



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

HELLENIC REPUBLIC

**Α.ΔΙ.Π.**

**H.Q.A.A.**

ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ ΠΟΙΟΤΗΤΑΣ

HELLENIC QUALITY ASSURANCE AGENCY

ΑΝΩΤΑΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

FOR HIGHER EDUCATION

**EXTERNAL EVALUATION REPORT**

**DEPT OF BIOLOGY**  
**UNIVERSITY OF CRETE**

MARCH 2010

### **External Evaluation Committee**

The Committee responsible for the External Evaluation of the Department of Biology of the University of Crete consisted of the following five (5) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005 :

**PROFESSOR PHILIPPOS TSICHLIS (Coordinator)**

TUFTS UNIVERSITY

**PEOFESSOR SPYROS AGATHOS**

UNIVERSITY OF LOUVEN

**PROFESSOR SPYROS ARTAVANIS-TSAKONAS**

HARVARD UNIVERSITY

**PROFESSOR VASSILIOS KORONAKIS**

UNIVERSITY OF CAMBRIDGE

**PROFESSOR ATHANASSIOS THEOLOGIS**

UNIVERSITY OF BERKELY

## ***Introduction***

### **Dates and brief account of the visit**

#### ***Monday March 15***

##### *Morning*

Meeting with ADIP at the Divani Akropolis Hotel. Presentations by Dr. Loukopoulou and Dr. Amourgis regarding the external evaluation process.

##### *Afternoon*

Flight to Herakleion Crete

#### ***Tuesday March 16***

##### *Morning*

Meeting with Dr. Christos Louis, Department Chair, and members of the Internal Evaluation Committee (Ioannis Karakasis, Electra Gizeli, Eirini Athanasaki and Konstantina Lyka) at the University Hospital. The building of the Department of Biology of the School of Natural Sciences and Technologies was regarded by Dr. Louis as unsafe because of student unrest.

Dr Louis presented an outline of the metrics of the Department.

##### *Afternoon*

- 1) Private meetings of the members of the External Evaluation Committee (EEC) in one of the IMBB buildings to develop a plan regarding the subsequent steps of the visit.
- 2) Meeting of the committee with Dr. Louis and Dr. Eirini Athanasaki, to discuss the undergraduate and postgraduate curriculum and teaching, the research, infrastructure and other metrics of the Department.

During this discussion the committee was discouraged from meeting the students or visiting the physical plant. A tentative plan for the program of the next day was agreed upon.

#### ***Wednesday March 17***

##### *Morning*

- 1) Meeting with Drs Eirini Athanasaki, former chair of the undergraduate education committee, and Despina Alexandraki, current chair of the same committee, to discuss undergraduate and graduate education.
- 2) Meeting with three graduate students
- 3) Meeting with three recently hired young faculty members (Drs Kalantidis,

Poulakakis, and Spilianakis)

*Afternoon*

- 1) Tour at the Museum of Natural History
- 2) Meeting with five undergraduate students selected at random.
- 3) Short private meeting of the EEC.
- 4) Brief meeting with Dr. Louis
- 5) Departure for Athens

***Thursday March 18***

*Morning*

Meeting of the EEC at the Divani Akropolis Hotel, to discuss the preparation of the report.

Tasks were assigned to individual committee members and the meeting was adjourned.

***Friday March 19***

*Morning and afternoon*

Meeting of the EEC at the Divani Akropolis Hotel to integrate the thoughts of the individual members in to the preliminary report.

***Saturday March 20***

*Morning*

Meeting of members of the committee at the Divani Akropolis Hotel and delivery of the preliminary report to Dr Achilleas Gravanis

**Whom did the committee meet?**

All the individuals the committee met are listed in the above outline of the visit.

**Reports documents and other data examined by the committee**

- 1) The internal evaluation report and the associated documents providing details regarding the metrics at the Department
- 2) The student's guide of the Department of Biology of the University of Crete.

- 3) The student's guide of postgraduate programs
- 4) Postgraduate materials, such as web sites and publications that are publicly available.
- 5) Presentation of the metrics of the Department by Dr. Louis
- 6) Detailed listings of publications (peer reviewed, 2003-2009) and current funding (sources and amounts), supplied by Dr Louis, following a specific request by the EEC.

### **Facilities visited by the External Evaluation Committee**

Problems due to student unrest made it impossible for the committee to visit the physical plant (laboratories and core facilities) at the Department. As stated in the outline of the visit the committee met with members of the Department at the Hospital, an IMBB building and the Museum of Natural History.

### **General comments**

Overall, the EEC was impressed with the culture and the high standards of the Department. More important, it was impressed with the human potential as evidenced by the quality of the young faculty and the students it met.

However, it should also be stated that the visit of the EEC was not optimal for a number of reasons.

- 1) The committee did not have the chance to visit the physical plant or to meet with a sufficient number of students. Also, the committee did not meet other members of the Department's community such as post-docs and technical personnel.
- 2) The *in situ* visit was too short to provide a full picture of both the teaching and the research activities of the Department.
- 3) The committee was not given the chance to meet with Institutional officials, such as the Dean and the Rector in order to place the Department in the overall context of the University and the School of Natural Sciences & Technologies.

### ***Streamlining the Evaluation Process***

We suggest the following changes to improve the process for future evaluations:

- 1) ADIP should consult with the chair of the EEC to establish a mutually agreeable visit plan, which will be communicated to the committee members prior to the visit. During this process, the chair will be given the opportunity to request additional materials that may not have been provided

by ADIP.

