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**ΕΞΩΤΕΡΙΚΕΣ ΑΞΙΟΛΟΓΗΣΕΙΣ
ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΠΡΟΓΡΑΜΜΑΤΩΝ**

**REPORT OF THE EXTERNAL EVALUATION COMMITTEE
TRAINING PROGRAM IN NEUROSCIENCE
University of Crete**

November 17-18, 2003

INTRODUCTION:

A meeting of the External Evaluation Committee of the Training Program in Neurosciences was convened by the Program Director, Dr Plaitakis, in November 2003. The committee included Professors Angelos Halaris, Loyola University, Chicago, USA, Arne Schousboe, The Danish University of Pharmaceutical Sciences, Denmark, and Marie-Francoise Chesselet, University of California Los Angeles, USA. A brief summary of the credentials of the reviewers is provided as an appendix to this report.

The Evaluation Committee met in Heraklion on November 17 and 18 2003 for two full days of review. The visit included research presentations from the large majority of Faculty in the program, including faculty from the University of Athens, a meeting with the students in the program in the absence of the faculty, the presentation of research posters by the students, and a meeting with the program Faculty after an executive session.

The program in Neuroscience was created in 2002. It succeeded a previous training program that included some of the same faculty but also system and computer neuroscientists, that has been in existence since 1994. The present program was created to refocus the training of students in molecular and cellular neurosciences. This is well justified in view of the enormous possibilities currently offered by this field to better understand and possibly cure neurological and neuropsychiatric disorders that represent an increasing burden to society, and the need to train investigators to pursue state of the art research in this area in academia, the pharmaceutical industry and the biotechnology sector. The present program admitted 15 students in 2002. This is the program being evaluated in this report.

1. The Program

A major asset of the program is that it is broadly based and represents a large area of the neurosciences. The program is commendable in that respect. The areas covered by the program are represented by productive scientists, often at the cutting edge of their field and encompass a large number of state of the art techniques. Particular areas of strength include molecular biology, molecular genetics in a variety of model organisms and humans, cellular imaging, enzymology, receptor pharmacology, neurodevelopment. Another strength is the inclusion of clinical research, and areas of specific strength include sleep physiology and pharmacology, and humans models of psychiatric conditions. Behavioral neuroscience is represented to some degree and will be strengthened in a near future with the inclusion of faculty from Larissa University. The program will benefit from continuous development to include behavioral models in non-mammalian and mammalian species.

Other areas of neurosciences are represented to a lesser degree, specifically cellular electrophysiology and molecular pharmacology. Here again, local lack of expertise is being compensated by the inclusion of faculty from other Universities. The program will gain from the inclusion of additional faculty with expertise in these areas in the future.

A particularly attractive aspect of the program is that it includes a significant number of students with a medical training and of faculty with clinical expertise. This undoubtedly results

from the strong leadership of the Program Director, Dr Plaitakis, who is a practicing neurologist with an impressive record in both basic and clinically-related research. The committee feels that the program has achieved an impressive degree of maturity in the basic neurosciences and the committee feels that it can continue to expand to include more clinical neuroscience and clinical research assuming that the resources can be found.

It is the committee's distinctive impression that the program is beneficial not only for the students but also for the Faculty. Some faculty even indicated that one of the attractive reasons for returning to Greece was the existence of this program. The inclusion of excellent faculty from the University of Athens and, in a near future from the University of Larissa, was also seen as strength because it reinforces the research ties between the Universities.

2. The Faculty

The Faculty currently includes both junior and senior members of the University of Crete (both Heraklion and Rethymno) as well as from the University of Athens. The majority of them have returned from successful post-doctoral training, and even faculty positions, abroad. Both physicians and basic scientists are represented on the faculty, the basic scientists being preponderant. The quality of their research is, for the most part, state of the art, and many are performing at a truly outstanding level. The committee was impressed by the enthusiasm, dedication, and commitment of the faculty to the success of the program and of the students.

The faculty are scientifically productive, they publish for the most part in first class peer-reviewed journals and they present their work at national and international meetings. Some of them also serve on national and European committees. Most have attracted outside funds to support their research and many are part of successful European networks. They constitute an extremely strong and diverse group of mentors for the students.

The training record of the faculty who have been part of training programs at the University of Crete in the past is excellent. Students from the previous program who have trained with current faculty have publications and have gone onto post-doctoral positions abroad. One of these students, Ana Vassilaki, will soon join the Faculty of the program upon her return to Greece at the University of Larissa. There is no doubt that the expertise and record for successful graduate training is in place.

Neuroscientists with an appointment at IMBB have specifically mentioned that their inclusion in the teaching faculty of the neuroscience program provides them a unique opportunity to teach and work with graduate students who already have a solid background in neuroscience. They see this as extremely beneficial for their competitiveness in their field.

3. The students

The committee noted that a unique strength of this program on the European scene is the inclusion of students trained in the basic and in the medical sciences. This was recognized as an attractive and useful part of the training by the students and is expected to provide a cadre of basic scientists sensitive to the issues of translational neuroscience as well as physicians with a solid basic training in the neurosciences.

The students are admitted following a rigorous selection process that includes evaluation of their GPA, research experience, abilities in written and spoken English, recommendation letters, and evidence of demonstrated interest in the Neurosciences, as well as an interview in person. The selection is made by a large committee that includes representatives from a

wide range of research areas among the Faculty. The Evaluation Committee did not perceive evidence of collusion or favoritism in student recruitment, which seemed to be solely determined by the perceived excellence and promise of the applicants.

The students come not only from the University of Crete but also from the best institutions and medical schools in Greece, notably the University of Athens and of Thessaloniki. In that respect, the program has already proven to be a magnet to attract some of the brightest and most motivated students with an interest in the Neurosciences.

The students unanimously rate the program as outstanding and express a high level of enthusiasm about the unique opportunities afforded to them by the program. They feel strongly that the master level program prepares them solidly from subsequent enrolment in a PhD program that the majority of them envision to pursue.

The committee was impressed by the dedication of the students reflected by the quality of their research and the enthusiasm they demonstrated at their poster presentation. Their command of spoken English was impressive.

4. The Curriculum

The curriculum consists of a core course covering all major aspects of basic neurosciences, a required method in neuroscience course and electives. The electives include courses presented as seminar, and journal clubs that prepare the students for a critical reading of the literature as well as a statistics course that all students are strongly encouraged to take. Course examinations include writing of manuscripts. The committee commends the faculty on the breadth and depth of the curriculum. It was suggested that the statistic course should be labeled "required" to reflect the fact that all students must take it and that a new course in the ethical conduct of science be developed. The faculty enthusiastically endorsed these suggestions.

The students feel that the model of three rotations is ideal to expose them to a variety of techniques and questions and facilitate the choice of a PhD laboratory. Accommodations are made for the medical students.

