



Job Description: Postdoctoral Fellow in Mars Atmospheric Science

General Information	
Job Title:	Postdoctoral Fellow in Mars Atmospheric Science
Department:	National Space Science and Technology Center (NSSTC)
Division:	National Space Science and Technology Center (NSSTC)
Location:	UAE University, Al Ain, United Arab Emirates
Type:	Full time
Closing date:	Review of applications will begin on 1 August 2020, and the position will remain open until filled.
Length of contract:	Two years in the first instance, with the possibility of renewal.
Contact:	Dr Claus Gebhardt (claus.gebhardt@uaeu.ac.ae)

Direct Supervisor's Job Title
<ul style="list-style-type: none"> ▪ Director of the National Space Science and Technology Center ▪ Day-to-day supervision will be by a Senior Researcher in the NSSTC Planetary Science group.

Subordinate's Job Title(s)
<ul style="list-style-type: none"> ▪ N/A

Description of the Position
<p>The National Space Science and Technology Center (NSSTC) at UAE University (UAEU) in Al Ain, UAE seeks a candidate to join its Planetary Science Group (and the wider Earth and Planetary Science Unit) as a postdoctoral fellow. His/her focus will be on Mars dust storm research in preparation for and in support of the exploitation of scientific data from the upcoming Emirates Mars Mission (EMM, https://www.mbrsc.ae/emirates-mars-mission). The anticipated start date is as soon as possible but is likely to be sometime during Fall 2020.</p> <p>The EMM science phase is scheduled to start in early-to-mid 2021. EMM is expected to provide an unprecedented dataset of satellite images covering the Martian surface and atmosphere.</p>

Description of the Position

The planned work will start with imagery and dust-climatological-data from past and existing Mars satellite missions. The initial goal is a study to gauge the feasibility of extracting information about Mars dust storms from such observations. It is common practice to identify dust storms manually by the visual inspection of Mars Daily Global Maps. This may be based on different criteria, such as dust clouds, dust storm texture/convective structures, and atmospheric fronts. Manual identification will be backed up by comparisons against the performance of automatic dust storm detection and/or machine learning methods.

Once EMM begins its science phase, the researcher will focus on EMM observations (and/or EMM data synthesized with models using data assimilation methods, on a make-available basis) as the main source of information about Martian dust storms. This will include quantitative constraints on key parameters related to the formation of dust storms, such as dust optical depth, atmospheric and surface temperatures, surface winds, etc. The objective of this part of the work is to generate a comprehensive database of Mars dust storms.

During both phases of the project, the postdoctoral fellow is also expected to pursue independent research in the field of Mars dust storm physics/dynamics/meteorology. Should the successful candidate have the required expertise and aptitude, this may include the use of Mars Global Climate Models (MGCMs) on the UAEU's supercomputing cluster.

The National Space Science and Technology Center, Al Ain

NSSTC is a research and development institute of some 50 staff located on the UAE University campus in Al Ain, about 90 minutes' drive from Abu Dhabi and Dubai. UAEU is the largest and highest-ranked public university in the UAE.

The Center was established jointly by UAEU, the UAE Space Agency, and the UAE Telecommunications Regulatory Authority (ICT-Fund), motivated by UAEU's desire to strengthen its role in and contribute to the needs of the nation in Space Science and Space Technology, and to become a Space Science and Technology hub for the region. NSSTC focuses on research and development, higher education, and community outreach. The Center's priorities are three-fold: excellence in Space Science, leadership in Space Technology, and providing innovative solutions to a broad spectrum of societal challenges.

Currently nearing completion at UAEU is NSSTC's Assembly, Integration, and Testing facility for satellites up to 200 kg, which will also support UAEU students' CubeSat projects with the capability of building multiple satellites at a time. The facility will include a cleanroom, thermal vacuum chamber, vibration system, and anechoic chamber. Once complete, this facility will also include a ground station and mission control. The Center's other upcoming facilities include Global Navigation Satellite System and In Space Resources Utilisation laboratories, a Radio-Array Observatory for Astronomy, Space Situational Awareness and multidisciplinary space science research, and NSSTC's research staff also have access to UAEU's supercomputing cluster.

Description of the Position

NSSTC has expertise in spacecraft communications and precision positioning, on-board real-time systems, space situational awareness, global navigation systems, space resource utilization, geospatial information systems, Earth observation, and planetary science. The NSSTC Planetary Science group currently includes two resident and one visiting faculty, one senior researcher, two research assistants, and MSc students. Alongside Mars, its members have expertise in modelling giant planet atmospheres, geophysical fluid dynamics laboratory experiments, visible and radar remote sensing, and small satellite spacecraft. The group members have ongoing international research projects with Oxford University in the UK, the Laboratoire de Météorologie Dynamique in Paris, France, the Space Science Institute in Boulder (CO), USA, and the ExoMars Trace Gas Orbiter ACS instrument team. Also, they are in an ongoing exchange and research collaboration with Aeolis Research in Pasadena, CA, USA.

Application instructions

To apply, please submit the following via UAE University's jobs portal at <https://jobs.uaeu.ac.ae/>:

- (1) Cover letter
- (2) CV
- (3) Publications list
- (4) Contact details of two professional references.

Tasks and Responsibilities

- Inspection of satellite image series and quantitative datasets
- Tracking and cataloguing of multiple dust storms
- Statistical analysis of dust storm characteristics
- Comparisons against the performance of automatic dust storm detection methods/machine learning
- Independent research in Mars dust storm physics/dynamics/meteorology
- Publish research work in the open scientific literature
- Present research work to a variety of audiences within the University, the UAE, and at international conferences
- The interpretation of remote-sensing-based data and independent research may be supported by running Mars Global Climate Models (MGCMs)
- Contribute to NSSTC capacity building and outreach events
- Take part in NSSTC research group and business meetings
- Represent NSSTC and UAE University within the UAE and internationally

This is not intended to be an exhaustive list of tasks and responsibilities, and will be subject to periodic review by NSSTC.

Organizational Relationships & Communications

Internal Communications:

- NSSTC Planetary Science Group
- NSSTC Earth and Planetary Science Unit
- UAEU Department of Geography and Urban Sustainability
- UAEU Department of Physics

External Communications:

- National and international project partners

Job Requirements

Educational Level/ Required Certificates:

- Undergraduate degree in Physics, Mathematics, Physical Earth Science, Engineering, Computer/Data Science, Astronomy, or a related subject.
- PhD degree in Physics, Planetary Science, Meteorology, Physical Earth Science, Computer/Data Science, Astronomy, or a closely related field.

Experience:

- Personal background in
 - Atmospheric Physics/Meteorology,
 - Satellite Remote Sensing,
 - Climate Modelling,
 - Planetary Science/Astronomy,
 - or similar.
- Proficiency in
 - the analysis of big scientific data and/or images
 - the use of relevant analysis toolboxes and programming codes (Python, IDL, Fortran, Matlab, etc.)
- A publication and conference record that compares favourably with others at a similar career stage.

Recommended Training Courses:

- If appropriate, a ca. 2-week training abroad in Mars climate modelling may be arranged once the applicant is in post.

Required Knowledge, Skills, and Competencies

- Excellent communication skills in English, both verbal and written.
- Flexibility and proactive attitude, communication, and conflict solving skills
 - To work independently and in a local group
 - To harmonize with a large project team
 - To do both remote sensing and modelling based work
- Well-organized and self-motivated.
- Multitasking and deadline-oriented working.
- Desire to contribute to cutting edge research.
- Willingness to travel overseas when necessary.