- 2) The EEC members should arrive at the site the day before the evaluation.
- 3) The chairman and the members of the EEC should meet in the evening prior to the evaluation, or in the morning of the first day. The purpose of this meeting will be the assignment by the chairman of specific tasks regarding the evaluation process and the writing of the report to the members. Here we should mention that we found the evaluation form useful in that it provides a good template for the issues to be discussed during the visit.
- 4) The schedule should give the committee the opportunity to:
  - Visit and evaluate the research and teaching facilities and the core facilities, including the computing facilities and the library.
  - Meet with the Dean of the School, the Rector of the University, the Chairman of the Department and with the members of the faculty who wrote the internal evaluation report. Finally, meet with a spectrum of individual faculty from the ranks of assistant, associate and full professor. Faculty members who request a meeting with the visiting committee should be given such an opportunity. If possible, a meeting with the entire faculty should also be arranged. During this meeting the chair of the visiting committee would introduce the members and summarize the goals and aspirations of the visit.
  - Meet with randomly selected undergraduate and graduate students ( MS and PhD)
- 5) The EEC should convene in a private room with internet access that will be reserved for all its deliberations for the entire length of the visit.
- 6) We recommend a two day visit with a full prearranged schedule and a one day long private meeting of the EEC to write the first draft of the report.

## ***A. Curriculum and Teaching***

### ***A1. Curriculum***

#### **APPROACH**

- What are the goals and objectives of the curriculum? What is the plan for achieving them?
- How were the objectives decided? Which factors were taken into account? Were they set against appropriate benchmarks? Did the unit consult other stakeholders?

- Is the curriculum consistent with the unit's objectives and the requirements of the society?
- How was the curriculum decided? Has the unit set a procedure for the revision of the curriculum?

Overall, we found the curriculum to be appropriately rich and soundly structured. The Department of Biology is divided into three Divisions, offering specialized courses in three different areas of Biology: a) Biochemistry, Molecular Biology and Cell Biology and Development; b) Organismal, Population, Environmental and Marine Biology; and c) Biotechnology and Applied Biology. 46% of the 26 core courses students must take to graduate, are common to different tracks and 16% of the courses are track-specific. The remaining 38% are specialized courses in a broad range of subjects.

The curriculum is designed to take 4 years to fulfil but most students finish in 5-6 years. While the effort is made to offer a timely sequence of the courses, the system allows a student, in our view inappropriately, to carry a fundamental core course "indefinitely" over the years, without having passed it. This reflects the fact that prerequisites are not truly required. This system is of course highly undesirable because it allows students to take "specialized" courses without the proper intellectual or experimental foundation.

The curriculum was significantly revised during the 2004/2005 academic year, in order to respond to new developments in the field. This was done with the broad participation of the faculty. We are satisfied with the timely renewal of individual courses by the teaching staff and with the faculty participation in the revision of the curriculum.

#### IMPLEMENTATION

- How effectively is the curriculum implemented?
- Is the structure of the curriculum realistic?
- Is the curriculum coherent and functional?
- Is the course material coordinated?
- Are there necessary resources and appropriately trained staff to implement the curriculum?

The implementation of the curriculum suffers from the apparent lack of prerequisites for enrolment into specialized advanced courses. Another problem is the apparent resignation regarding the time that is usually required for a student to graduate. Although the four years recommended are realistic in our view, they are not adhered to by most students who graduate on the average in 5 years. This undesirable outcome is due to a combination of factors, including poor supervision, and, importantly, the economic realities, which, force many students to work in order to support themselves. Improvements in the student to

faculty ratio and the availability of student stipends will go a long way to address this issue.

The curriculum is well coordinated and appropriately renewed to keep pace with a rapidly evolving field. We do need to emphasize, however that the number of faculty serving the existing and apparently constantly growing student body must also grow, if we want the excellence of the curriculum and its implementation to not be endangered.

## RESULTS

- How well is the implementation achieving the planned approach?
- If not, why is it so? How is this problem dealt with?
- Does the Department understand why and how it achieved those particular results?

The implementation of the goals of the curriculum suffers from the lack of prerequisites for enrolment into advanced specialized courses. In addition the large student body relative to the size of the existing faculty presents difficulties, as alluded to above, manifested in a less than optimal ability of the faculty to reach out to students. Consequently, graduation timing is less than optimal. Although some students who have graduated from this Department have achieved significant distinction both in Greece and abroad, there is no systematic information on the careers of the majority of the students that have graduated so far and thus it is difficult to assess the overall success of the teaching activities of the Department.

## IMPROVEMENT (use of the self-evaluation conclusions)

- Does the academic unit know how it can improve?
- What initiatives does it take in this direction?

The faculty seems keenly aware of the existing deficiencies but it needs the help of the state to correct them. It seems that good ideas for improvement are not lacking, but fundamental, structural problems cannot be addressed by the faculty alone. We mentioned several times the issue of faculty to student ratio, the enforcement of prerequisites in the curriculum and the very commonly observed delay in the timing of graduation, all of which would be unthinkable in any of the Universities we know abroad. The less than optimal funding, which deprives the Department of discretionary operating funds dedicated to educational initiatives is another serious issue which cannot be addressed by the faculty alone.



## **A2. Teaching**

### **APPROACH:**

The overall teaching philosophy of the department is to provide basic knowledge in biology with specialization in molecular and environmental biology.