The students expressed a wish to have a greater choice of electives. This should be possible with the expansion of the faculty. The newer faculty members should be strongly encouraged to develop elective courses in their areas of specialization.

5. Facilities

The committee feels that the facilities are appropriate for training in the modern techniques of neurosciences. Funds obtained in conjunction with the training program were instrumental in obtaining state of the art equipment and it is hoped that this type of support will continue in the future to permit the update of the equipment made available to the trainees.

6. Financial issues

A major concern of the faculty and the students is the stability of the program. Enormous efforts have been expended to develop the program and it is clearly successful. It is difficult to see, however, how it could continue to flourish without long term funding. The student body and the faculty expressed concerns about the overall viability of the program if the government decides to terminate its current support.

7. Overall assessment

The committee is impressed with the overall quality of the program. The program is unique in its mission and scope and it is a model to be mimicked by other similar institutions in Greece. It serves as a breeder for future basic scientists and physicians specialists who wish to obtain further training in basic neuroscience. Graduate form othis program stand to benefit tremendously the country, its academic institutions, its pharmaceutical industry, and will be critical for future development of a biotechnology industry in Greece. The quality of the faculty is uniformly impressive and some of them have already attained international reputation. Similarly the faculty has been successful is securing grant support from national and international sources and the most senior faculty has positive previous training record, auguring well of the future of the current generation of students. The students appear well trained, enthusiastic, and committed to their own progress and the success of the program.

8. Recommendations

The external committee wishes to express the utmost level of support for the survival, continuation, and possibly expansion of the program.

The committee strongly recommends that the support provided by the Greek government be continued at least at the current level of funding. In addition, the committee recommends the funding of stipends for the full duration of the master and the PhD level. The committee recommends that the program continue to grow to include additional high quality faculty that would represent additional areas of neuroscience to further enhance the already high quality of the training program. To strengthen the collaborations and exchanges among Faculty and students in the program, the committee suggests additional common activities, such as an annual “research day” bringing all faculty and students of the program to present their research, and a monthly research colloquia for faculty and students on the Heraklion campus. One mechanism to strengthen the cohesiveness of the teaching faculty would be to offer adjunct faculty appointments to the neuroscientists based at IMBB and any other participating institution. The more junior members of the faculty are encouraged to develop additional elective courses in their area of expertise.

In conclusion, the committee is impressed by the quality of the program curriculum, its faculty, and its students. It recognizes the uniqueness and contribution of this program to the development of a strong elite in neuroscience in Greece and unanimously recommends its continuation and expansion.

EXTERNAL EVALUATION COMMITTEE:

Marie-Francoise Chesselet, MD, PhD, is the Charles H. Markham Professor of Neurology and Chair, Department of Neurobiology, University of California Los Angeles (UCLA), USA. She has directed Graduate Programs in Pharmaceutical Sciences at the University of Pennsylvania and in Neuroscience at UCLA. She is currently the Director of a federally funded Training Program in Neural repair at UCLA. Her research, which is supported by several federal grants, uses a variety of approaches to study the molecular mechanisms of dysfunction, neurodegeneration, and neural repair in the basal ganglia, brain regions involved in the control of movement and cognition, and affected in neurodegenerative diseases such as Parkinson’s and Huntington’s diseases.

Angelos Halaris, MD, PhD, APA, ACNP, CINP is the Chair and Professor of the Department

of Psychiatry and Behavioral Neurosciences, at the Stritch School of Medicine, Loyola University Chicago. He is a member of the Board of Directors, Loyola University Physician Foundation. Previously, Dr Halaris was Professor and Chairman of the University of Mississippi Medical Center where he initiated the International College in Neuropsychopharmacology (CINP) Research Mentor Program dedicated to assisting scientists from developing countries in sharpening their skills and advancing their careers in the field of neurosychopharmacology. His research, which is supported by several federal grants uses a variety of approaches to study the molecular mechanisms of dysfunction and therapy of depression.

Arne Schousboe, MD, DMSci, D.Sc, is Professor of Pharmacology at the Royal Danish School of Pharmacy, Pharma Biotec Research Center, Department of Pharmacology. His research, which is supported by several grants includes studies of metabolism, transport and receptor functions for glutamate and GABA using a variety of methods including culturing of neurons and astrocytes. Receptor functions are also studied in a variety of expression systems such as *Xenopus* oocytes.

EXTERNAL EVALUATION

March 27, 2006

Graduate Program in *“Cellular and Genetic Etiology, Diagnosis and Treatment of Human Disease*
“Medical School, University of Crete, Heraklion

Committee Report

A. Introduction

The goal of this graduate program is two-fold: to train physicians in the fundamentals of biomedical research, so that they may become leaders in academic medicine; and to train biologists, biochemists, and other basic scientists in the medical sciences, so that they can apply their skills to problems of human disease in their subsequent careers in biomedical research. The program, including a list of current students and faculty, the courses and schedules, lecture materials, papers, and announcements are described on the internet at: <http://www.molmedgp.med.uoc.gr/>

The program began in the academic year 2003–2004 and is currently in its third year of operations. Students in the program can obtain a Master’s degree or a Ph.D. The program is unique and innovative, and complements two existing graduate programs at the University, one in neurosciences and one in molecular biology and biomedicine.

The program review took place on March 27, 2006, on site at the University of Crete. The review included examination of course materials, student applications and program critiques, and faculty Curricula Vitae; meetings with the program directors, faculty, students, and university administration (Rector and Dean); and research presentations by students in the program (oral and posters). The review was intended to evaluate the facilities, resources, and support available to the program; organization and administration of the program; the quality of the faculty participating in the program; the quality of the students; and the structure and content of the courses and research opportunities available to the students.

B. Facilities

The laboratories and classrooms are sited in the recently constructed buildings of the Medical School of the University of Crete in Heraklion. These facilities are spacious and modern and have all the necessary technological facilities for the performance of molecular and cellular biomedical research, including access to DNA sequencing, flow cytometry, confocal microscopy, cell culture equipment, polymerase chain reactors, *etc.* The first round of funding for the program provided support for needed equipment items, although unfortunately support was delayed, but these have now been purchased.

According to the Dean, a new building for postgraduate education is planned. Nearby are the University Hospital, Schools of Biology, Physics, and Chemistry, and the Institute of Molecular Biology and Biotechnology of the Foundation for Research and Technology. These provide a rich environment for biomedical education.

Recommendations: The committee was impressed by the well-equipped research laboratories in the Department of Internal Medicine. One deficiency that was identified by the students was inadequate numbers of computers to access the internet and on-line journals. Although there is a room for video-conferencing and computing, access to it is limited. The students need to have around-the-clock availability of computer and electronic information technology. While there are plans for additional facilities in the new building, it is critical to address this as soon as possible. It would be appropriate to request funds for this in the new application to the government or through other funding sources. One way to increase internet access is with wireless networking, which can be done on a building or even campus-wide basis. Additionally, there will be needs for periodic upgrading of other laboratory equipment for use by trainees in the program, and support for this is appropriate in the future.

