

Private address:
7, Av. Félix Viallet,
F-38000 Grenoble

Work address:
ESRF, BP 220, F-38043 Grenoble-Cedex
☎ 33-(0)476882513

e-mail: srio@esrf.fr

Born in Madrid (Spain) 27 July 1963.
Spanish citizenship.
Married with two children (4 and 6 years old).

Education

- **Ph. D. in Physical Sciences**
1987-1991
Universidad de Zaragoza.
Ph. D. Dissertation: "Óptica de rayos x para líneas de radiación de sincrotrón y aplicación de la espectroscopía de absorción de rayos x al estudio de materiales ordenados y desordenados de metales de transición". (X-ray optics for synchrotron radiation beamlines and application of absorption spectroscopy to the study of ordered and disordered materials with transition metals.)
- **University Degree in Physics**
1981-1986
Universidad Complutense de Madrid.

Publications

More than 60 publications in international journals (see attached list. List and reprints available at <http://www.esrf.fr/computing/scientific/people/srio/publications/>)

Professional Position and Activities

Since September 1990, I am staff member at the Experiments Division of the European Synchrotron Radiation Facility. All my professional activity is devoted to synchrotron radiation instrumentation and research.

During my formation period (Ph.D. thesis) I worked at the Frascati (LNF-INFN) and Wisconsin (CXrL, UW) synchrotrons. Then I joined the ESRF in 1990 where I participated in the support groups (computing) to the design, construction and operation of the beamlines.

My main activity is the conception, development, maintenance, documentation and training on computer codes for scientific applications (specially modelling and simulation of physical phenomena, visualization, data analysis and fitting of experimental data). I give computational support for the optical modelling and optimisation of the x-ray optics. I participated in the design of several ESRF beamlines and performed calculations for the optics of most ESRF beamlines.

I extensively used the ray-tracing code SHADOW. I actively participated in the coding and documentation of this package. I developed at ESRF a visual user interface, new algorithms and created educational material (courses, tutorials, workshops). These tools are used worldwide today.

The computational needs for optics calculations at ESRF required not only ray-tracing simulation, but also a toolkit for performing quick calculations in an easy way, that could be used in an easy way at the beamlines. This was materialized in the package XOP, now a standard tool in most synchrotron facilities and in other laboratories, with more than 400 registered users.

I was also involved in the development of data analysis tools targeted for different beamlines and synchrotron techniques (x-ray absorption spectroscopy, x-ray fluorescence, etc.). I also used a Monte Carlo radiation transport package for simulation on a multi-strip solid state detector and for the calculation of dose deposition in Microbeam Radiation Therapy.

The expertise I obtained in the synchrotron field has been extended to other fields, and I have fruitful collaborations with scientists working with thermal neutron instrumentation (ILL, France), x-ray telescopes for astrophysics (Osservatorio Astronomico di Brera, Italy), and x-ray plasma sources (Multicharged Ions Spectra Data Center, Russia).

I always wanted to encourage and maintain an experimental activity in parallel with the computer modelling, and I proposed and run several experiments at ESRF and ILL.

I am also interested in expanding the applicability of SR to new research areas. I have started a collaboration (México-France-Spain-Cuba) for applications in cultural heritage. I am currently studying the Maya blue pigment.

Courses attended

- Especialista en Gestión de los Sistemas y las Tecnologías de la Información de la Empresa 1992-1994
Universidad Politécnica de Madrid, CEPADE (Centro de Estudios de Postgrado en Administración y Dirección de Empresas).
- Management course at ESRF (2001): Le management "dynargie".
- Courses on software languages and applications at ESRF (Phyton , Matlab, Mathematica, C++, IDL, Logiscope).
- Courses on Monte Carlo packages for Radiation Transport: EGS4 (Montpellier, June 10-13, 1996) and PENELOPE (Paris, Nov. 5-7, 2001).
- Simulación de Problemas Físicos mediante el método de los Elementos Finitos. Cursos de verano de Laredo (1994), Universidad de Cantabria.
- International School of Physics Enrico Fermi, "Photoemission and Absorption Spectroscopy of Solids and Interfaces with Synchrotron Radiation", (Varenna, Italy, July 12-22, 1988).
- CERN Accelerator School : General accelerator physics (Salamanca, Nov. 19 - 30, 1988).

Advised Students

- Tutor of a Ph.D. student: L. Alianelli, Dissertation title: "*Characterization and Modelling of Imperfect Crystals for Thermal Neutron Diffraction*", Université Joseph Fourier (Grenoble), 2002.
- Undergraduated students (more than 10) in their work as trainees at ESRF.

Teaching/Lecturing activities

- Invited seminars at Universities: La Sapienza-Roma (1991), Ferrara (1994,2001), UNAM México (2002); and Synchrotron Facilities: APS (2002), SLS (1998), Barcelona (1996), LURE (1992), Frascati (1992).
- Courses and tutorials at summer schools:
 - "Ray tracing" at the *Summer school on synchrotron radiation: applications to materials science and physics* Luso Portugal (1998)
 - "Hard x-ray optics simulations and ray tracing" at the *Summer school of synchrotron*

radiation applications, Beijing China (2001).

- Short course "Computer simulations and ray-tracing for hard x-ray optics" at SPIE annual meeting, San Diego CA (2001).
- University course "Aplicaciones de los rayos x en ciencia y tecnología" at the Universidad Autónoma Metropolitana, México D.F. (2002).

Computer expertise

- Computer software systems implementation.
- Software selection.
- Internet technology (web site design and management).
- Development of tutorial programs and educational material.
- Maintenance and distribution of packages.
- Interaction with users, troubleshooting.
- Artificial intelligence (evolutionary computing).
- Parallel computing (MPI) in Beowulf clusters.
- High-level languages (Fortran, C).
- Application languages (IDL, Matlab, Python, Java).
- Operating systems (Unix, Windows, Macintosh).
- Programming Graphical and Visual user interfaces (IDL, Python).

Languages

Fluent Spanish, French, English, and Italian.