- **Teaching methods.**

Teaching methods include classroom teaching, laboratory exercises and field trips for selected courses and opportunities to engage in laboratory research. The latter can be formalized by assigning the student an experimental “Diploma” work, which however is not required for graduation. The overall quality of the teaching is excellent. Using both text books and original literature, the instructors are making a conscious effort to teach courses that are both comprehensive and up to date. This is essential as biological knowledge and experimental methodologies are changing at a rapid pace. In this respect it is worth mentioning that to keep courses current and up to date, the Department needs faculty members with active research programs, as such individuals are better equipped to achieve this goal. The content of the lectures and the methods of teaching are evaluated by the faculty annually.

- **Teaching staff-student ratio.**

The teaching staff/student ratio for the core courses that are common to all tracks is approximately 1/100, which is high. This ratio is  $\sim 1/60$  to  $\sim 1/20$  for the track-specific courses. However, the ratio for the laboratory courses is 1/5 which is good. We understand that the trend is to accept an increasing number of students every year. If this continues it will change these ratios for the worse. Increasing the student body must be accompanied by a proportional increase of the faculty.

- **Teacher-student collaboration.**

The few undergraduate students we interviewed indicated that the faculty is easily accessible by Email to address questions and to give advice related to the teaching material.

- **Adequacy of means and resources.**

The available teaching space and resources appear to be adequate. However, laboratory courses need additional technical support (Teaching Assistants-TAs). The absence of such support places more demands on the time of an already overworked faculty and an under-remunerated graduate student body.

- **Use of information technologies.**

The entire faculty have access to e-class and IP phones for communication with the

students. This allows easy communication regarding reading materials, materials for laboratory exercises, announcements about examination dates, etc.

- **Examination system.**

The quality and effectiveness of the teaching is evaluated by midterm (“proodos”) and final examinations. Examinations are almost exclusively written, rarely, if ever, oral. Significantly, we heard from students-that written exams are “corruptible” and that substantial plagiarism is not uncommon. We are not in a position to judge the accuracy of such a claim but the faculty should take this into account and be vigilant. The student participation varies between 15-80% for the regular examination period and 3-38% for the repeat examination. We find the participation percentages to be worrisome, indicating that a large percentage of students are not committed to their studies for reasons unknown to the evaluation committee. As mentioned earlier, economic realities perhaps force many of the students to work to support themselves and thus be distracted from their academic duties.

#### IMPLEMENTATION

- **Quality of teaching procedures.**

The faculty is highly dedicated and enthusiastic about their teaching and as a result, the quality of teaching appears very high.

- **Quality and adequacy of teaching materials and resources.**

The teaching material and resources are adequate and appropriate to the mission of the department

- **Quality of course material. Is it brought up to date?**

The lectures of the courses are revised annually and the quality of the course material is high.

- **Linking of research with teaching.**

The undergraduate students have the opportunity to participate in part time research in various laboratories and the faculty is encouraging this activity. Currently, such students are not compensated for their work. We believe that it would be desirable to award such students a small stipend, to encourage their effort.

- **Mobility of academic staff and students.**

The Department does not have a formal plan for faculty training in developing new areas of Biology in other institutions. However, faculty members accumulate sabbatical time, which they can use for their scientific advancement according to a personal plan that fits their needs. Four faculty members used their sabbatical leaves to carry out research in other institutions during the last five years.

Two faculty members participate regularly in the highly successful ERASMUS program for teaching abroad. The training of the students is also advanced via the ERASMUS program and the practical exercises it provides. Fifty-one students went to other institutions for one or two semesters of training during the last five years. Furthermore eleven students came to this Department from other institutions for training.

- **Evaluation of teaching by students.**

There is a course evaluation process but it seems that neither the students nor the faculty take it seriously. We do encourage a more formalized and more systematic evaluation process. From our discussions with a small group of students we believe that initiatives to engage the students will be welcomed and rewarding.

## RESULTS

- Efficacy of teaching.
- How are discrepancies in the success/failure percentage between courses justified?
- How are differences in time of study completion and in degree grades justified?
- Does the Department realize the reasons of such positive or negative results?

See above.

## IMPROVEMENTS

- **Does the Department propose methods and ways for improvement?**

Yes. It recommends the reduction of student admissions yearly by 50%, which is quite appropriate for the size of faculty. Currently, the faculty is overloaded with teaching responsibilities. The majority teach 90-100 hours per year which is EXTREMELY high. Such a teaching load seriously hampers the research activities of the faculty. Yet, reducing their research effort undermines, in the long run, the quality of their teaching.

- **What initiatives does it take in this direction?**

There is not much the faculty can do in the direction of improving the teacher/student ratio, because the number of students assigned to the Department each year is the product of governmental policy. Another incentive the Department could potentially introduce is to reward faculty members for excellence in teaching and students for outstanding performance. However, this is not an option currently,

because there are no funds available for such initiatives, although in the absence of funds, the Department could give symbolic, non monetary awards.

## ***B. Research***

### APPROACH

- **General comment**

Research is an indispensable part of the teaching process, which is admittedly, the main function of the University. The link between teaching and research excellence is indeed the guiding principle of all the major universities to-date. However, research in the university environment is important for other reasons as well. The role of the universities in the society is not only to preserve and disseminate old knowledge, but to also generate new knowledge and to teach students how to think critically and formulate questions that will lead to new knowledge. Such new knowledge may cure diseases, may create new sources of energy, or may save the environment. Finally, it may allow the society that created it, to acquire prestige and wealth.