C. Program Faculty and Administration

The program faculty primarily comes from the departments of the University of Crete. The faculty appears to be very committed to the program and to the students. Their background, training, and preparation for teaching biomedical sciences is generally excellent. Some courses are also supported by visiting faculty from other institutions, expert in a particular field (*e.g.* in the course of Immunity and Infection). Currently there is no compensation for teaching.

The Program is directed by Dimitrios T. Boumpas, MD, FACP, Professor of Medicine and Director, Internal Medicine/Rheumatology, Clinical Immunology and Allergy. Dr. Boumpas is clearly dedicated to the success of the program and to the training and career development of the students in it. He is assisted by the Associate Director Dimitrios Kardassis, PhD. Dr. Kardassis is a course director and maintains the website. The program is governed by a Coordinating Committee that also includes, Vassilis Zannis PhD. Dr. Zannis, an adjunct faculty member from Boston University School of Medicine, USA, has a distinguished record of teaching there and in the combined Harvard-M.I.T. program in Health, Science, and Technology. Dr. Zannis directs the course in molecular medicine.

Recommendations: The Review Committee found the members of the Coordinating Committee and key teaching faculty to be superb scientists and teachers, who are highly dedicated to the success of the Program. The high quality of Program faculty should be maintained by continuing to utilize top basic and clinical faculty with active research programs to teach in the Program. In addition, we encourage the Coordinating Committee of the Program to continue to recruit faculty from other universities and collaborating institutions in Greece and from around the world. Although this adds to the operating expenses of the program, it provides a unique national and international perspective on science for the students. It is also a superb way to advertise the research and training activities of the University of Crete to other scientists and other institutions, and is likely to lead to productive collaborations and interactions in the future. In the new application, allocation of funds to support expenses for visiting faculty should be a priority.

One deficiency in the Program is that the process of mentoring the students is somewhat informal, overseen on an *ad hoc* basis primarily by members of the Coordinating Committee. The students might benefit from a more formalized system, in which they are assigned to a faculty member who is an active participant in the program and experienced in graduate training, who would assist them with planning their courses and research, and with career development.

The students also felt that there was a lack of interaction between the senior students working in labs, and the junior students taking courses. This can be rectified in a number of ways, including having senior students paired with junior students for mentoring and by having more Program activities like journal clubs as well as social activities.

D. Organization and content of courses

The formal coursework takes place in the first seven months of the Graduate Program. The courses offered cover 260 hours and are divided into five required core courses covering 130 hours, and six elective courses covering 130 hours. The total number of hours that are required is 200, thus, the students choose 70 hours of the 130 hours of elective courses offered, providing a good menu of choice. Because the background of the students is quite variable, the first few weeks in the fall are devoted to training the basic scientists in the terminology and basic concepts of clinical medicine, and training the MDs in principles of molecular and cell biology.

After formal courses are completed, the students choose two laboratory rotations for the balance of the first year. The second year is devoted to research and preparation of the Master's thesis. The top students are then eligible to take a qualifying examination and continue with research for a PhD, requiring an additional three to five years.

Recommendations: The spectrum of courses is diverse. Some courses are very thorough (*e.g.* "Interdisciplinary Approach to the Molecular, Cellular and Genetic Basis of Human Disease", "Immunity and Infection") while others continue to evolve in response to an annual internal review process that includes input from the students (*e.g.* "Pathophysiology" was replaced by a new course "The Pathologic Basis of Human Diseases"). This ongoing annual review of the course requirements and content is essential, as courses should change over time depending upon the needs of the students and the goals and interests of the program faculty. The External Review Committee recommends that the course on immunology be required. Other topics that might be considered, if appropriate faculty can be identified, include electives in vascular and endothelial biology, cardiovascular disease, or gene and cellular therapies. Analytical principles in biochemistry, immunology and microbiology and in microscopy should be covered in the course "Introduction to Basic Research Methodology".

The Review Committee solicited input from the students privately about the courses and faculty. Overall, they were remarkably happy with the training they are receiving. They did remark that some courses that have multiple lecturers are not well-coordinated. This can be rectified by having the course director review the content of the lectures, and where necessary, provide introductory materials. They also felt that some of the examinations were overly long and required too much memorization. At the graduate level, examinations should strive to focus on critical analysis of current literature and on creative thinking. The Program Coordinating Committee was aware of these concerns through the internal review process, and is working to address them.

E. Students

This Program is receiving an increasing number of applications. Less than half of the applicants are interviewed, and about half of those interviewed are accepted. Thus the Program can be highly selective and can take top students, about 20-25% of those who apply. The Program

strives to admit equal numbers of students with MD degrees and BS degrees, and was able to achieve this goal after the first year of operation. Of 10-12 students per year, only about three can be supported by fellowships given the current resources of the Program and the limitations imposed by the granting agency, the Ministry of Education. The lack of financial support was a major concern of the students.

Recommendations: The Review Committee was extremely impressed with the quality of the students. They are enthusiastic about their research training. The quality of their oral and poster presentations to their colleagues and the Review Committee were outstanding. They describe the Program as “the best option in Greece for those with a medical degree to gain knowledge in biomedical research” and a way for physicians to “bring information from the clinic back to the bench”. However, the availability of fellowship support for only about a quarter of the students is a serious obstacle to the success of the Program. Funding should be sought in from the government, as well as from non-governmental sources including donations, foundations, and the pharmaceutical industry, with the goal of eventually providing fellowship support to all of the postgraduate students.

Efforts should continue to be made to maintain the balance of MDs and BS matriculants. This is essential to meet the goals of both training scientists who can apply their skills to medical problems, and of training physician-researchers that will be the leaders in academic medicine in Greece in the future. The fact that many of the students continue on to do PhD research is an important measure of the success of the Program.

F. Conclusion

This is a unique graduate program that seeks to train physician-scientists and academic leaders for Greek medicine in the future. The External Review Committee was extremely impressed with the quality of the Program: the faculty is dedicated to its success; the students are outstanding; and the courses and training that are offered are excellent. Minor modifications in course, policies, and resources as recommended will further improve the Program. We recommend the Program for continued support by the Ministry of Education. Furthermore, key to its continued success is additional funding in three areas: firstly, to expand the fellowship support for the students, so they can pursue their training with financial assistance; secondly, to support the expenses of external visiting faculty; and thirdly, to expand access to computers and information technologies that are required for modern biomedical research. In addition, financial support for laboratory supplies or bench fees would help defray the cost of research training of the students. Also, there will be ongoing equipment needs for the Program to stay current. It is essential that financial support for the program be available in a timely fashion, to not interrupt the training and recruitment of the students. In addition to full financial support, the program would benefit from flexibility in how resources can be reallocated as needed to support the students, visiting faculty, and programs.

