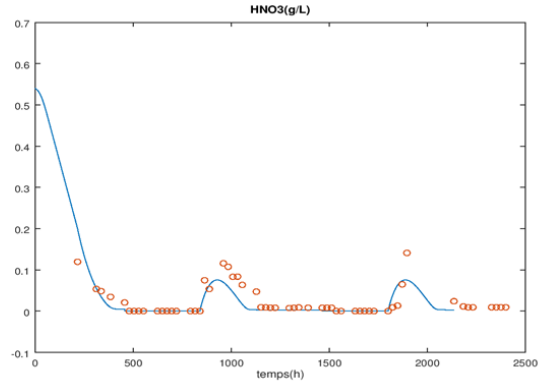
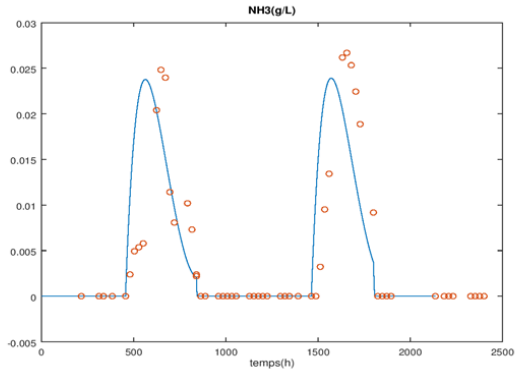
Biologist want to open the black boxes

✓Biorat2 project









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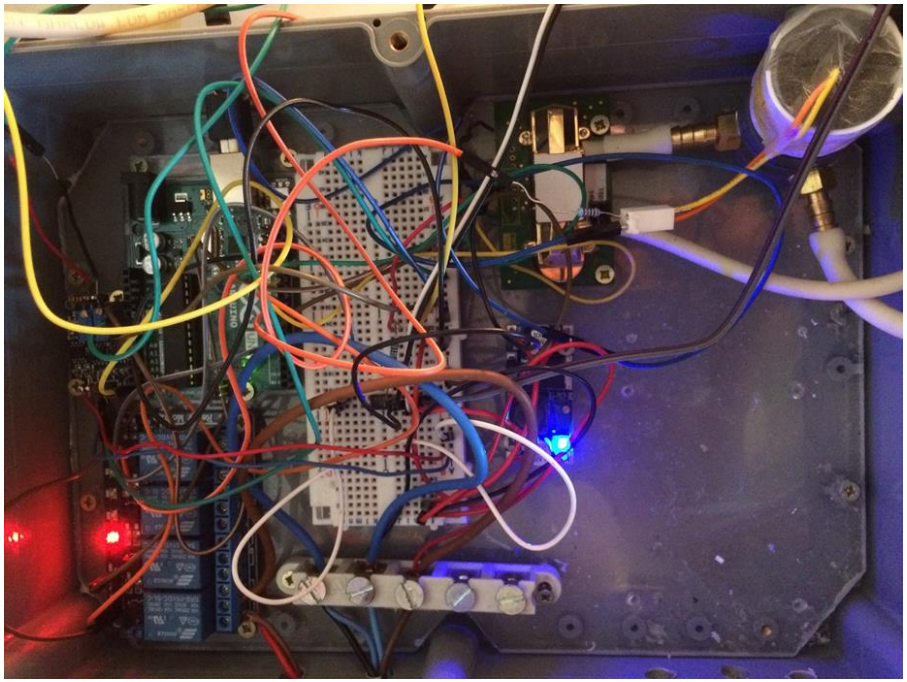
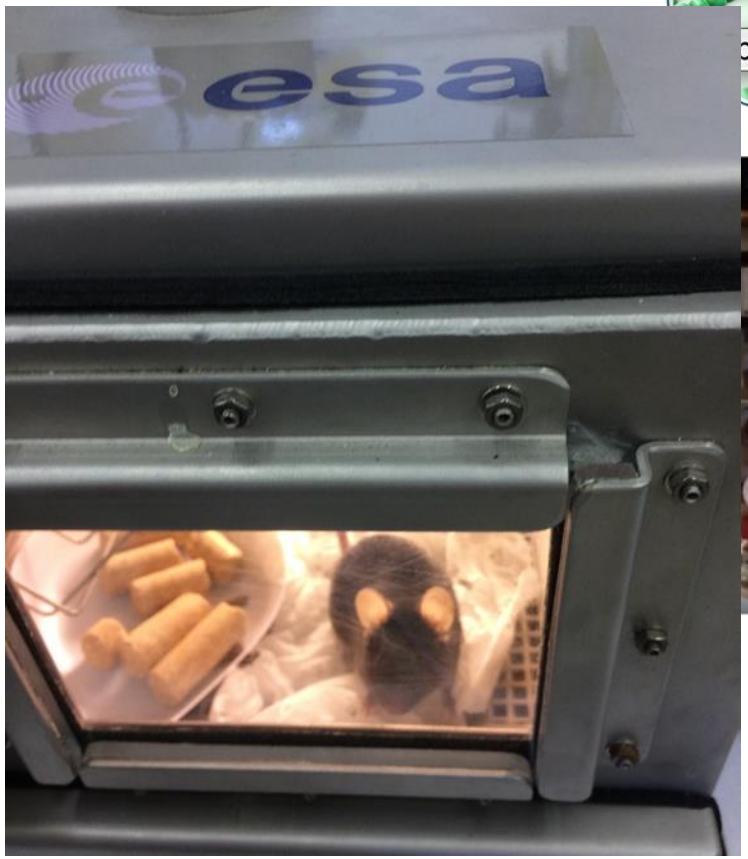
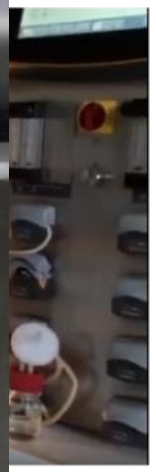
Biologist want to open the black boxes

