

NZASE
scientist
profile

Pamela Kilmartin & Alan Gilmore

Born where and when

Pākehā. **Alan:** 1944, Greymouth; **Pamela:** 1949, Manunui.

How they got into science

Alan and Pamela's interest in astronomy began in early childhood. As a secondary student, Alan observed variable stars, which change in brightness, and volunteered on the site-testing programme for what became Mt John Observatory. As a university student, Pamela observed variable stars at what is now Auckland's Stardome.

Their backgrounds in amateur astronomy got them jobs at Wellington's Carter Observatory, then the country's only professional observatory, in the early 1970s. They married in 1974.

They say "we were in the right place at the right time - it's not a career path that could be replicated now." They are the only living astronomers on the NZ Space Pioneers stamp set, which is sprinkled with meteorite dust.

Their training and jobs

Alan: BSc.

Pamela: Library school, MA in French and English.

Alan: Senior assistant, Carter Observatory; technician/observer at Canterbury University's Mt John from 1980; Superintendent, Mt John 1996-2014.

Pamela: Librarian/information officer and observer, Carter Observatory and Mt John.

Field of science

Astronomy and astrometry - measuring the positions and movements of celestial bodies.

Photometry - measuring their brightness.

Spectroscopic observation (Pamela) - determining their composition, temperature and speed.

What they observe

They measure the precise positions of asteroids and comets in the southern skies to identify them by their orbits, something few observatories did in the 1970s. **Comets** travel in elongated orbits, spending most of their time far from the sun and developing a tail of gas and dust only when close to the sun. **Asteroids** are lumps of rock and ice; in the 1970s only 2,000 had been identified in the main belt orbiting between Mars and Jupiter. **Near-Earth objects** (NEOs) are asteroids and comets that come closer to the sun than Mars. From the 1980s, when scientists generally agreed that an asteroid impact had caused the extinction of dinosaurs, the search for NEOs became focused on their danger to Earth.



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How they find things out

They measure objects' positions against stars whose positions are accurately known, reporting them to the International Astronomical Union's Minor Planet Center in Cambridge, Massachusetts. They measure star brightness by turning star light into an electron current that can be measured precisely.

Until the 1980s astrometry required a good telescope, photographic equipment, a machine to measure the photograph, and a calculating device. It also required staying in the dome all night, often in winter when it was freezing.

Digital technology and the internet from the late 1980s enabled images of much fainter objects to be measured remotely, rather than in the dome, and sped rates of discovering objects and confirming observations.



2017 Pamela, Alan and Superintendent Nigel Frost inspect the Mt John telescope glass after cleaning in 2017.

What they like about astronomy

At first it was the delight of being able to see things invisible to the eye, like craters on the Moon, moons circling Jupiter and Saturn's rings. Later it was being able to do internationally useful work in New Zealand. "This is underlined when we get emails from the Jet Propulsion Laboratory in Pasadena, USA, asking if we can follow an asteroid deep in the southern sky, recently discovered by one of their satellites, that is too far south for other observatories".

Though officially retired since 2014, they continue to observe from Mt John and from an observatory at their Tekapo home.



Most valuable results

1. Following up discoveries of NEOs made by search programmes in Arizona and Hawai'i.
2. Measuring Halley's Comet to help the Giotto spacecraft pass close to its nucleus.
3. Photometry of many variable stars for Canterbury University research projects.
4. Confirming new orbit calculations of celestial objects lost early in the 1900s.
5. Discovering and naming 41 minor planets and one comet.

Ngā Kupu

Aorangi iti – Asteroid (and the name of Pamela and Alan's home observatory)

Auahitūroa – Comet

Karu whātata - Telescope

Tātai arorangi - Astronomy

Tohunga kōkōrangi - Astronomer

Whare mātai ātea - Observatory

Whetū – star.

Links

- **New Zealand's astronomy stamps**
- **The tricky process of cleaning** the 1m telescope at Mt John in photos
- **Alan talking about astronomy** on Radio National.
- **Pamela's list** of discovered minor planets.

Mt John Observatory in mid-winter.



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