- **What is the Department's main objective in research?**

The stated objective of the Department is “scientific excellence and the best possible coverage of exciting areas of research, taking into account the educational needs of the Department” (Chapter 5.1. First paragraph, page 42, of the internal evaluation report).

**Strengths:** The objective is strong and appropriate for a modern department of Biology.

**Weaknesses:** None.

- **How does the Department promote research?**

Based on the internal evaluation report (Chapter 5.1, pages 42 and 43), and our discussions with the Chairman of the Department (Dr Louis) and members of the internal evaluation committee, the Department of Biology promotes research by a number of mechanisms:

- 1) By promoting local, national and international collaborations. These collaborations are normally organized around postgraduate training programs, or competitive research programs. Among them, the institutional collaboration between the Department of Biology and ITE is particularly strong and fruitful.
- 2) By monitoring the research activities of the Department. This is done once a year, when the office of the chairman requests the updating of the website of the Department.
- 3) By informing faculty members of emerging funding opportunities.

4) By providing administrative and technical support to faculty members. Technical support is provided through personnel hired by the Department with three-year contracts.

**Strengths:** All the preceding activities effectively support the stated goals of the Department. Although it is difficult to comment on the specifics of some of these activities, the overall success of the Department in the research area indicates their successful implementation.

**Weaknesses:** The following major weaknesses were observed:

1) The lack of start-up funds. Most universities and research institutions in Western Europe and America provide their newly hired faculty members with financial support for the first few years, until they succeed to obtain independent funding. The failure of the Department of Biology at the University of Crete to provide such support to new faculty members, places them at a serious disadvantage that impairs their competitiveness nationally and internationally. This problem was noted in the internal evaluation report (Chapter 5.1, paragraph 5, page 42). The external evaluation committee strongly agrees with the report. The only new faculty members who receive start up support are the ones with a dual appointment to both the Department of Biology and IMBB, which has the means to provide such support. The Department of Biology and some of its faculty members therefore benefit substantially by the association with IMBB. Left to their own devices the department and its faculty are in a serious disadvantage.

2) Most of the work in research laboratories is done by postgraduate (Master's) and doctoral (PhD) students. Unfortunately, many of these students are not paid. The reason is that they belong to laboratories that do not have the resources to pay them. The dedication of these students, who work hard without compensation, is admirable. It is the opinion of this committee however, that this practice presents serious practical and ethical problems. Providing funding for these individuals, who are indispensable for the research enterprise, is imperative.

3) Research in the Department of Biology of the University of Crete, and other university and research institutions in Greece, is supported primarily by competitive grants from the EU, which are both restrictive and very difficult to obtain. Research grants from Greek sources are very limited and for the past several years non-existent! Greek funding opportunities are announced erratically and no one can count on them. They are therefore highly inadequate. The virtual lack of national funding, places the researchers of the University of Crete and other universities and research institutions in Greece, at a serious disadvantage relative to their colleagues in other European countries, and in America and Asia. Since the full benefits of research can be realized only if research is conducted at the highest level, the Department of Biology of the university of Crete and other institutions in Greece cannot achieve their potential without the proper level of funding. The availability of

governmental, philanthropic or corporate funds is essential.

4) The Department of Biology covers thematically a very wide and diverse discipline. To teach the courses needed to cover this discipline with a faculty of ~25 members, each member is charged with an unusually high teaching load (> 100 hours of teaching per year for many of them). If teaching was the only responsibility of these individuals, this load would be acceptable. However, most of them are expected to carry out active and competitive research. Their teaching load therefore, places them at a significant disadvantage. As we alluded to several times in this report, to correct this problem, the size of the faculty needs to be increased.

5) Although the overall quality of the research is good, despite the difficulties mentioned above, future success depends on the departmental vision in thematic areas of basic and translational research, including biomedicine, plant biology and environmental biology and biotechnology. With the exception of a plan to develop an environmental biology institute, such a vision is not apparent. A number of reasons may be responsible for this: a) the lack of developmental funds. Without funds for the recruitment of new faculty and the development of shared resources, planning can become a meaningless exercise; b) the research area covered by the department is very diverse, and as a result, competing interests make it difficult to articulate a common vision. Although the latter may be a problem however, it may also give rise to opportunities, because the close physical proximity of different disciplines may promote interesting interdisciplinary collaborations.

Our recommendations to the Department include: a) the establishment of a committee of senior members, who will be charged with the development of a plan of strategic priorities, taking into account the strengths and the weaknesses of the Department, new developments in science and potential opportunities that may be unique to the Department; and b) the establishment of an external advisory committee, to help the Department in articulating an exciting and realistic future plan.

6) The practice of Medicine is changing rapidly today, through the application of discoveries in basic biology, made in the last 30-40 years. Biomedicine is therefore a very important and timely topic. The Department has realized this, and to its credit, it has developed a program in Biomedicine. However, a similar program also exists in the Medical School. Since the success of this program depends on collaborations with clinicians and the Hospital, this committee believes that combining the two programs would be beneficial. The combination of the two programs should create a stronger program, because it will facilitate the establishment of the desired critical mass and it will avoid duplication of effort. For the program of the Department of Biology, it will also provide a dependable clinical link.