If the Program continues to flourish and expand, it will be successful in serving as a source of future outstanding scientists and faculty in medicine and related basic biomedical sciences, and it will continue to further the reputation of the Medical School of the University of Crete as a unique and outstanding research-oriented medical school.

External Evaluation Committee Members



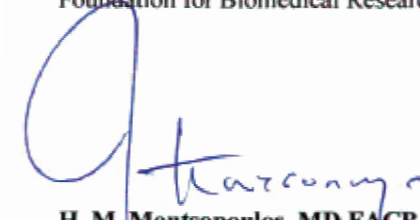

David C. Seldin, MD, PhD, Chair

Boston University School of Medicine, Boston MA



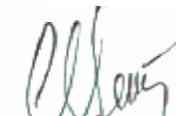
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POSTGRADUATE PROGRAMME IN PUBLIC HEALTH AND HEALTH CARE MANAGEMENT

Report of an external evaluation

University of Crete

8- 10th April 2008

Evaluation Committee

Professor John Ashton, Director of Public Health, Cumbria, UK

Professor Martin McKee, London School of Hygiene and Tropical Medicine, UK

Professor Raynald Pineault, Universite de Montreal, Canada

Professor Erik Trell, Linkoping University, Sweden

Mr Glenn Warren, Change Through Partnership, UK

Introduction

The Evaluation Committee convened at the University of Crete on 8th April, having previously been provided with a detailed portfolio of material related to the postgraduate programme. The committee wishes to thank Professor Anastas Philalithis, Dr Maria Vassilaki, and the other staff of the programme for their careful preparation for the meeting and the excellent organisation of it.

Background

In 2003 the University of Crete received a grant of €393,600 over five years, co-financed by the European Union's Third Community Support Framework and the Hellenic Ministry of National Education and Religious Affairs. The grant enabled the establishment of a postgraduate training programme with two strands, in public health and health care management. Since its establishment in 2003, the course has attracted between 61 and 105 applicants each year for the 20 places available. This funding comes to an end in 2008, with no obvious replacement.

Crete has a special place in the history of public health research, as one of the original settings in the landmark Seven Countries Study, which led to recognition of the health-promoting qualities of the Cretan diet. It also benefits from the historical contribution of ancient Greek medicine and public health. We mention this because we believe that this is something that the University can and should capitalise on.

Process

The Evaluation Committee, having read the preparatory material, received an overview of the programme from Professor Philalithis, followed by presentations on each of the main subjects offered. We also met the Dean of the Medical School and visited the computer-based learning facilities and library, and met with a group of current and past students.

Impressions

The Evaluation Committee was impressed by the high degree of motivation of both staff and students. The passion with which the students expressed their commitment to using the skills they had obtained to advance the cause of public health was particularly striking. The Faculty are actively engaged in a range of European research activities and many of the senior staff have a long history of engagement with international research of the highest quality. Overall, the programme is of high quality and, in our view, provides a model that could be emulated by

other Greek universities. We welcome the commitment made by the EU and the Greek government in providing the support that has allowed this programme to achieve success. We have made observations in several interlinked areas, as follows.

Facilities

The university occupies new, very attractive buildings in a very pleasant setting overlooking Heraklion. The classrooms seem well-equipped. The library, which is split over several campuses, takes full advantage of electronic access to on-line journals through a national system. SPSS is available to students, with the university having obtained a licence allowing the students to access SPSS at home. We did, however, learn that computer facilities in the university, although of high quality, are often stretched. There is a particular problem with out-of-hours access.

Staff

The University has been able to attract several highly qualified individuals, especially in the area of biostatistics and epidemiology. The Committee was impressed with the high degree of motivation, expertise, and enthusiasm of the staff. In particular, we were very impressed by the leadership and inspiration provided by the Faculty, something that was commented on very favourably by the students. We are aware that some students have travelled from other parts of Greece because of the high reputation of some senior staff. It was also noted that the administrative support of the programme is of high quality.

However, we do have some concerns. Modern public health demands a very broad range of skills, from qualitative to quantitative approaches, embracing disciplines ranging from economics and demography to sociology and anthropology, and including areas such as medicine, law, and environmental sciences. It is very difficult for any university to provide this range of expertise with any depth. There appear to be some important gaps. For example, we did not meet anyone with specialist postgraduate training in health economics. This is addressed by bringing in staff from outside Crete but in the long term this is unsustainable. However, even in the short term it has implications for the ability to support doctoral students.

We also have some concerns about the high teaching load falling on some staff, with adverse implications for their ability to develop research programmes. Active engagement in research is important for many reasons. First, it ensures that staff keep up to date. Second, it is a means of generating funds to attract staff with disciplines currently missing, who can then contribute to teaching.

Quality of teaching

We were able to study the content of the courses and to have feedback from current and past students. As far as we can assess, we believe that the quality of teaching is very high. The content of the courses is what we would expect to see and, on questioning, the students demonstrated a good understanding of key concepts.

We are especially impressed by the quality of teaching in epidemiology and biostatistics.

The teaching of research methods is also an important module in the Programme, sharing the challenge of breadth of disciplines described above, and it was the impression of the Evaluation Committee that it could be even further strengthened by increased involvement of those from other disciplinary backgrounds.

Although the quality of teaching in health services management seems to be high, there appears to be scope for greater use of case-studies and role play, ideally drawing on experiences

in sectors other than in health. There may be scope for greater collaboration with those teaching business studies elsewhere in the university.

We understand that the traditional model of doctoral training in Greece does not include taught courses in research methods, although we recognise that, in Crete, PhD students do attend some of the postgraduate courses on offer. We do, however, have some concerns that this may not be adequate. Although formally outside our remit, we also noted that those undertaking PhD research in clinical medicine do not normally pursue specialised courses in subjects such as advanced biostatistics. We consider that the Medical School could undertake a review of the need for courses designed for doctoral students.

External Environment

We feel it essential to reflect on the higher education and public health context in Greece as we see this as the most important constraint on the future development of public health training in Crete.

The public health service in Greece remains focused on traditional hygiene, with little recognition of modern public health. There is no established career structure, with residency programmes and recognised professional qualifications, as is the case in other medical specialties. There is no Greek public health association that would provide a forum for interchange of ideas and advocacy of public health action, although the Rudolf Virchow society, established among the alumni of the Crete course, could develop into such a body. Successive Greek governments have placed a low priority on the development of a public health strategy; where initiatives are launched they are typically short-term, with no continuity.

Investment in health research in Greece has been inadequate. The Greek higher education system has no obvious mechanism to develop tomorrow's workforce. There is no system to provide funding that would allow junior researchers to progress from doctoral through postdoctoral to senior positions. As a result, those seeking an academic career are obliged to spend time studying and working abroad.

Organisations engaged in the funding and delivery of health care have, elsewhere, sought to train and recruit individuals with skills in public health and health care management. This is essential if they are to ensure that the services they are paying for and providing are effective. Such organisations include insurance funds and hospitals. It is not clear to us that, in Greece, these organisations do not seem to have engaged in this agenda.

