



# Beyond Earth Orbit: Solar System Exploration and Spacesuits

## Course Synopsis

This 6-day workshop will provide a state-of-the art overview on solar system exploration: Ranging from robotic mission to the dusty deserts of Mars, the spectacular Saturn System to the ice-worlds of Pluto. In a series of interactive lectures, the participants will learn about the engineering challenges, programmatic backgrounds and the scientific dimension of recent solar system exploration missions. The program will also introduce educational tools and classroom activities for various student age groups and how to implement them in the daily teaching.

A special focus is on human spaceflight, including future human Mars missions – a specialization where the hosting organization, the Austrian Space Forum, offers a significant expertise – especially in the field of human-robotic Mars simulations. As a highlight, the participants will be introduced to the Aouda.X, currently Europe's only Mars exploration spacesuit simulator: How it is built and operated, what kind of challenges astronauts will encounter when exploring Mars. This will also include practical exercises using a small Mars mock-up rover and training equipment for the analog astronauts of the Austrian Space Forum. The international flavor of the event also aims to offer teachers the opportunity to make links with colleagues and schools in other countries.

# Curriculum

## Mo, 09Jan2017

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- Introduction to the Solar System: Origins, scales, transition to interstellar space. A tour of the planetary system & comparative planetology; major solar system missions
- Hands-on Exercise: Classroom materials: Sounds of Space (“Sonification”), Smells in space, scales, building your own DIY-Infrared camera, solar scope, etc.

## Tue, 10Jan2017

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- Spaceflight Basics: Trajectories, spacecrafts and their subsystems, how do space agencies operate missions?
- Introduction to Human Spaceflight: The human body in space (medical and psychological aspects), astronaut selection and training
- Hands-on Exercise: “Would you be the right stuff?” - Selected tests and trainings from the analog astronaut selection. This includes teleoperating a Mars-rover mock-up and elements of a spacesuit training exercise!



## Wed, 11Jan2017

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- Model rockets and stratospheric ballooning – lessons learned and how to’s.
- Hands-on Exercise: Building Model Rockets, simulating the flight profile and measuring their flight.
- Evening-Option: Visit to the Planetarium in Schwaz (tbc)



## Thu, 12Jan2017 “Mars Day”

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- Planetology of Mars – the Basics about the Red Planet
- Mars Analog research – what’s that and what does it do in my classroom?
- Hands-on Team-project: Designing your own analog mission in the classroom (Part I)

## Fri, 13Jan2017

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- Demonstration: Aouda.X Spacesuit simulator – getting to know a prototype spacesuit simulator for Mars exploration. Meet & Greet with an analog astronaut (tbc).
- Hands-on Team-project: Designing your own analog mission in the classroom (Part II)

## Sat, 14Jan2017

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- Presentation: Mars analog mission Team-projects for the classroom
- Course review and feedback.

## Location

### Where to stay in Innsbruck?

Although we do not strongly recommend any specific hotels, e.g. tiscover.com is a nice booking platform for Innsbruck. Our visitors and guest researchers had good experiences with either the Ramada Hotel, the Hotel Altpfadl, Hotel Alpinpark, Binders Hotel or the B&B Garni (cheapest) – all of them in walking distance to the OeWF building. There are a few supermarkets and restaurants in walking distance. The spacesuit laboratory is about 20min walking time from the medieval Innsbruck city centre.

### Where to meet...

Please report to the Austrian Space Forum spacesuit laboratory, Sillufer 3a, 6020 Innsbruck, Austria – that is behind the main building of the Innsbruck Red Cross services- on **Monday, 09Jan2016, 09:00 CET**.

Walking distance railway station: 10-15 min

Public transportation from airport: 30-35 min



## About the course lead

Dr. Gernot Groemer holds a masters degree in astronomy and a PhD in exploration astrobiology. He is an alumni of the International Space University, where he also served as a lecturer. He currently teaches at the universities of Innsbruck and Klagenfurt. Dr. Groemer is a member of the board of directors of the Austrian Space Forum. He led 12 Mars expedition simulations, including the Northern Sahara, Utah and southern Spain.



## About the Austrian Space Forum

The Austrian Space Forum (Österreichisches Weltraum Forum, OeWF) is a national network for aerospace engineers, scientists and people with a passion for space. The citizen-science organization is involved in cutting-edge space exploration research and serves as a communication and networking platform between the space sector, industry, academia and the public.



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