7) Research is a process that requires an intellectually supportive environment and sustained effort. Unfortunately this is not always the case in the Department of Biology of the University of Crete, as well as in other Greek institutions of higher learning. For reasons that will not be discussed here, a small group of students can disrupt all intellectual activities in the University, including research, claiming that certain activities threaten their hard earned collective rights. The presence of these students was evident during the evaluation process, which they succeeded to partially disrupt. The reasons for this unique and undemocratic phenomenon are complex but not impossible to understand. Exploring these reasons and ensuring the integrity of the educational process is extremely urgent. We therefore recommend a serious effort on the part of both the University and the Government to address this extraordinarily important issue without delay. Without solving this problem, success will always be limited and unstable.

8) A problem of lesser importance that was discussed during the visit is that the dissemination of information regarding funding opportunities is slow, so that the information sometimes reaches the faculty either too close to a deadline or after the deadline has passed.

9) A weakness that is pervasive in most of Greece's higher education landscape is the absence of effective mechanisms for the transfer of the fruits of research to the economy (start-ups, university-industry partnerships, etc.). We encourage a more systematic exploration of such opportunities perhaps through contacts with relevant people from industry and the financial world. Such links are often not evident and they present "cultural" challenges that need to be overcome. Therefore, an open discussion exploring the opportunities and challenges offered by Academia-Industry links can be constructive.

- **Quality and adequacy of research infrastructure**

As stated in section 5.3 at the Internal Evaluation Report and discussed during the site visit, the laboratory space available to each faculty member is 50-70 m<sup>2</sup>. Offices are also currently available to all faculty members. Most required core facilities for the Molecular Biology Program such as microscopy (electron and confocal), DNA sequencing, microarrays, proteomics, bio-informatics, flowcytometry and animal facility are available. However, most of these services are available only through collaboration with the faculty member to whom the equipment for the services belongs.

Before we discuss the strengths and the weaknesses of the research infrastructure, we need to repeat that, due to the disruptions by a group of students, the Evaluation Committee failed to inspect the physical plant of the Department.

### ***Strengths***

The laboratory and office space available to the current faculty members appears adequate and is apparently efficiently used. Basic core facilities for the Molecular Biology Program are also available and apparently, they are used efficiently as well.

### ***Weaknesses***

1) If the Department expands, a requirement for its future success, both the laboratory and the office space will not be adequate. Therefore, additional

space will be needed.

- 2) On page 44 of the Internal Evaluation Report and during the site visit, it was stated that the Environmental Biology group lacks several core facilities that are required for the development of its Research Program.
- 3) The animal facility requires upgrading to be certified for research. Similarly, the greenhouse will soon need to be upgraded and expanded.
- 4) The equipment for the core facilities are aging and they will need upgrading.
- 5) The fact that the currently available services are not provided by facilities that are organized as core facilities in the strict sense of the word can be viewed as a weakness. However, if the system works, it should not necessarily be changed.

## **IMPLEMENTATION**

The overall evaluation of the Research Program was hampered by the fact that the evaluators did not have adequate time to discuss in depth the Research of the faculty. Short discussions with three junior faculty members, Dr. Kalantidis (RNA silencing in plants), Dr. Poulakakis (Molecular evolution) and Dr. Spilianakis (Transcriptional Regulation) were very informative. The discussions of the Committee with those individuals focused primarily on teaching and their experiences as junior faculty members in the Department. However, we had the opportunity to also discuss briefly their scientific work and their plans for the future. The Committee was very pleased with the commitment and the quality of the work of all three new faculty members. Some of this work appears “cutting-edge” and highly promising.

The rest of the Program was evaluated primarily on the basis of the written documents.

- **Scientific Publications**

All Programs appear productive based on the number of listed publications for the period between 2003 and 2009 (394 papers). The overall quality of the papers appears good to excellent. Some of the papers were published in highly visible journals, an indication of the international recognition of the research of the Department. Careful examination of the publications allows the recognition of potential themes of excellence within the Department.

- **Research Projects**

The list of publications discussed above provides evidence for several cutting edge projects. The list of grants provided by Dr Louis, shows that fifteen investigators have external funding and that total current funding equals ~3.5 million Euros

- **Research Collaborations**

A significant number of collaborations were listed in the Internal Evaluation Report. These include collaborations in the areas of Biomedicine Bioethics, Marine Biology and Plant Biology. The collaborating units include the Medical School, the Department of Chemistry and the School of Philosophy and Sociology of the University of Crete, as well as several other Universities and Research Institutes in



Greece and abroad. Specific mention should be made of the collaborative arrangements with IMBB, which are essential to both institutions.

### ***Strengths and weaknesses***

The number of collaborations appears significant. However, there is not enough information to evaluate them in depth. Such an evaluation would need a different kind of review than the one we were engaged in.

## **RESULTS**

- **How successfully were the Department's Research objectives implemented?**

### ***Strengths***

The research objective of "scientific excellence" was largely achieved despite the impediments listed above. The reviewers were indeed impressed with the overall culture of excellence in the Department. They were especially impressed with the young investigators and the students they had the opportunity to meet, who showed real dedication and commitment in the face of major difficulties.

### ***Weaknesses***

There is significant room for improvement. However, this depends on factors that are not totally under the control of the Department, such as availability of funding and resolution of other external problems listed above. Finding solutions to these problems is critical for the Greek society. For the Department, the development of a long-term vision and strategic plan is essential. The establishment of an internal strategic planning committee and an external advisory board will be important first steps in this process.