Experience elsewhere indicates the importance of addressing these issues if the course is to become sustainable. However, the Committee was concerned to discover that there is no obvious mechanism, within the existing system in Greece, to do so. Universities elsewhere have been able to develop productive collaborations with service public health and with government, generating funding for training but also enabling interchange of ideas between the two sectors, to their mutual benefit. In the time that was available to us, we were not able, despite strenuous efforts to do so, to identify ways in which this could be done. Nonetheless, we must emphasise the very high priority of doing so.

Summary and recommendations

Summary:

This is a high quality course, provided by skilled and motivated staff. The quality of graduates is striking and we are convinced that many of them will go on to provide leadership in the health sector in Greece. Any weaknesses are a consequence of a lack of staff with detailed expertise in some areas, so that others are covering subjects where they have limited experience. The need for modern public health training in Greece is obvious and the University of Crete is one of the very few places in a position to provide it. We see this course as one that

should be supported and grown in the long term, as well as being a model to be emulated elsewhere.

To the Hellenic Ministry of National Education and Religious Affairs

- Recognising the importance of the training provided by the University of Crete in an area where there will be significant needs for trained staff over the next few decades, we recommend the continuation of government funding of the MPH course following the conclusion of the current grant.
- Recognising the experience of the University of Crete in developing public health training, we recommend that the Ministry explore ways to share this experience with other Greek universities.

To the University and Medical School

We recommend

- That a mission statement be developed, which should recognise the contribution that the University can make to the health of the Cretan population
- That the potential significance of the MPH course for the international standing of the university and medical school should be recognised and the programme should be supported and invested in
- A proactive search for positive links with other faculties should be undertaken
- The Medical School should explore how it can become an exemplar for the promotion of health in all its activities. This should include, as first steps, a comprehensive ban on smoking on the campus and the promotion of healthy eating in the food outlets
- A review should be undertaken of the need for taught courses by PhD students across the Medical School.

To the Postgraduate Programme in Public Health and Health Care Management

- As many of the constraints on future development and sustainability lie in the external environment, we recommend that senior staff become more outward looking, proactively pursuing stakeholder engagement, in the health sector and beyond (e.g. philanthropic foundations, local government, the private sector)
- Recognising the strengths of the Programme, especially in areas such as epidemiology and biostatistics, we recommend that efforts are made to capitalise on them. This will require freeing up some of the time currently committed to teaching to allow staff to develop research programmes, building collaborations within other parts of the medical school and internationally.
- Given that there are some areas of the curriculum where there are some weaknesses, as described above, we recommend that these should be targeted for future investment as funds become available.
- We recommend that the Programme should strengthen its international engagement, through participation in the Association of Schools of Public Health in the European Region

To the Rudolph Virchow society

- We recommend that the Rudolph Virchow society should explore the possibility of developing into a Greek public health association, which can facilitate scientific exchange of ideas within the nascent Greek public health community, as well as acting as an advocate for the strengthening of Greek health policy

Evaluation Committee

Professor John Ashton, Director of Public Health, Cumbria, UK

Professor Martin McKee, London School of Hygiene and Tropical Medicine, UK

Professor Raynald Pineault, Universite de Montreal, Canada

Professor Erik Trell, Linkoping University, Sweden

Mr Glenn Warren, Change Through Partnership, UK

Προς τον Πρόεδρο του Βιολογικού Τμήματος Π.Κ Καθηγητή Άρη Οικονομόπουλο

Από Χ Σαββάκη Δν/ντή Σπουδών Διατμηματικού Προγράμματος
Μεταπτυχιακών Σπουδών Μοριακής Βιολογίας-Βιοατρικής

Θέμα: *Εξωτερική αξιολόγηση Προγράμματος ΜΒ-Β*

Κύριε Πρόεδρε,

Σας επισυνάπτω την εξωτερική αξιολόγηση του Προγράμματος η οποία έγινε από διεθνή επιτροπή εμπειρογνομόνων (SAC) στις 6 Ιουνίου 2000, στα πλαίσια της αξιολόγησης των δραστηριοτήτων του IMBB.

Η επιτροπή είχε την εξής σύνθεση:

Καθ. Φώτης Κ. Καφάτος, EMBL, Heidelberg, Γερμανία (Πρόεδρος)

Δρ. Στρατής Αβραμέας, Ινστιτούτο Παστέρ, Paris, Γαλλία

Καθ. Frank Collins, Κέντρο Ελέγχου Ασθενειών (CDC), Atlanta, ΗΠΑ

Καθ. Frank Grosveld, Πανεπιστήμιο Erasmus, Rotterdam, Ολλανδία

Καθ. Roger Hull, John Innes Centre, Norwich, Αγγλία

Καθ. Herbert Jaeckle, Ινστιτούτο Βιοφυσικής Max Planck, Goettingen, Γερμανία

Δρ. Matti Saraste, EMBL, Heidelberg, Γερμανία

Καθ. Edwin M. Sourthen, Πανεπιστήμιο της Οξφόρδης, Oxford, Αγγλία

Καθ. Kevin Struhl, Ιατρική Σχολή Πανεπιστημίου Harvard, Boston, ΗΠΑ

Καθ. Marc van Montagu, Πανεπιστήμιο του Gent, Gent, Βέλγιο

Η διαδικασία έγινε σε τρεις φάσεις: Κατ'αρχήν έγινε παρουσίαση τού Προγράμματος από το Διευθυντή Σπουδών, παρουσία της Συντονιστικής Επιτροπής και του Δ/ντή του IMBB. Κατόπιν η Επιτροπή συνομίλησε με τους Μεταπτυχιακούς Φοιτητές του Προγράμματος χωρίς την παρουσία διδασκόντων. Τέλος, η επιτροπή, συνέταξε το κείμενο αξιολόγησης που ακολουθεί.

Είμαι στη διάθεση σας για περισσότερες πληροφορίες.

Χ. Σαββάκης

REVIEW OF THE JOINT GRADUATE PROGRAMS IN MOLECULAR BIOLOGY AND BIOMEDICINE

The graduate program in Molecular Biology is the oldest in Greece and remains the finest in the country (many of the students indicated that it was in fact the only credible program). Two years ago the program was significantly re-organized into the Joint Graduate Program in Molecular Biology and Biomedicine (JGP), a program combining the resources of IMBB and the University of Crete (including the Medical School). The university of Crete and the IMBB have used the JGP to sign an agreement with EMBL for awarding a joint PhD degree to EMBL students, and to open bilateral opportunities for collaboration in advanced training. The JGP includes 37 faculty (11 IMBB Researchers, 17 University faculty with IMBB affiliation, and 9 University faculty without direct IMBB affiliation.) Currently there are 27 MSc and 32 PhD students in JGP, with 11 additional MSc students accepted for this coming academic year.

