

# PolyU helps to map the moon precisely

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Scientists from the Hong Kong Polytechnic University have devised ways to precisely map the moon by using data collected from various space missions.

Their work has improved understanding of the topography and core substance of the moon, and will be useful in determining where to land in future missions.

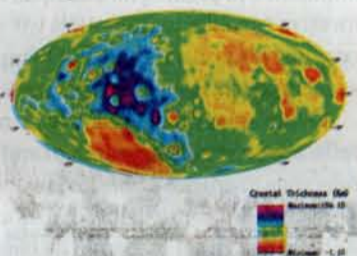
Helped by mainland and overseas research centres, they created a digital elevation model of the moon by combining laser altimeter data obtained from the Chang'e I mission and others, including Japan's SELENE and America's Clementine missions.

Chang'e I was a Chinese lunar-orbiting spacecraft that was launched in 2007. Chen Yong-qi, emeritus professor of the university's land surveying and geo-informatics department, led the team. Chen is also on the expert committee of the mainland's Lunar Exploration Programme.

"Although research about the moon began a long time ago, we still know very little about it - like how thick exactly its crust is, what's inside, and the topography and weight of it," Chen said.

Researchers found that the average thickness of the moon's crust was about 40 kilometres on the side near the earth, and about 50 kilometres on the other side. They have come up with a more accurate gauge of the moon's shape. It was "like an egg", researchers said. The small end of the "egg" points towards earth. This position causes the moon to keep the same face towards earth at all times.

Researchers also found that the part of the moon closer to earth is heavier than the other side, because of different densities of the rock in



**Scientists used new topographic and gravity models to map the moon.**

various places on the moon. Their findings were achieved by integrating 17.5 million laser altimeter measurements from Cheng'e 1 and other missions.

The team began to look at ways to map the moon's surface in 2006. It is much more difficult than mapping the earth's surfaces because there are few control points, which are essential for accurate map-making - just 14 lunar laser ranging retroreflectors and Apollo lunar surface experiment package transmitter sites with coordinates. Installed by America's Apollo and the former Soviet Union's Luna space missions in the 1960s, they were available only on the near side of the moon.

Money for the project was about HK\$2.2 million, which came from the university's Niche Area fund and the government. "Since projects like this don't generate any direct economic benefits for society, it's difficult to secure funding," Chen said. He said he hoped funding for the project would be supported because such research expands mankind's knowledge and understanding of the world.

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