



## Extracting Records of Life on Mars

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*Figure 1. Future Mars rovers will encounter mineral and salt mixtures that cause problems for current extraction methods. Our water-based system may solve the mineral problems of Mars for future life detection missions.*

The quest to determine whether life existed, or still exists, on Mars is underway with a number of missions planned for the next few decades. For organic matter to be analysed it must be first extracted from its rock matrix. Thermal extraction (heating samples to release organic compounds) is causing problems on Mars because of the highly reactive minerals present. Water extraction circumvents the problems of reactive minerals and offers the potential for extraction of organic compounds ranging from amino acids to polycyclic aromatic hydrocarbons.

The project investigates extraction with subcritical water as a method for future missions. Manipulating temperature and pressure of water allows it to dissolve different materials and targeted or selective extraction is possible. A range of relevant samples already exist for the project but future field work to Mars analogue sites on Earth is possible. The spin-off benefits from space mission work are legendary and this work also has spin-off potential for future green solvent approaches in analytical chemistry.

The research will use a **unique and operating subcritical extraction system developed for Mars mission work** at Imperial College London and will use other equipment in the Imperial College Organic Geochemistry Laboratories. Full training will be provided. The project would suit a candidate with a background in Earth Science, Chemistry, Geochemistry or a subject that develops similar skills.

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- Details of how to apply are at: <https://www.imperial.ac.uk/study/pg/apply/how-to-apply/>.
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