In JGP, all graduate students join the program as MSc candidates and have two years to complete the degree, with the requirement of one year of academic courses and laboratory rotations followed by 1 year of thesis research. Students can apply to the PhD program only after completing the MSc. The faculty are currently considering a new system in which students would directly enter the graduate program and complete 6 months of academic training followed by 6 months of laboratory rotations. At this time, they would begin a research track and identify a dissertation topic. The first 6 months would be preparation for the Qualifying Exam, on successful completion of which they would embark on their dissertation research. The new system would streamline the PhD training and give greater emphasis to a dissertation based on publications. SAC considers these improvements sensible.

Twenty nine graduate students (both MSc and PhD students) were invited by SAC to give their assessment of JGP. About half received University training in Crete, and all but one of the rest in other parts of Greece; one student received her University education in France. While by the nature of the process, most of the comments were suggestions as to how the program could be improved, the students were almost universal in their praise of the JGP, especially as compared to other graduate opportunities in Greece. When asked to compare JGP with other Greek programs, several students emphasized the sentiment that "there is no comparable program elsewhere in Greece, joining it is a real opportunity!". SAC was impressed with the maturity, thoughtfulness and critical ability of the students. They are well informed, appreciate very much the opportunities they have and still are able to make constructive critical suggestions for improvement. Based on what we heard we certainly would recommend renewal of the funding for this programme, and serious consideration of the students' recommendations. A by-product of this meeting was the commitment of one member of SAC (M.Saraste) to organise an EMBL-led summer school in Crete for PhD students from both Crete and elsewhere in Greece. Another member of SAC (Fotis C. Kafatos) points out that there are unused opportunities for working visits of PhD students to EMBL laboratories. These have been grouped in the following categories.

Courses: The students emphasized that the courses were generally very good for learning, and there was a shared sentiment among some of the more senior students that courses had been improving over time. Most of the courses are didactic, but there are some that involve critical student input. A prevailing sentiment was that there should be more "critical thinking" academic work like graduate seminars or journal clubs; SAC members pointed out that the students could, take the lead in organizing such activities. The one problem voiced by all was

that organization or scheduling of courses was often not planned well enough for students to efficiently schedule their academic programs, it also was suggested by some that the number of courses was too limited. When asked if there should be more emphasis on teaching in English, many students were somewhat uneasy, but all agreed that some courses in English were important and that if phased in, an entirely English language program would certainly improve career opportunities for the program's graduate students.

Laboratory Rotations: All agreed that laboratory rotations were a valuable method of learning new techniques and helped significantly in their ultimate choice of a research lab. Some suggested that the current 3 month rotation cycle should be shortened to 2 months. All students felt that the rotation cycle should not occur concurrently with the main academic course period (and that were in agreement with the faculty proposal).

Other aspects of training: Most students felt they would benefit from more opportunities to travel abroad, either for short term training (e.g. a rotation) or to attend scientific meetings or courses. A suggested policy that each student must spend at least 2-3 months working abroad during his/her studies was favoured, and recommended. About 25% had been abroad to meetings or conferences paid for by IMBB, but many more indicated that they would pursue such opportunities if advance financial support were available (rather than being paid at the end). Two students had done rotations in Germany and one in France. All students recognized the paramount importance of publishing in international journals, but several students voiced the sentiment that their advisors were not aggressive enough in helping them get their work submitted in a timely manner. No training currently exists in writing scientific papers or grant proposals, a deficiency many students pointed out.

Qualifying Exam: The exam apparently now consists of a requirement that the student give a detailed review of current research in three distinct fields, each identified by one of the 3 different committee members. Host students felt that this method did not encourage enough critical thinking. There was also some concern that rules for the exams were unclear and that the manner of examination varied unpredictably among examiners. Many seconded a student suggestion that the exam be changed to reflect the development of a detailed research proposal by the student, which then should be presented and defended before the committee. There was no consensus as to whether this proposal had to be built around the area ultimately to be selected for the thesis, or around a different area.

Quality of the Thesis Advisory Committee and advising generally: Most students said that the present system works very well with the sole exception being the current requirement that 2 professors serve on each 3-member committee. Given the limited number of JGP faculty who hold university appointments, students felt that committees could be better constituted if the requirement were reduced to one professor. Most felt that the JGP faculty were generally very supportive, even in situations of non-scientific problems. A requirement of at least one professor and at least one IMBB researcher on each committee would seem sensible.

After JGP: About 10-15% of the students indicated that they planned careers other than in academia or scientific research, most because they were concerned about the lack of future opportunities. Somewhat more than half the students said that they planned to do a postdoc abroad, and few said that they would look for such positions in Greece. Most admitted, however, that attractive opportunities in Greece were currently limited largely to Crete. The primary reasons for looking abroad were (1) significant opportunities to continue to grow scientifically and (2) limited numbers of opportunities in Greece.

Student responses to SAC question: How could the program be improved?

- Financial support for students is inconsistent (apparently a local problem).
- The lack of radiation badges was a safety concern ;it was pointed out that practice elsewhere in Europe was not consistent).
- Several suggested that Army Service requirement disrupted their training.
- Some students indicated that they would prefer to go directly into a PhD program, as is now done in many US and European universities. Others would prefer an MSc-PhD program where they could divert directly into a PhD if they so selected, without the requirement of finishing a research MSc thesis distinct from a doctoral dissertation.
- Many students indicated that they would like to do part of their dissertation research abroad, and most student; indicated that some aspect of their training abroad would significantly improve the program.
- Many students voiced the concern that their research was often significantly delayed because of long delays in ordering critical reagents or repairing broken equipment (this is clearly a problem, and SAC recommends that serious attention be paid to solving it).

Recommendations to SAC from students:

- Students would like SAC members to give research seminars.
- SAC should review English-language dissertation abstracts as part of the review process.

FINAL REPORT: EVALUATION OF THE UNIVERSITY OF CRETE'S INTERDISCIPLINARY MSc COURSE "OPTICS AND VISION"

Introduction

The two-year MSc course in "Optics and Vision" was originally proposed in 2002, received ministerial approval in 2003 and enrolled its first students in the academic year 2003-2004. Since then it has admitted approximately 20 students each year, with teaching being provided by the university's Departments of Medicine, Mathematics and Physics. This evaluation of the course was carried out at the invitation of the course supervisor, Professor IG Pallikaris, by the following external academics:

Professor DA Atchison PhD, DSc, School of Optometry, Queensland University of Technology, Australia

Professor WN Charman, PhD, DSc, Optometry and Neuroscience, Faculty of Life Sciences, University of Manchester, Great Britain

Professor SD Klyce, PhD, Ophthalmology and Anatomy/Cell Biology, Louisiana State University, USA

Professor Charman accepted the nomination to chair the evaluation committee.

All the discussions among the evaluators, university staff and students were carried out during the Fifth Aegean Summer School in Visual Optics, held at Rethymnon, Crete, during the period 1-6 July 2006.

