From Cambrian to Cretaceous: 50 Years of Optical-NIR Instrumentation Evolution (No 56)

12:30 - 13:00 | Prize Winner | Tycho Brahe Medal

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This talk skirts over the last 50 years Optical-NIR astronomical instruments "Cambrian explosion" as, over this period, their observational spatio-spectral grasps have ballooned by whopping factors of up to millions.
One prime mover along this (at times tortuous) route has been the swift demise of the once ubiquitous photographic plate with its abysmally low detective quantum efficiency. It has by now been replaced by almost perfect digital detectors with close to 100% quantum efficiency and negligible noise. The main other working force being the advent of brand-new instrumental phyla which has pushed instrument multiplex -the number of spatial pixels observed spectroscopically in single observations- from typically 10 in the 1960s to up to 10? today. In every case, these huge gains had come to full fruition thanks to the deployment of customized data reduction "factories" that convert raw detector output into precise physical measurements.
Such enormous gains look highly unlikely to reoccur anytime soon. This underlines the huge challenge that now faces instrument developers for the Extremely Large Telescopes currently being built, as instrument shapes are inexorably being pushed to gargantuan proportions. Adaptive Optics techniques, developed through much effort and sweat since the 1980s are providing some relief in that respect, but also bring an additional complexity layer. Much skill and stamina will be needed in the next decades to avoid dinosaurs-like demises with ELT instrument projects collapsing from unmanageable size and complexity.