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What is IScAI

The **International School for Advanced Instrumentation (IScAI)** is a major international initiative in higher education that aims to become a centre of excellence to learn expertise in all areas related to the construction of cutting-edge scientific instrumentation, with a particular emphasis on astronomical instrumentation.

IScAI offers a highly specialized set of courses and laboratory work, in all aspects related to the design and construction of scientific instrumentation. The laboratory work will be done at several astronomical institutions with world-class instrumentation programs, in collaboration with high-tech companies with expertise in design and construction of scientific instrumentation.

IScAI is open to astronomers, physicists and engineers world-wide. A pilot programme will start in January 2008, funded by the Consolider-Ingenio 2010 grant “First Science with the GTC”, under the Consolider Ingenio Programme of the Spanish Ministry of Education and Science.

IScAI is a multicenter collaborative school:

Participating Institutions

[Instituto de Astrofísica de Canarias \(IAC\)](#)
[Universidad Complutense de Madrid \(UCM\)](#)
[University of Florida \(UFL\)](#)
[Instituto de Astrofísica, Óptica y Electrónica \(INAOE\)](#)

Collaborating partners

[GMV \(Madrid\)](#)
[Fractal SLNE](#)

[Instituto de Astronomía \(IA-UNAM\)](#)



IScAI for Students

The IScAI will offer the students:

1.

A highly specialized curriculum of courses in frontline scientific instrumentation that will provide the necessary expertise to become Principal Investigators responsible for the construction of the future generation of instruments for ground-based and space observatories.

2.

Internships working with world-class instrumentation groups in academic institutions and high-tech companies. Participating institutions will provide the laboratory equipment required for completing successfully the internship.

3.

Tutors to supervise their progress in all activities of the School. Students will be required to deliver a written report of activities and present the results of their work in an oral contribution to the IScAI Board of Directors at the end of the Pilot Programme.

4.

Participating institutions will provide the laboratory equipment required for completing successfully the internship.

There is **a limited number of positions** for this pilot programme.

The deadline is: **November, 26th 2007**



Industries & IScAI

Recent years have seen a dramatic increase in the development of instruments for the new generation of large ground-based observatories. In the early 1990's, the budgets for "large instruments" were typically in the range of 1M€ and small teams at the universities carried out their construction. By 2007, the current generation of instruments under construction or being planned for **major observatories have budgets ranging from 20M€ to 70M€** –an increase of nearly 2 orders of magnitude in just over a decade. The instruments for the future generation of extremely large ground-based telescopes and space observatories will be even more complex and expensive. Likewise, the size and composition of the teams required to construct such instruments has changed dramatically, involving dozens of scientists and engineers from academic institutions and high-tech companies around the world.

The **education of a highly skilled workforce** in the area of scientific instrumentation is the main rationale behind the creation of the **IScAI**. This School will be the first such international endeavour in the world. A tangible benefit for the participating companies is that the

IScAI

will further the development of the necessary skilled workforce in high-tech companies willing to play a major role in the construction of state of the art scientific instrumentation. For these companies, the

IScAI

will facilitate the

technical and intellectual environment and the visibility in the astronomical community needed to position them to play a leading role in the construction of the future instruments

for the new generation of extremely large ground based and space observatories



Pilot Programme

The **IScAI** will start in **2008** with a pilot programme. This programme will offer a reduced plan of the School activities and will serve as a testbed to help define the final format of the School. The current plan for the pilot programme consists of **two months of**

course work

(from

mid-January to mid-March), and

three months and a half of lab work

(from mid-March to end-June) and

a week for presentations and evaluations (first week of July)

. The

IScAI

is expected to start offering a full curriculum of activities in

September 2009

There will be **six positions open** for students to participate in this pilot programme. All

accepted students will be eligible for

financial aid, including

a

1,600 €

monthly salary and a travel grant

. Funding for this pilot programme will be provided by the

Consolider-Ingenio 2010 grant

“First Science with the GTC”

, under the Consolider-Ingenio Programme of the

[Spanish Ministry of Science and Innovation.](#)



Further Information and Application forms

For further information download a [pdf whole description of the School](#) . **Deadline for applications: November, 26th 2007**

1. All expenses resulting from the student visit's to the IScAI participating institutions or collaborative partner centers will be covered by the IScAI.

2. In addition the IScAI is offering 6 grants. Each grant will provide a monthly salary on top of the above. The IScAI grant is offered to those potential candidates who are not receiving any financial compensation as a result of carrying out any professional activity, either as an employee or as a self-employed person, nor is receiving unemployment benefit or enjoying another grant.



Courses

Optics: Dr. Stephen Eikenberry (University of Florida)

The goal of this course is to teach the basis of optical design for astronomical instrumentation. Students should learn to translate scientific requirements into high-level optical specifications and to make decisions based on figures of merit and error budget calculations.

Mechanics: Dr. Vicente Sánchez (IAC)

The goal of this course is to teach the basis of mechanical design for astronomical instrumentation. This includes precision mechanics for both opto-mechanical and robotic systems, as well as the intricacies of cryogenic systems.

Electronics: Dr. José Javier Díaz (IAC) The goal of this course is to teach the basis of electronic systems for astronomical instrumentation. This includes both control electronics for devices, as well as low noise electronics for detector control and read out electronics.

Software:

Dr. Nicolás Cardiel (UCM)

The goal of this course is to teach the basis of control and data processing software. Students will be familiarised with the latest trends in data processing software.

Management:

Dr. Marisa García Vargas (Fractal)

Project Management bases are studied from three different and complementary perspectives: the formal-academic point of view; the human and emotional analysis, and the business-practical issues. The good knowledge of these three views will allow a manager to drive a project to success. The course is fully focused on Instrumentation and all the examples and exercises will illustrate the Management aspects of astronomical instrumentation projects.

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