open data and Space Science in the UAE

Francesco Arneodo - New York University Abu Dhabi
the UAE

- substantial effort by the government towards space
- driver for economical and educational growth
- the society responds well
- universities play a role
the UAE
a new neighbour: Louvre Abu Dhabi
space science in the news

UAE Space Agency in talks with universities to create more space-science degrees
Agency seeking to recruit more Emiratis with science and engineering backgrounds

The results are in - and Alia's Genes in Space experiment is a winner
Dubai schoolgirl sent her experiment to the International Space Station for testing

Pressure is on for young Emirati space engineers aiming for Mars
The joint project between the centre and the UAE Space Agency is expected to lift off in 2020 and these engineers are working tirelessly to achieve that goal

Buzz Aldrin meets students at UAE Space Agency
Aldrin, who was the second person to walk on the moon, was in the country to discuss the UAE’s advancements space science, technology, education and exploration.

Emirati students reach for the stars
Ahlam Al Qasim and Fatema Al Khouri have returned from a two-week internship at the Italian Space Agency and now want to help the UAE on its Mars mission.
space science in the UAE society

Sharjah Center for Astronomy & Space Sciences
the Mars mission

Emirates Mars Mission Hope Spacecraft

- 1.5m High-gain antenna to communicate with Mission Control on Earth
- 600-watt solar panels for charging batteries that is enough power to run around 20 laptop
  - Dimension: 2.37 meter in width and 2.9 meter in height
  - Wet mass = 1,500 kg
- Star Trackers
- Eight 5-Newton RCS thrusters
- Aluminum honeycomb structure with composite face-sheet
- Six 120-Newton Delta V thrusters
- 20 GBytes of data storage

- Emirates Exploration Imager (EXI)
  - Measures properties of water ice and dust aerosols, and abundance of ozone in Mars’s atmosphere
- Emirates Mars Ultraviolet Spectrometer (EMUS)
  - Measures global characteristics and variability of thermosphere and hydrogen and oxygen composition.
- Emirates Mars Infrared Spectrometer (EMIRS)
  - Measures global thermal structure and abundances of water ice, water vapor, and dust in Mars’s atmosphere

Image of Mohammed Bin Rashid Space Center

an open universe opportunity?
the context

- Emirates Institution for Advanced Science and Technology (EIAST), now Mohammed Bin Rashid Space Center, founded in 2006
- a Space Agency has been created in 2014
- existing collaborations between NYUAD - UAESA and NYUAD - MBRSC
- existing MoU UAESA - ASI
- existing links NYUAD and ASI
- other universities with space interests (KU-Masdar, University of Sharjah)
- recurrent space events as the Global Space Congress:
NYU Abu Dhabi

- Probably the most exceptional higher education `adventure’ of modern times
- Students acceptance rate of less than 3%
- About 115 nationalities in the student body
- a research university
NYUAD students

BY the NUMBERS ACADEMIC YEAR 16-17
(as of Oct. 10, 2016)

OVERALL STUDENT BODY

1,050+ students enrolled for Academic Year 2016-17

54% female 46% male

110 nationalities (including dual nationalities)
**Academic Divisions**

**Arts & Humanities** | Arab Crossroads, Art & Art History, Film & New Media, History, Literature & Creative Writing, Music, Philosophy

**Engineering** | Civil, Computer, Electrical, General, Mechanical

**Science** | Biology, Chemistry, Computer Science, Mathematics, Physics, Psychology

**Social Sciences** | Economics, Politics, Social Research & Public Policy

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**Undergraduate Programs**

- 22 Undergraduate Majors
- 19 Concentrations
- 6 Multidisciplinary Programs

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**Global Ph.D. Programs**

- Biology
- Chemistry
- Computer Science
- Engineering
- Physics
astronomy and astrophysics @NYUAD

faculty interests strongly focused on A&A
• galaxy formation
• exoplanets
• helioseismology
• water masers
• supernova remnants
• compact objects
• dark matter
• TGFs....
use of astronomy data at NYUAD

• outreach
• core courses (typical of a liberal arts college)
• Astronomy/Astrophysics courses
• research
projects NYUAD-UAESA

- CubeSat for TGFs
  - idea born at ASI Data Center (thanks to Carlotta Pittori and Paolo Giommi)
- possible project on radio astronomy
NYUAD, a hub for Open Universe in the UAE?

Just brainstorming, everything TBD!!

- Use of Open Universe tools:
  - in the classroom
  - for students’ thesis
  - for outreach and science citizen projects
NYUAD, a hub for Open Universe in the UAE?

- Collaboration in Open Universe initiatives?:
  - having dedicated courses or one-week schools?
  - students coding?
  - triggering interest in other UAE Universities and institutions

- UNOOSA Director S. Di Pippo will visit in January
Conclusions

- the UAE space sector is growing
- opportunities to participate in shaping this growth
- the open universe approach to data sharing matches NYUAD philosophy to knowledge
- NYUAD and other institutions in the area are well placed to promote the open data approach
- open data would certainly help research and outreach