

Shooting for the Moon

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The Apollo programme inspired thousands of people to pursue careers in science. Today, they still support human spacefaring — but balk at the price. Richard Monastersky reports on the results of a Nature poll.

In the heady days after the Apollo 11 lunar landing on 20 July 1969, countless children travelled to the Moon by cupping their hands over their mouths and announcing: "Houston, Tranquility Base, here. The Eagle has landed." With giant strides, they bounded across the landscape just like their heroes, Neil Armstrong and Buzz Aldrin. They practised lift-off by counting backwards to zero and blasting themselves skywards. And many of them landed, decades later, in scientific careers.

Humans have not walked on the Moon since the Apollo 17 mission of 1972. NASA

In fact, the Moon landings deserve credit for motivating a large fraction of today's scientists, according to [a survey of almost 800 researchers](#) who have published in Nature in the past three years¹.

Half of the researchers who responded to an online poll last month said that the Apollo missions had inspired them to pursue science — and not just in astronomy or planetary science (see '[Survey respondents](#)'). "I became completely space crazy," said one life scientist. "I was certain I'd be an astronaut. My interest shifted to biology, but I still believe Apollo 11 was a major influence on me."



The survey, intended to capture broad impressions rather than to precisely measure attitudes, also reveals surprisingly widespread support among scientists for human space exploration. Nearly 80% of scientists polled said that there are scientific research justifications for continuing human spaceflight.

More than 80% felt that the life sciences, physical sciences, engineering and human physiology all benefited to some degree from human spaceflight, and almost 90% said that it still inspires younger generations to study science (see '[Survey results](#)'). Their impressions are not without justification. The US National Research Council concluded in 2003 that work in microgravity has had a major effect on several areas of physical sciences, including research into fluids, combustion and crystal growth². The Neurolab experiments, which flew on NASA's space shuttle Columbia in 1998, are regarded as the high point of life-sciences research in space and resulted in 100 publications, according to Joan Vernikos, former director of life sciences at NASA.

Up, up and away

In principle, the scientists who participated in the poll seemed to support manned space programmes, with 62% of Americans and 83% of Europeans rating their own country's expenditures on human spaceflight as "about right" or "not enough". The stronger support in Europe perhaps reflects a vast difference in spending on either side of the Atlantic. Including money provided by the stimulus package, NASA will pour US\$9.7 billion into activities related to human spaceflight in the current fiscal year, roughly half of the agency's \$18.7-billion budget. The European Space Agency (ESA) allocates only €481 million (\$670 million), about 13% of its €3.6-billion (\$5.0 billion) budget.

But support for sending people to space flagged when participants were asked to prioritize spending. Nearly 80% would welcome a shift in spending from human spaceflight to unmanned space missions, whereas 70% would prefer some of that cash to be spent on other areas of scientific research.

David Southwood, director of science and robotic missions for ESA, says that the affection for shifting money rests on a false premise, because money taken from human spaceflight would not go to unmanned projects. Indeed, written responses from several of those who completed the survey revealed the opposite sentiment: some supported human spaceflight thinking it would increase spending generally on space research.

Southwood says that the positive attitudes seen in the Nature poll reflect the broad impact of human spaceflight, beyond simply yielding data for science. "It gives humans a vicarious means of breaking the surly bonds of gravity," he says, borrowing a phrase from the pilot-poet John Gillespie Magee.

During the lead-up to the Apollo missions, scientists had similar outlooks to those seen in the current survey. A study conducted by the American Association for the Advancement of Science in 1964 found that scientists generally supported the goal of landing humans on the Moon, but they objected to the tight timetable and the extreme costs³. At the time, the NASA budget consumed 4.3% of the total US budget; it now accounts for just 0.5%. Scientists in the public eye have generally been more sceptical about human spaceflight than those in Nature's poll, says John Logsdon, an aerospace historian at the Smithsonian Institution in Washington DC. "There have been very few scientists publicly giving this kind of support for human spaceflight," he says.

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With some scientists, the support for spaceflight was quite personal (see '[Moondreams](#)'). About 5% have applied to be an astronaut and 14% said they would pay between \$10,000 and \$50,000 for a brief sub-orbital trip into space.

It remains to be seen whether NASA's space programme will continue to earn their enthusiasm. Next month, a panel convened by US President Barack Obama will issue its assessment of America's plans to return to the Moon by 2020 (ref. ⁴), and its approval of the programme is far from certain.

Yet more than 36 years after man last ventured beyond the confines of low-Earth orbit during the Apollo 17 mission, Nature's survey would suggest that many will support the next grand voyage to the Moon and beyond.

Survey work was aided by Sara Grimme.

See Editorial, [page 307](#), and Nature 's Apollo special at <http://www.nature.com/apollo>.