- ✓ Biorat2 project : the ground demonstration







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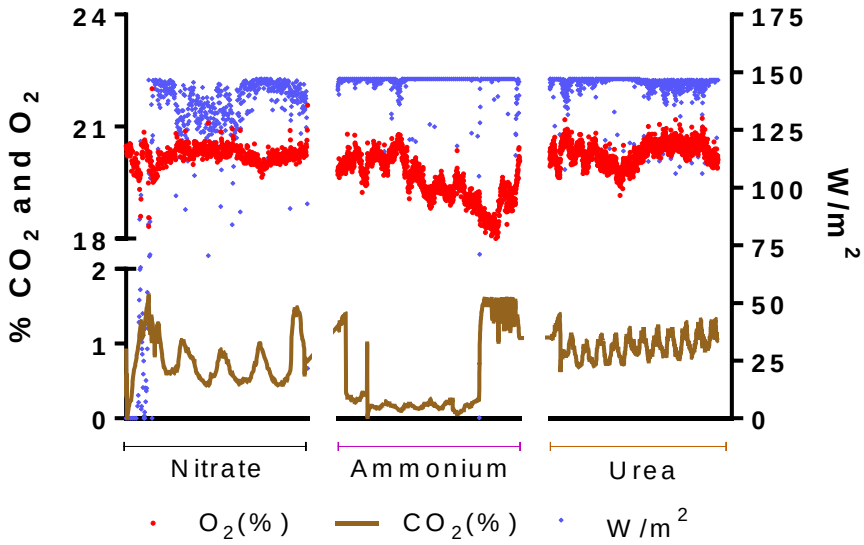
Biologist want to open the black boxes

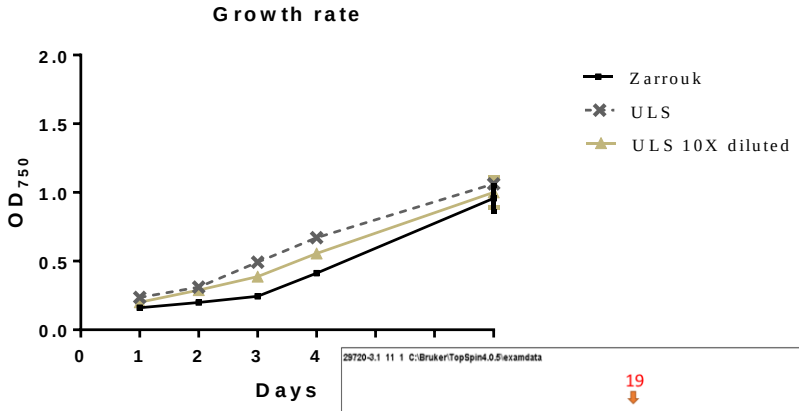
- ✓ **Biorat2 project : the ground demonstration**

