

## Five New Nuclei and their Principal Investigators:

### ***Animal developmental biology/genomics; Miguel Allende***

Dr. Allende proposed a Nucleus on Genomics of the Cell to study three model systems: the fruit fly, *Drosophila*; the zebra fish; and the mouse, to advance understanding of neurogenesis, the processes cell proliferation, migration and differentiation by which neural stem cells generate specific organs. The team includes two NIH-funded investigators recently recruited from the US.

### ***Magnetism; Dora. Altbir***

This Nucleus, a spin-off from a previous one on solid-state sciences, will study magnetism, especially in nano-structures. An appeal of this project is its combination of basic and applied topics. Another is that it takes advantage of previous MSI efforts to assemble more up-to-date instrumentation, overcoming the previous need to restrict projects to marginal theoretical studies.

### ***Astrophysics/supernovae; Mario Hamuy***

Dr. Hamuy proposes to lead a group in the exploration of the nature of dark energy in the universe. The group will approach this question by identifying and characterizing new nearby supernovae using robotic telescopes at Cerro Tololo. While many distant supernovae have already been identified, the group will close the gap in our knowledge of nearby phenomena. Although astronomy and astrophysics are well-funded in Chile through international collaborations, this Nucleus will be funded to help train young scientists in Chile.

### ***Plant functional genomics/systems biology; Rodrigo Gutierrez***

Dr. Gutierrez has recently returned from New York University where he was trained in systems biology, which uses large databases of genomic, proteomic, and metabolic information to understand how signals from the outside perturb cellular activities. This group will study an internal signal that results when plants are infected by pathogens. The arrival of Dr. Gutierrez at the PUC strengthens the activities of several plant molecular biologists and creates considerable synergy as well as bringing excellent contacts with the systems biology group at New York University.

### ***Neurobiology/drug addiction; Katia Gysling***

Using a well-established rodent model, Dr. Gysling will lead a study that attempts to explain the vulnerability to drug abuse of individuals exposed to chronic stress, as well as stress-induced relapse. Team members already have complementary strengths in neuropharmacology, neuroanatomy, and molecular cell biology. Necessary electrical neurophysiological studies will be carried out with a collaborator in Puerto Rico.

### Three Renewed Nuclei:

#### ***Quantum optics; Carlos Saavedra***

The work was renewed both for the high quality of its work and for its ability to extend its mostly theoretical focus to competitive experimental studies. It was also commended for its outreach to the community.

#### ***Plant cell biology and biotechnology; Ariel Orellana***

The researchers will continue their basic studies on the secretory system of plant cells and concentrate on understanding how and why proteins are transported to specific domains of the membrane surrounding the cell. The committee called this an important area of cell biology of high relevance to Chile's fruit export business, and commended the group for its good contacts with industry and effective public outreach.

#### ***Seismology; Jaime Campos***

The PC was strongly supportive of this study, saying that it has enormous potential to help understand the neotectonics of Chile and the deformation of the country by colliding tectonic plates. It urged outreach to the Chilean planning and engineering communities, who can promote more consideration of earthquake risk in standards for urban development, building codes, and infrastructure planning.