Gert Finger Becomes Emeritus Physicist

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Gert Finger has retired after almost 33 years service and he has been made the first Emeritus Physicist at ESO. An appreciation of some of his many achievements in the development of infrared instrumentation and detector controllers is given. A retirement party for Gert Finger was held in February 2016.

Gert Finger obtained a PhD degree in physics at the ETH (Eidgenössische Technische Hochschule) in Zürich in March 1983, and a few months later joined ESO as an infrared instrumentation engineer with duty station in Garching.

At that time, the state-of-the art detector in the nearinfrared had a single pixel, providing indium antimonide (InSb) photometers for the nearinfrared and bolometers for longer wavelengths. ESO had started to develop the Infrared Spectrometer (IRSPEC), a general purpose 1–5 μm spectrograph for the New Technology Telescope (NTT), under the leadership of Alan Moorwood. Together with Manfred Meyer, Gert developed a multiplexed readout for a 1 × 32 element linear InSb detector array. This was a major step forward in infrared astronomy, both for the concept and in terms of the performance achieved (Moorwood et al., 1986).

Soon the first two-dimensional arrays became available, based on a 58 × 62 pixel readout architecture from Santa Barbara Research Center (SBRC). But Europe had no access because of export restrictions from the USA. A Mullard infrared CCD and various other detectors were installed in the Infrared Array Camera (IRAC), but problems with the injection threshold of these detectors affected the performance for astronomical applications. After some years InSb detectors based on the SBRC 58 × 62 array became available in Europe and in 1991 IRSPEC was retrofitted with this detector and a rather advanced Virtual Machine Environment (VME) based readout system (Moorwood et al., 1991).

IRAC was succeeded at the MPG/ESO 2.2-metre telescope by its sibling IRAC2 which used a 256 × 256 HgCdTe (1.0–2.5 μm) detector, the first of its kind at ESO. The Infrared Spectrometer And Array Camera (ISAAC) for the Very Large Telescope (VLT) was originally designed for 256 × 256 format detectors, but was readily modified to receive the new 1k × 1k HgCdTe detector arrays; one arm of ISAAC was fitted with a Hawaii detector and the second one with an Aladdin detector, a quasi-proprietary device which then had become available to the community. To achieve the efficient readout of these much larger detectors, the IRACE controller was developed by Gert together with Manfred Meyer, helped by Joerg Stegmeier and Leander Mehrgan.

As a spin-off, and also to bridge the gap to the time when ISAAC was operating on the VLT, SOFI (Son OF Isaac) was built for the NTT in order to replace IRSPEC, which suffered from rather strong internal background noise. SOFI arrived on La Silla (in 1997) a year earlier than ISAAC at the VLT, and it is still heavily in demand by the community. *K*-band low resolution spectroscopy provides an example of the enormous impact of these detector developments: in 1998 SOFI was four orders of magnitude more sensitive than the single pixel circular variable filter (CVF) spectrophotometer in operation at the ESO 3.6-metre telescope in 1980, while having twenty-fold spectral resolution and ~ 400 simultaneous spectral elements, while the CVF allowed only sequential access.

Subsequent instrument and detector developments on the VLT have been more rapid, with CONICA, the VLT Imager and Spectrometer for the Mid-infrared (VISIR), the CRyogenic InfraRed Echelle Spectrometer (CRIRES) with its mosaic of 4096 × 512 pixel Aladdin III detectors (soon to be upgraded to 2048 × 2048 arrays) and the High Acuity Wide Field *K*-band Imager (HAWKI) with brand-new 2k × 2k Hawaii-II RG sensors. The most recent generation of standard detectors are the Hawaii IV RG (4k × 4k) and will be used by the Multi-Object Optical and Near-infrared Spectrograph (MOONS) on the VLT, and potentially also in instruments for the European Extremely Large Telescope (E-ELT).


Gert Finger

In the meantime, the next technological leap in the detector controller area, the New Generation Controller (NGC), caught up with the detector developments. In 2012–14 the upgraded VISIR, and then the *K*-band Multi-Object Spectrograph (KMOS), were the first instruments to benefit from what is now the standard, and probably the most advanced, detector controller available today.

Gert also contributed to collaborative detector programmes, such as the one with the University of Hawaii and also directly with manufacturers, for example in the development of the SAFIRA detector with SELEX. The first application of the SAFIRA detectors was for the infrared wavefront sensors for GRAVITY, a crucial component of the instrument. There was always the expectation that at some point there would be quasi-noiseless infrared detectors and Gert propelled the development of a second generation for operation at 90 K. The success of the E-ELT critically depends on these detectors for wavefront sensing.

Retirement party

A retirement party for Gert was held at ESO Headquarters on 1 February 2016, attended by his friends and colleagues; the party included some remote appreciations by detector physicists from the USA. In recognition of Gert's tremendous achievements, which have also substantially contributed to ESO's programme and reputation, he was awarded the official status of Emeritus Physicist at ESO.

The introduction of the Emeritus Physicist position, of which Gert is the first recipient, is a way of recognising and honouring individuals who have played a major role in the development of ESO during their career. Emeritus Physicists are able to continue with their research activities, for example by participating in meetings in their areas of expertise, or giving presentations at conferences. The similar position of Emeritus Astronomer has existed for some five years at ESO (see Primas et al., 2010). However, since ESO is made up of people doing many other jobs in addition to astronomers, the Emeritus roles have now been extended to include both Emeritus Physicists and Emeritus Engineers.

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Fellows at ESO

Melissa McClure

I grew up in the university town of Ithaca, NY in the USA, which provided a great atmosphere for promoting my curiosity about science. However, my particular interest in astronomy got off to a somewhat bumpy start. In elementary school, our science teacher's attempt to encourage my interest in the Solar System backfired when describing how the rubble left over from the tidal disruption of a protoplanet by Jupiter may have formed the Asteroid Belt. Having recently been chastised on the topic of sharing with other children, I felt that Jupiter had clearly cheated the rules and informed the teacher that "I don't like grabby people, and I don't like grabby planets!".

Fortunately, the terrestrial planets maintained their charm, and by the time I reached high school I had progressed from reading *The Magic School Bus: Lost in Space* to collecting news clippings about the Earth and Mars. During my first year of high school, testing began on the prototype for the future *Spirit* and *Opportunity* Martian rovers. As part of the mission's outreach programme, each of the four principal US universities selected one of their local area high schools to participate in the field tests of the prototype, *FIDO*. We were the high school selected by Cornell University. This was my first opportunity to see scientists in action and also to see how a large "collaboration" can work to accomplish a huge and complicated task. At the time (1999–2000) it was very exciting just to teleconference over the internet with the three other groups in order to plan out our test mission (driving the rover through the Mojave Desert) and then watch it being executed. I was hooked!

When starting college at the University of Rochester in 2003, I was still unsure about whether to pursue geology or astrophysics. After taking an introductory course with Professor Bill Forrest, I decided to go the astrophysics route, and ended up badgering him to let me work in his research group. My first project was reducing ground-based near-infrared photometry from the NASA InfraRed Telescope Facility (IRTF) in support of a future Spitzer InfraRed Spectrograph (IRS) programme on discs by the Spitzer

Melissa McClure

instrument team. I continued working with Bill on these data, mid-infrared photometry from the United Kindom InfraRed Telescope (UKIRT), and eventually the Spitzer IRS spectra themselves during the academic year and over sum-