Curriculum vitae et studiorum

Short history:

Degree in physics at the University of Cagliari (1994)

PhD in physics at the University of Cagliari, on molecular spectroscopy of the interstellar medium (1998)

During the PhD, about one year studentship at ESO (Garching, Germany) and collaboration with the Laboratory of Experimental Astrophysics of the Astrophysical Observatory of Catania, including visits for a total of a few months.

Grant at the Astronomical Observatory of Cagliari (1998-1999)

(1999) Appointed PI of the development team of data reduction software for the FLAMES-UVES facility, currently in operation at VLT UT2 of the ESO Observatory of Paranal (Chile)

since 2000, staff research astronomer at the Observatory of Cagliari

(2006) "Poste Rouge" of six months, as a visiting scientist, at the CESR institute of Toulouse (France), working with the group of Christine Joblin

Scientific activity and know-how:

1. Astrochemistry, in relation to the diffuse ISM and PDRs. I am expert in modelling the photophysics of large organic molecules, in particular PAHs and derivatives. Wrote a MonteCarlo code which simulates in detail the photophysics of PAHs and estimates, with a unified approach, all their expected spectroscopic signatures throughout the electromagnetic spectrum, in a very detailed way, including the anharmonic and rovibrational fine structure of bands. The fundamental molecular data needed for the above modelling are obtained using state-of-the-art quantum-chemistry techniques (for such large semi-rigid molecules, static and time-dependent DFT, calculation of anharmonic effects via second-order perturbation theory).

2. Reduction of astronomical data in the optical and IR range, where appropriate writing custom software for the purpose. Algorithmic design, development and implementation of the DRS of FLAMES-UVES, which is the basis of the online pipeline of data reduction currently operating on that instrument at ESO Paranal Observatory.

3. Configuration, administration and use of supercomputing facilities, ranging from loose clusters of workstations with MPI libraries to parallel supercomputers such as the IBM SP5 at CINECA, on which grants of computer time were consistently obtained over the past few years in the framework of the CINECA-INAF agreement. The quantum chemistry and modelling codes mentioned at point 1) were ported to all available computing resources.