- **Is the Department's Research acknowledged and visible outside the Department? Rewards and awards**

The research of the Department has been reasonably well recognized, as suggested by the large number of papers published by its members. The publication of some of these papers in highly visible scientific journals provides additional evidence that the scientific work at the Department is recognized internationally. Another piece of evidence for national and international recognition is the ability of members of the Department to attract Research grants, including highly competitive EU grants. Finally, several of the members of the Department have received national and international awards, which are listed in the Internal Evaluation Report. Other distinctions of faculty members, such as citations of their work, participation in scientific meeting organizing committees, inclusion in editorial boards of scientific journals and invitations to scientific meetings, are listed under section 5.5 of the Internal Evaluation Report.

- **Efficacy of Research Work. Applied Results. Patents etc.**

Four patents have been awarded to faculty members of the Department during the time period covered by the Internal Report.

## **IMPROVEMENT**

- **Improvement in Research proposed by the Department if necessary**

The Department has proposed the establishment of an Environmental Research Institute and the promotion of Biotechnology (Section 11.1 of the Internal Evaluation Report). The Environmental Research Institute, although discussed only in an outline form, appears reasonable. However, the plans regarding the promotion of Biotechnology appear diffuse.

The members of the External Evaluation Committee recommend that these issues are reexamined in depth. An internal strategic planning committee may reassess these issues and develop a more detailed plan. An external advisory board composed of experts who will review these plans, or may propose other focus areas based on the nature of the Department and its environment, is also recommended.

- **Initiatives undertaken in this direction**

The Department has already submitted a EIII (University Research Institute) proposal for the establishment of an Environmental Research Institute. Therefore, the idea of such an Institute has already progressed to an advanced stage.

## ***C. All Other Services***

### **APPROACH**

Administrative services were staffed only recently and some of the staff members are still on the learning curve. Nonetheless, the services themselves appear adequate and effective. Web support is available to the students, whose needs are fully met. The connection with the University's central administration in Rethymnon and in another location in Iraklion is more problematic. A tangible consequence is that information on time-sensitive issues may not reach the Department on time.

The technical support staffs for teaching and supervising at the undergraduate laboratories is less adequate to cover the needs of the curriculum and is aided by several graduate students, some of them with no remuneration, who are willingly offering their time and effort. The limitations of the technical support also undermine the time of faculty members who need to train successive generations of transiting graduate students in the use and maintenance of instruments and other precious infrastructure.

### **IMPLEMENTATION**

The administrative infrastructure is adequate in its organization. However, precious

time and effort is often lost in the illusory implementation of transparency through public bids for ordering a variety of supplies.

The Library was recently enriched with both books and electronic journals covering all areas of interest in the Department. However, subscription to electronic publications is apparently unstable and this is a potentially serious problem. Although we did not have the opportunity to see the library, we understand that it provides study space and rooms equipped with PC's that are available to students. However only 5% of the students can be apparently served at any one time, by the existing work stations. Finally, the library provides free internet access including WiFi.

Student counselling is dispensed on an ad hoc basis but the students we spoke to, appreciate the accessibility and general availability of faculty members. Although the students get sufficient attention however, there are very few other incentives to reward excellence.

The University of Crete, like all other Higher Education Institutions in Greece, is lacking adequate student housing. This impacts adversely on the attractiveness of the University and the Department for highly motivated students from other parts of Greece, who do not put it first in their choice of studying venue. This interferes with the matching of the University with meritorious students, for reasons other than academic fitness and is undesirable.

The Museum of Natural History is a gem that serves both research purposes and community outreach with tremendous impact on young generations of pupils and on the scientific literacy of the public.

## **RESULTS**

The functionality of the Department's administrative services and infrastructure are inferred from the internal self-evaluation and from discussions with faculty and students, as there was no actual visit to the Department that would have allowed the on-site inspection of its physical plant.

Because we did not see the Dean of the School of Natural Sciences and Technologies, we could not establish whether there is a master plan for the School. However, based on the Chairman's presentation concerning the Biology Department's building (apparently inadequate for the long term) and the shared facilities with the Physics Department, there is an apparent lack of central planning at the institutional level setting different departments in competition for limited resources.

The Department is satisfied with its administration but not with the technical personnel whose number appears inadequate. It also considers that, although its Library is well-appointed and recently endowed with many new acquisitions, access to electronic subscriptions is not consistent and sustained.

There is inadequate laboratory space for the lab-based courses because of the ministry-imposed increases in the number of student admissions yearly. Hence, lab series for such courses must be given in 3-4 sessions per week. Addressing this problem may also require temporary renovations of the allocated space that are unsustainable in the long run.

The Department is satisfied with the expansion of IT-enabled teaching, such as the “e-class” platform and the possibility of offering the students virtual laboratories to enhance the learning of experimental techniques, even though some of these initiatives need more time to be fully implemented.

Perennial and peculiarly Greek problems of the higher education landscape such as sit-ins and exploitation of the concept of academic asylum have an adverse impact on the teaching and research activities of the Department.

### **IMPROVEMENTS**

Although the record keeping on current students seems to be adequate there is a need to expand it with information on the alumni. This information may allow the department and the university to help current students in their careers by realistically advising them on their options and by facilitating their placement in the labor market. In addition, it may facilitate fundraising initiatives amongst alumni.

The Department presents as a priority the recruitment of two new members of its technical personnel.

There is an urgent need for more laboratory space for student training and also new office space for projected new faculty members. A room equipped for teleconferencing is required, given the many collaborations of the PIs with colleagues abroad.

The animal care and greenhouse facilities need to be upgraded and expanded.

