

RESEARCH UNIT NUMBER 1 / 208

COORDINATOR Jean-Claude Zambrini

RESEARCH UNIT NAME Grupo de Física-Matemática da Universidade de Lisboa
Fundação da Universidade de Lisboa

Mathematics

PANEL MEMBERS Jean-Pierre Bourguignon, David Cox, Roland Glowinski, Gérard Huet, Thomas Laffey, Jalal Shatah, Carles Simó, Vera T. Sós, Joel Spencer, Tamas Terlaky, Irene Fonseca (Coordinator)

Overall Research Unit Quality

Excellent Very Good Good Fair Poor

Comments and recommendations regarding the Unit activities, research orientation, organization and application of funds

Mathematics *Excellent*

This Center has some of the strongest researchers in Portugal. It is composed of 10 PhDs and 4 students, although only seven of the PhD members seem to be active in research.

The scientific program is focused on Mathematical Physics and Stochastic Analysis. The strongest research activity and production are made in the areas of Analysis and Geometry of (Feynman) Path Spaces and Extended Dynamical Systems, Malliavin Calculus, Quantum Control. Members of this Center have established themselves as major contributors in these areas of research, and some of them have very high, and well deserved, international visibility. The quality of their research is absolutely stellar and most of their publications are in excellent journals.

Here applications of mathematics are targeted to theoretical physics rather than applied physics, engineering, chemistry, or biology. As it turns out, some of the techniques investigated at this Center can be very useful when applied to the above-mentioned areas, e.g. dynamics of polymers (cf. G. Frederickson in Chemical Engineering at UC Santa Barbara). A possible expansion of the scope of applications to include some of these areas would be of considerable benefit to the group and to the mathematics community in Portugal.

Following a recommendation of the Panel of 1999, which read

"...We recommend that the group considers diversifying its activity to include Mathematical Finance or some other field in which Stochastic Analysis plays an important role..."

the Center is now venturing into Mathematical Finance and Computational Mathematics. At this incipient stage of development of activity in these areas, contacts with a variety of groups, for example Aarhus (Barndorff-Nielsen), INRIA (D. Talay), EPF Lausanne (M. Picasso), KTH Stockholm (A. Sepesszy), and the Mathematical Finance groups at Courant Institute and Carnegie Mellon University, may prove to be very useful.

As also mentioned in the 1996 and 1999 reports, the excellence of this Unit puts it in a position of responsibility towards the Portuguese research community. It is a serious waste that this Center fails to attract a reasonable number of PhD students and postdoctoral fellows. The reasons behind this shortage are many, including research-blind teaching assignments, thus preventing these researchers from offering advanced topics courses, and poorly aggressive recruitment mechanism (a good web page with preprints on-line, announcements in SIAM, Notices of the AMS, etc., may help). Also, the Unit may have a better access to students if they expand their activities to include some of the areas mentioned above.

This Center has a very ambitious research program for such a small group of researchers, and it is carrying it out very well. As it is now, the bulk of the scientific activity falls on the shoulders of two or three members, which makes the unit unstable especially if some of these researchers leave the group. The panel hopes that the situation will improve from this point of view.

This Center has been very active in developing links and collaborations with other institutes. A considerable effort is being devoted to the organization of the ICMP in 2003 in Lisbon.

A final remark on the site visit. The panel regretted the absence of the Center Director. Although the other members did an excellent job in answering questions, many issues remained to be asked because he was not present. When confronted with similar conflicting situations, and whenever possible, the leader of a Unit should give priority to the Unit he/she is in charge.