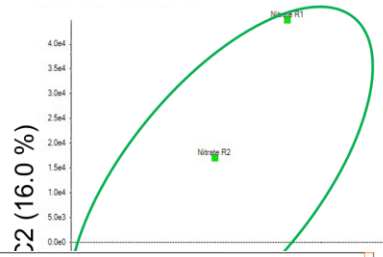


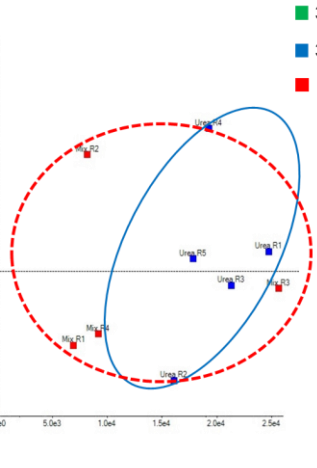

esa

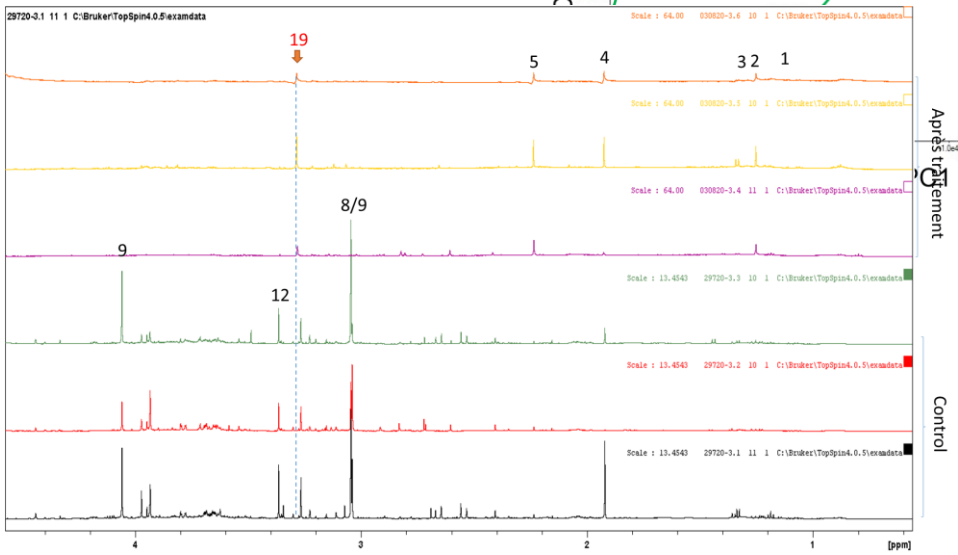
Biologist want to open the black boxes

- ✓Biorat2 project : treating (partially nitrified) urine









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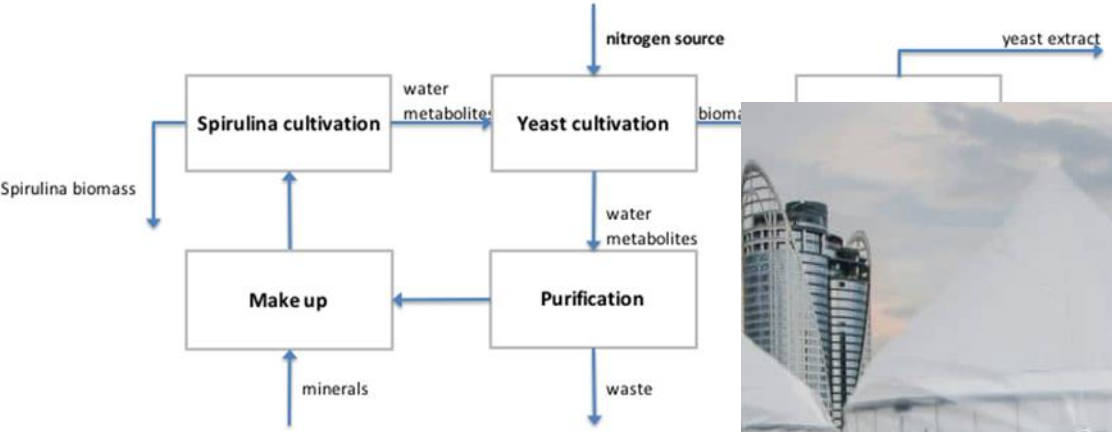
What about terrestrial applications

✓Arthrospira production and medium recycling : Purge To Value project



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What about terrestrial applications?

- ✓ **MARS : Architecture Energy and CO2 capture in a UMONS Living Lab (submitted at Walloon region)**
- ✓ **Farm at Factory : Valorisation of industrial waste for Arthrospira production (submitted at ERA-Net/FOSC)**

✓What about you being involved in MELiSSA?

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