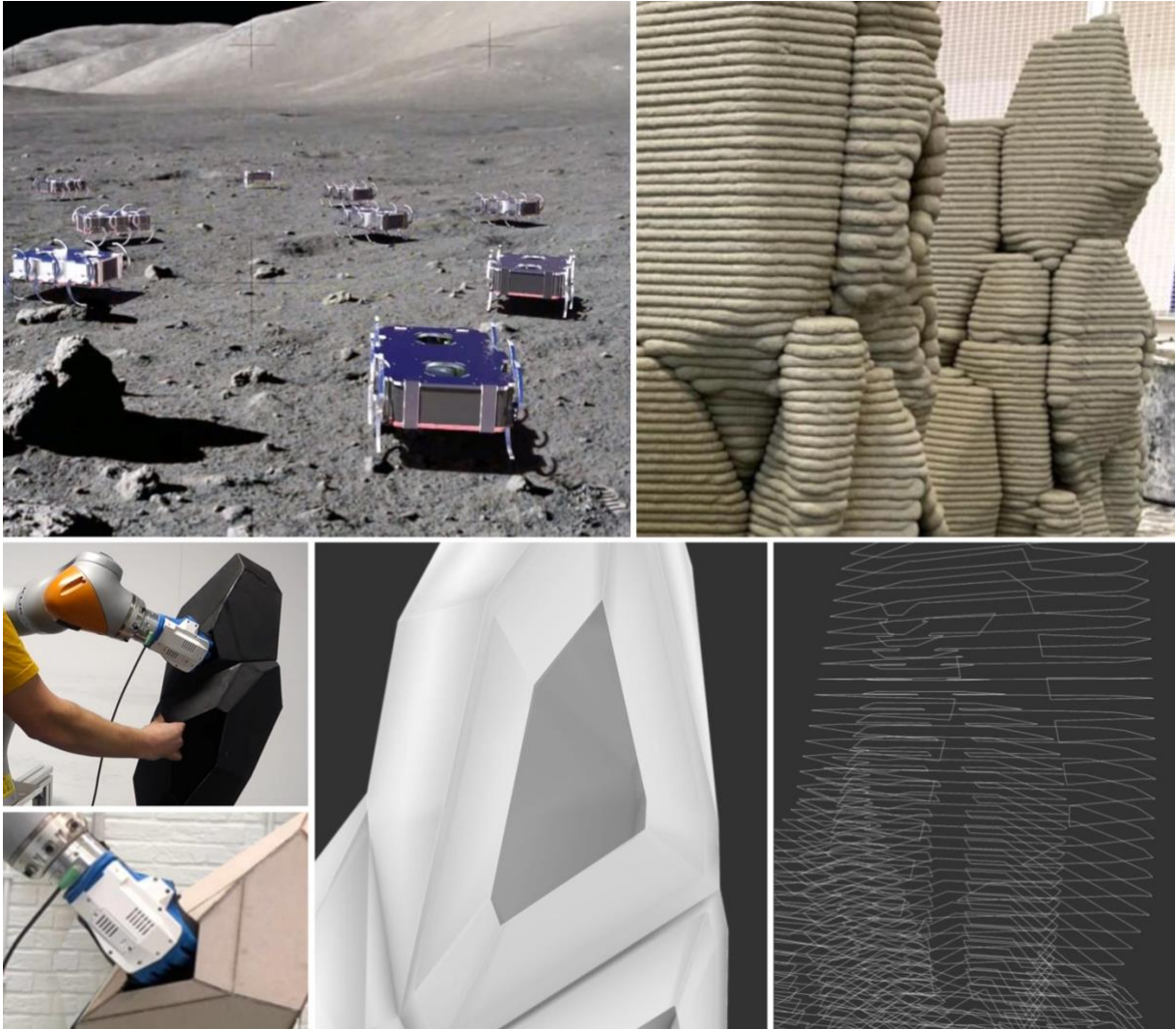


(Hosted by) Complex Projects

Msc 3/4 - Lunar Architecture and Infrastructure



Source: Rhizome 1.0 © Zebro, RB, and CoR labs

Tutors

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|-----------|----------|
| Code | AR3CP120 |
| Credits | 55 ECTS |
| Location | Moon |
| Excursion | - |
| Costs | - |

Mirroring the interdisciplinary nature of space colonization projects where engineers, architects, roboticists, and space scientists work together to achieve common goals, the new interfaculty course, Lunar Architecture and Infrastructure (LA&I) is designed to foster collaboration and shared objectives among students from various faculties. It is open to all TU Delft students and addresses challenges of space colonization.

To survive in outer space, humans need protection from radiation. Such protection requires architecture and infrastructure to ensure habitation and accommodate various activities ranging from living to working while relying heavily on In-situ Resource Utilization (ISRU) and a high degree of automation. Lunar architecture and infrastructure are designed by computational means and are constructed by robotic means involving Robot-Robot and Human-Robot Interaction (R/ HRI) supported Design-to-Robotic-Production-

Assembly and -Operation (D2RPA&O). The construction relies on a swarm of mobile robots equipped with various end-effectors that are deployed to map the terrain and mine for materials used to 3D print building components. These are then assembled using R/ HRI-supported methods. The assembled structure is equipped with a Life Support System (LLS), which relies on D2RO methods. Both habitat construction and inhabitation are powered by an energy system space-based solar power. The ultimate goal is to develop an autarkic R/ HRI-supported D2RPA&O system employing ISRU for building and operating habitats and to transfer developed technology to terrestrial applications in due time.