Last but not least, it is clear that the current rotating style of Department leadership is largely managerial and forced to address a multitude of operational minutiae. Real improvement in reaping the benefits of the tremendous investment (previous and ongoing) in high quality faculty will only come from changing the role of the leadership to emphasize the setting of medium- and long-term strategic goals based on a clear-sighted vision of the life sciences in the 21<sup>st</sup> century.

We believe that it is urgent for both the government and the society in Greece to strive to understand the logic by which a group of students considers it their right to exploit and abuse the concept of academic asylum, so that they can take action to correct this anomaly. Addressing this problem is imperative for academic progress for the benefit of all concerned, including the ones who engage in such activities.

### ***D. Strategic planning, perspectives for improvement and potential inhibiting factors***

#### **• Short-, medium- and long-term goals.**

Based on the Internal Evaluation Report and the discussions of the External Evaluation Committee with the chairman of the Department and members of the Internal Evaluation Committee, the following were identified as the goals (or wishes) of the Department :

#### **1) Faculty, Students, Curriculum and Teaching:**

- a) To increase the size of the faculty, to facilitate the teaching of the student body, whose size is not under the control of the Department and continues to increase.
- b) To acquire a larger space, to accommodate the new faculty. A space increase of approximately 6,000 m<sup>2</sup> was suggested as desirable.
- c) To limit the size of the student body. It was suggested that current faculty and existing facilities are insufficient to teach the number of students assigned to the Department (120-140 per year)

#### **2) Research:**

- a) To upgrade major equipment, which are aging rapidly.
- b) To establish an Environmental Research / Academic Institute to study the effects of climate change on living organisms and ecosystems.
- c) To promote and strengthen Biotechnology.

### ***Strengths and Weaknesses***

Plans and wishes regarding faculty, students, curriculum and teaching are logical and appropriate. The External Evaluation Committee strongly agrees with the Department.

Plans regarding the Environmental Research Institute are also reasonable, and developed in sufficient detail for a grant application to be submitted. Proceeding with the establishment of this Institute is recommended, assuming that the grant application is funded.

Plans regarding the promotion of Biotechnology are more vague, and therefore difficult to evaluate.

The External Evaluation Committee also recommends the establishment of a Strategic Planning Committee, composed of senior members of the Department, and an External Advisory Board. The purpose of these bodies will be to help the Department develop a vision and a plan for the future (see also other sections of

the report).

- **Strategies, programming and actions.**

**1) Curriculum and Teaching.**

- a) All faculty members participate in discussions on shaping the teaching strategies. Students are also actively involved in matters of academic programming.
- b) The Department collects the required data and teaching indicators. So far, these indicators have pointed to continued progress and they did not suggest the need to change existing strategy.
- c) There is no clear and institutionalized monitoring plan. Such a plan is not currently foreseen by law. Also, there is no institutionalized plan as to how to respond to deviations from current strategies.

**2) Research.**

The role of the leadership, based on the way it is currently understood, does not emphasize the setting of goals and the formulation of long range strategic plans.

**Strengths and weaknesses**

Strategies to address weaknesses discussed in the preceding paragraph have been recommended in previous sections of the report. These include the establishment of a strategic planning committee and an External Advisory Board for the Department.

- **Potential inhibiting factors at state, institutional and departmental level.**

Several inhibiting factors were identified, including:

- 1) Suboptimal governmental funding. Specifically, funding from state sources is minimal and suboptimal at best. This is most prohibitive for new faculty members, who are not given sufficient start-up funds when they are hired. Another problem, also related to the low funding is the insufficient number of faculty for teaching the number of students assigned to the Department.
- 2) Space, which will not be sufficient, if the size of the faculty expands, as recommended.

3) Student unrest, which is motivated by sterile politics and perhaps ignorance.

4) The current mechanism of student selection. a) Current law forces students to choose a path not on the basis of their declared intellectual interests but rather on the basis of where they were accepted given their performance in the entrance exams. b) Universities are not allowed to select their students and they do not have sufficient autonomy to decide on the number of students they can teach effectively with the resources they have. c) The lack of sufficient housing and other support frequently forces students to choose a school based on strictly financial criteria.

5) Insufficient autonomy of the universities, which in addition to the areas discussed above, affects all aspects of university life.

5) Living expenses force many students to work. This makes it difficult for many of them to graduate within the 4 years allocated to their university studies.

6) There is paucity of incentives, such as scholarships and awards for both students and faculty

***Recommendations:***

Most of the problems discussed in the preceding paragraph are problems that can only be corrected at the state level. We therefore recommend that the state assumes the leadership to correct these problems because their correction is vital for the well being and advancement of the Greek society.

### ***E. Conclusions:***

- Conclusions of the E.E.C. and recommendations on:
  - (a) the development of the Department to this date.
  - (b) the Department's quality assurance.

External evaluations of University Departments (Schools) represent a routine and essential tool by which the administration governing the University evaluates the quality of its academic programs. Such evaluations are normally performed by independent panels of peers who can judge a program according to internationally accepted criteria of excellence. As such, we very much support the long due decision to evaluate academic and research programs in Greece.

Notwithstanding the particularities of local realities, which must always be taken into account, academic quality can be judged according to criteria that meet a very broad consensus. First and foremost the evaluation should address the question whether the educational needs of the student body are served adequately at all levels. Education is arguably the only weapon we can give the next generation to address challenges. We therefore consider quality education to be not a privilege but a right for our students. Moreover, we see public universities and the broad and egalitarian education they provide as the life line of our country. It is in this spirit that we evaluated the Department of Biology of the University of Crete.