A Draft Report was sent to Professor Pallikaris in August 2006. This Final Report takes account of the responses of the course organisers to the factual content of the earlier report and includes details of the specific actions already taken by the organisers on some specific comments in our Draft.

Information provided to Evaluators

The university freely provided us with whatever information we requested to assist us in our evaluation. The main sources of information were:

- (i) A substantial "Course Description" document detailing the origins of the course, its major objectives and sources of funding, the backgrounds of the staff and details of the individual modules. Other information included analyses of the student intake and pass rates, student evaluations of the course and abstracts of project reports.
- (ii) A short document outlining the way in which the various administrative responsibilities for the course were shared between staff from the three current participating departments, and the Regulations governing student progress through the course.

- (iii) A course outline presentation by Professor Tsilimbaris and presentations by staff from the three departments - Medicine, Mathematics and Physics-involved in the course.
- (iv) An extensive meeting with five instructors from the course, including the 3 members of the Steering Committee.
- (v) A meeting with about 20 students representing both the first and second years.
- (vi) A selection of examination papers (as many of the papers were in Greek, which none of us could read, we did not request a full set).
- (vii) Presentations of their project work by 8 students within the framework of the Summer School in Visual Optics

A tour of the facilities was also proposed. However, we felt that it was not practical to include this due to the limited time available and the location of the evaluation.

An overview of the course

The course aims to provide high-level, interdisciplinary education in the field of visual optics, so that graduate students from a variety of backgrounds (physics, mathematics, engineering, ophthalmology, optometry and optics) can gain a firm grounding for subsequent progress to PhD studies or a research/industrial/academic career in vision sciences and visual optics. It benefits from instructors who have research experience in three disciplines (Ophthalmology, Optics and Applied Mathematics). We understand that staff from the Department of Material Sciences of the university are also likely to contribute to the course in the near future.

All students follow a standard 1st semester, designed to bring them to a common standard. In the second and third semesters there is an increasing element of choice in the subjects to be followed and the fourth semester is devoted to a 6-month clinical or research project.

The course is funded at the level of 100, 000 Euros annually, 75% of which comes from the European Union and 25% from the Greek government. Half of this money is spent on Fellowships for student support, the rest paying for non-academic instructors and a variety of other support costs: students pay no fees.

Comment on Course Documentation

In general we found the "Course Description" document very helpful. The range of material covered by the syllabus was impressive. However, in our Draft Report we noted a number of points (some of which were trivial, some more serious) where the original "Course Description" was unclear. The course organisers have responded to our Draft Report by making the changes shown in brackets below:

p.9. Elements of Mathematical Modelling. Lecture hours: 4 X 13 = 52 rather than 42? (Corrected)

p.11. Biostatistics. The methods used to assess this module are not given (These are now specified as: "A 3hr written examination (closed book) at the end of the semester).

P.15. Computational Mathematics. Lecture hours: 4 X 13 = 52 rather than 42? (Corrected)

p.19 Processes in the Visual System. We understand that assessment includes project reports as well as the examination. (This is now specified as: "3hr written examination at the end of semester + Reports")

p.21. Applied Optics. The assessment method is not specified. (project + examinations?). (This is now specified as: "3hr written examination at the end of semester (40% project presentation and 60% written examination"))

p.22. It is not specified who is responsible for the project module. We understand that there is a committee for each student but it would be helpful to have this spelled out. (The following passage has now been added "Each student is supervised by three members of the Program appointed by the steering committee of the program. The members are either instructors of the program or researchers from national research centers. One of them is the main supervisor of the student")

p.24. First figure. The distinction between "Candidates" and "Registered students" is not clear. Are candidates people who apply for the course, of whom only a subset are allowed to register? (The following has been added to the caption "Candidates refers to applicants for the program whereas registered students are the students who have enrolled to follow the course")

p.27. The apparently high number of students who fail is a matter of concern. We understand that the figure many include individuals who never attended classes as well as those who actually fail examinations. It would be helpful to distinguish between the different types of failure in future reports. This point will be further discussed later.

p.34. Evaluation of the lectures. The comment is made that "the majority of students feel that the course lectures are not of very high difficulty. This can be translated as an indirect suggestion of a more in depth analysis in each scientific field covered by the course". If, however, we look at the students' actual responses to the questionnaires (incidentally we are not told how what percentage of the students completed these or whether they were from the 1st or 2nd year) we see that 70% of the students thought that the course difficulty was either "very high" or "high". Taken in combination with the apparently high failure rate (p.27, 13 failures so far from 67 students) these figures suggest that the current level of difficulty is already quite challenging for the majority of course entrants.

(The passage in the Course Document has been changed to "Furthermore, the majority of students feel that the course lectures are of high or very high difficulty. This may originate from the fact that the students who attend the course have diverse backgrounds, with BSc degrees from various disciplines. As a result they may not be familiar with a number of topics offered by the course. This might explain the relatively high rate of failure of our students".)

p.31. Summer Schools in Visual Optics. At present students are merely "encouraged" to attend the Schools for various possible purposes: as a preliminary to applying for the MSc programme; to receive instruction from experts other than the MSc program lecturers; and to present their own project work. If the opportunities offered by the Summer Schools are to

be fully exploited (as would seem sensible) it might be worth defining more precisely the requirements for student attendance at the Schools.

In the Course Administration document the composition of the Administration Board is not clear. Does the Board consist of all the Faculty members from the participating departments or only a subset. If the latter, who are these? (The following passage has now been added: "The board consists of a subset of the faculty members from the participating Departments. These members are appointed specifically by each Department").

Finally, we found the Course Regulations a little confusing. Each new student must take:

1st semester: 3 compulsory modules (1 module needed to progress)

2nd semester: 1 compulsory module + 2 selected modules (4 modules needed to progress, which must include at least 2 from the 2nd semester)

3rd semester: 2 selected modules (i.e. a total of 8 over the 3 semesters). To progress all 4 compulsory modules must be passed, plus at least one 3rd semester module.

4th semester: Project

For a student to successfully complete a module they must gain a grade of at least 5 on a scale running from zero to 10 (the highest), and the final criterion for success demands that only 3 modules can be passed at grade 5 or 6 (i.e. the other 5 must be passed at 7 or higher). What is not clear to us is how, having progressed, students can make up for the "missing" modules from earlier semesters. Is there an arrangement for repeat examinations? When are these taken? How many repeats is a student allowed to take? Possibly these questions have not arisen so far, but they might in the future and the regulations need to be clarified.

(The following passage has now been added: "Students who have missed any module are allowed to repeat the whole module and to sit the examination again. This repeat procedure can only be followed once for each module, to ensure that students complete their studies promptly")

Discussions with Staff

We were impressed by the enthusiasm and commitment of all those involved with the course. It was clear that much thought had gone into the planning of the course and in modifying it as necessary in the light of the experience gained over the first few years of its operation. The following points emerged from the discussion (several of these were to be repeated in slightly different form by the students):

- (i) The absence of dedicated laboratory space and equipment for the practical elements of the course was a grave handicap. In many cases, experiments had to be set up and dismantled within the space of a day, using space which was already used almost full-time for other purposes. Some practical topics in which students ought to obtain "hands on" experience were only demonstrated.
- (ii) The available funding, while just about adequate for the day-to-day running of the course and the fellowship programme, did not allow purchase of equipment specific to the needs of the course.
- (iii) There were concerns with the career prospects of students after they gained their MSc. How best could they be helped to further develop their potential? One forthcoming possibility was to make a PhD programme available to at least some of the MSc graduates.

- (iv) Various small improvements in the programme were envisaged. It was hoped that more staff from the Medical School might be involved in the planning and supervision of clinical research projects. Involvement of the Materials Science Department would introduce relevant new topics to the course and it might be that other departments could be usefully involved. It would be helpful to introduce illustrate the mathematics material with more examples taken from the field of optics and vision, such as modelling of eye movements, systems analysis of accommodation and pupillary control, and finite element analysis in relation to the lens and cornea.
- (v) Consideration was being given to the possibility of teaching the course in English and attempting to recruit students on an international basis, rather than purely Greek as now.
- (vi) The present funding system for the course would come to an end fairly soon. How could it best be supported in future? It was suggested that students might be charged fees, with commercial sponsorship being sought to offset these for at least some individual students.

Meeting with students

In general students spoke very positively about the course and appeared to have a high level of satisfaction with its general structure and content. Major points emerging from the discussion were:

- (i) Although students, depending upon their background, found particular early parts of the course difficult (e.g. physics graduates had problems with biological/medical material) they were generally able to overcome the problem with the help of staff and the other students. Staff were very willing to help and were easily approachable. Discussions with other students were very helpful and there tended to be an informal system of small groups of students working together on particular problems.
- (ii) Laboratory work was generally enjoyed but it was felt that more was required. At present there were problems of access to equipment. Some demonstrations to relatively large student groups ought to be replaced by "hands on" experience.
- (iii) Many students were concerned about career prospects and felt that they did not know what range of possibilities was available. They would appreciate better advice on this. Related to this, the possibility of short placements being made available in hospitals, laboratories or industry was suggested, to give students an idea of working in these environments. Some students suggested there should be direct collaboration with private companies (but this would obviously depend on the availability and proximity of suitable companies).

Comment on presentations of MSc Project work

These were of a high standard and reflected well on the calibre of the students and of the final semester project.

Assessment of the Course

Our overall impression was that this is a well-designed course with a good balance of relevant material. It obviously benefits from the way in which both teaching and administration

are shared by several of the university's departments and we were impressed by the enthusiasm that all the staff showed for this collaborative venture. As far as we can judge the standards of the course and its graduates are at least as high as those from broadly similar courses elsewhere in Europe. We strongly support the proposed extension of the graduate programme to include the PhD level.

We do, however, wish to make a number of recommendations regarding the MSc course:

- (i) The rate of course "failures" appears too high. We do not have sufficient information to establish the reasons for this but it seems that in some instances failures may reflect a lack of initial commitment to the course and in others a lack of ability to cope with its demands. In either case it may be that the criteria used to admit students are inappropriate. The course organizers need to consider ways in which the failure rate can be reduced. As noted earlier, we feel that the current level of difficulty of the course is appropriate and does not need to be raised.
- (ii) The entry criteria currently rely on letters of recommendation, a personal interview and university grades. The latter are not uniform across all educational institutions. This may underly the high failure rate. It is recommended that efforts be made to initiate a standardized entry examination that each student would be required to take as part of his or her application to the program. Such a standardized exam could be patterned after graduate entry exams used in other countries.
- (iii) There is an urgent need to improve the laboratory provision for the course. One of the selling points of its graduates ought to be that they have direct experience of the various techniques discussed in the course and at present this is not being fully achieved. At least one dedicated laboratory is required, in which equipment can be set up on a permanent basis: it should allow student access at all reasonable times.
- (iv) Closely related to this is the question of course funding. While it is not within our brief to suggest ways of achieving better funding, it is clear that the present level is barely adequate for an intake of 20 students/yr. As noted earlier, there is a need to acquire dedicated equipment for laboratory work in many areas of the course. It may be that some suitable equipment might be donated by relevant manufacturers but future funding ought to include provision for regular purchase of new and replacement equipment.
- (v) At present two people from the Department of Medicine appear to be supervising most 4th-semester projects, perhaps because students know them well. It would be valuable to have more other staff involved, particularly those from the areas of Mathematics and Physics. We appreciate that it takes time and experience for such staff to devise suitable topics.
- (vi) To support recommendation (v) and strengthen inter-disciplinary links, it is recommended that the program initiate monthly seminars where members of the program can present research of interest to their area. This would aim to initiate and foster collaborative research efforts between faculty as well as provide in-depth information to the students, helping them to choose appropriate faculty advisers.
- (vii) Although students may currently take their academic and personal problems to individual members of staff, this is not a very well organized procedure. We suggest the appointment from among the staff of a Graduate Adviser. This individual would be the

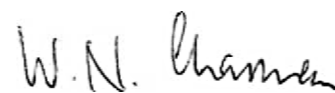
first point of contact for any student who has a problem, either academic or personal, which might affect their progress through the course. The Graduate Adviser would not necessarily be able to solve these problems him or herself but would need to be familiar with the appropriate sources of advice within the university. We assume that, as now, most problems relating to specific courses would be taken up with the lecturer concerned, although even here issues might arise in which outside advice was desirable, for example where there were problems with the quality of the teaching. The Adviser might be particularly helpful in cases where students are experiencing difficulties through illness, financial problems or domestic circumstances.

- (viii) There is a need for more systematic careers advice to be available to students, perhaps again through the Graduate Adviser. For example, it would be helpful to build up a pool of information on international universities offering relevant PhD programmes, on possible commercial/industrial employers, on hospital and academic opportunities and so on. Records of the destinations of past graduates would be helpful. Clearly students have the major responsibility for their own career but the university is well placed to collate the information on the opportunities available and, perhaps, to institute some form of dialogue with companies etc who might be interested in employing graduates.
- (ix) To help to familiarize students with potential areas of future employment, summer internships should be made available during the three months July-September between semesters to provide practical hands-on experience for students in research laboratories in university or industry environments.

Suggestions for future evaluations

Although we felt that we had an adequate amount of information on which to base our judgement of the quality of the course we note that future evaluators might benefit from:

- (i) The opportunity to view laboratories and apparatus, to assess improvements made in this area.
- (ii) Availability of marks for the assessments for all modules, to allow comparison of the relative difficulty and standards of the different subjects.



WN Charman (Chair)
DA Aitchison
SD CI

December 2006