#### **An overall assessment of The Biology Department**

The quality of the academic programs, the faculty and the students is excellent, possibly exceptional. The department, which is nevertheless not free of problems, provides truly high quality, up to date education to its students at all levels. This assessment is supported by a track record indicating that biologists graduating from the University of Crete are competitive for positions in the best Academic Institutions and enjoy considerable success once in these positions. It is not a coincidence that some of the most successful Greek biologists have graduated from this department.

#### **The Faculty**

We consider that the quality of teaching and the quality of the educational programs of a university are inextricably linked to the research activities of the faculty. It is not an accident that the best research universities have also the best academic programs and attract the best students. Based on these criteria, we found the faculty to be of very high quality. We were particularly struck by some of the youngest members of the faculty, whom we found to be exceptional. This is indicative of the competitiveness and overall academic strength of the department,



which allows it to attract exceptional young people.

We recognise the fact that the Department of Biology must teach a broad spectrum of subjects and we do understand that this is not a trivial endeavour. However, existing strengths should also not be diluted by hiring without consideration to what already exists. The Plant Biology group (five PIs) offers an example. This group is quite strong in both teaching and research. However, the recent retirement of Dr. Nikos Panopoulos and the upcoming retirement of Dr. Roubelaki will weaken the group significantly. We recommend that the vacant position of Dr. Panopoulos should be filled with a junior faculty member in the area of Plant-Microbial interactions (Symbiotic Nitrogen Fixation or Plant pathogen interactions), while the position of Dr. Roubelaki should be filled with a Plant Molecular Geneticist.

We commend the fact that each member of the faculty, all of whom have in our view unusually heavy teaching loads, is taking teaching and indeed the mission of the University as a cradle of education in Biology, very seriously.

### **Leadership**

The present but perhaps more importantly the future of an academic department does rest upon a continuing vision that goes beyond simply replicating what already exists. Given the rotating nature of the Department Chair, the governing rules of the University and many other factors, including the local realities one must take into account, the department would greatly benefit, in our view, by a standing “strategic planning” committee. Such a body could be composed of faculty members and possibly aided occasionally by outside advisers and would have as a goal to articulate, discuss, encourage and debate academic directions, new initiatives etc. We also believe that the Department would benefit greatly by an external advisory committee, which will help it to articulate an exciting and realistic future plan.

### **Students**

We saw a small number of undergraduate and graduate students and were invariably struck by their drive as well as their attitude. Even though such interviews are, by their nature, superficial, we can say without reservation that the impressions they gave us were equivalent to the impressions we have from students in the best Universities in Europe and the United States. We left the interview with a sense that the human capital is exceptional and were consequently particularly saddened and very much alarmed by the student disruptions we witnessed.

It seems quite clear from all the enquiries we made that there is a very small minority of students who are capable of imposing their views essentially by force. Any view should be permissible in an academic institution but the imposition of

the minority view by force is profoundly undemocratic and dangerous. Yet we witnessed the impotence of the university authorities to address this deeply undemocratic behaviour and were frankly struck by the extraordinary assessment of the department that we were in danger of being physically assaulted by the most aggressive of these students who opposed any evaluation by anyone except themselves.

We wish to submit that if the will or the ability to address this problem is lacking, then all evaluations seem moot. This is not the atmosphere that will allow our students to prosper and hence, if we do not address this problem, we will fail to support the University in its mission. If after all the struggles many of us witnessed or participated in over the years to ensure academic freedom, which in some occasions included sacrificing human lives, have been reduced in accepting that a small minority imposes by force their views, then we cannot properly educate our young people and indeed we are failing them completely. The best that have the fiscal means to leave will leave the country and those who do not, seem condemned: Unacceptable prospect.

We strongly recommend that the Greek State effectively intervenes to resolve this problem because inaction would endanger the education of the next generation.

### **Financial support**

Saying that the financial support the department receives is poor is stating the obvious. There are however, some particularly important shortcomings we have seen. One of the most striking is the fact that students working in various research laboratories may not be compensated. It is not acceptable that students have to work without any form of compensation. There have been instances, we understand, where the research support for a laboratory has been lost providing the students with the option to either work without compensation or abandon the program. Given the extreme unpredictability of research grant availability in Greece, obliging the Department to operate without a financial cushion that will protect students when faculty funding is lost, is a serious problem.

The students we interviewed indicated that a substantial number of undergraduates is financially obliged to work in order to cover their room and board. Needless to say that such an activity interferes with their studies. Supporting the existence of Universities outside the big urban centres (Athens for example) must be paralleled with the recognition that many, if not most, students are away from home and that this fact represents a financially non trivial problem.

We are judging the quality of the faculty heavily on the basis of their research, as we should. In the experimental sciences, including Biology, research needs serious financial support. Thus, a newly appointed faculty member needs financial support to start his/her lab, until he/she attracts external funding. Moreover, an established lab needs dependable and continuing support. However, start-up funds

are not commonly provided in Greece and the availability of research funding, and indeed the predictability of when and even whether public granting agencies will announce the existence of competitive funding programs, is extremely erratic. Thus, while in the Department of Biology most people seem to have some level of funding, the erratic nature of the funding process makes it very difficult, or impossible for them to make long range plans. This is a problem every academic researcher faces in Greece but we need to articulate it very clearly for the authorities.

As stated throughout this document, the close link between quality research and quality education of students, is one, but not the only reason to emphasize the need to support research in public universities.