



## **The Committee for the Evaluation of Statistics Study-Programs**

### **University of Haifa Evaluation Report**

**May 2010**

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## Chapter 1 - Background

At its meeting on October 07, 2008 the Council for Higher Education (CHE) decided to evaluate study programs in the fields of statistics during the academic year 2009-2010.

Following the decision of the CHE, the Minister of Education, who serves ex officio as a Chairperson of the CHE, appointed a Committee consisting of:

- **Prof. Abba M. Krieger, Statistics Department, Wharton School, University of Pennsylvania – Committee Chair**
- **Prof. Robert Adler, Faculty of Industrial Engineering and Management and the Faculty of Electrical Engineering, the Technion**
- **Prof. Peter Bickel, Department of Statistics, University of California, Berkeley**
- **Prof. Onno Boxma, Department of Mathematics and Computer Science, Eindhoven University of Technology**

*Ms. Noa Nof Steiner* - Coordinator of the Committee on behalf of the Council for Higher Education.

Within the framework of its activity, the Committee was requested to:<sup>1</sup>

1. Examine the self-evaluation reports, submitted by the institutions that provide study programs in statistics , and to conduct on-site visits at those institutions.
2. Submit to the CHE an individual report on each of the evaluated academic units and study programs, including the Committee's findings and recommendations.
3. Submit to the CHE a general report regarding the examined field of study within the Israeli system of higher education including recommendations for standards in the evaluated field of study.

The entire process was conducted in accordance with the CHE's Guidelines for Self-Evaluation (of October 2008).

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<sup>1</sup> The Committee's letter of appointment is attached as **Appendix 1**.

## Chapter 2 - Committee Procedures

The Committee members received the self-evaluation reports in February, 2010, and discussed them via email.

The Committee held its first meeting on March 7, 2010, during which it discussed fundamental issues concerning higher education in Israel, the quality assessment activity, as well as statistics study programs.

In March 2010, the Committee visited the four institutions offering statistics study programs, at Tel-Aviv University, University of Haifa, the Hebrew University and Bar-Ilan University. During the visits, the Committee met with various stakeholders at the institutions, including management, faculty, staff, and students.

This report deals with the **Department of Statistics at University of Haifa**.

The Committee's visit at the University of Haifa took place on March 10-11, 2010. The schedule of the visit, including the list of participants from the institution, is attached as **Appendix 2**.

The Committee thanks the management of the University of Haifa and the Department of Statistics for their self-evaluation report and for their hospitality towards the Committee during its visit at the institution.

## Chapter 3: Evaluation of the Statistics Department at University of Haifa

*\* This Report relates to the situation current at the time of the visit to the institution, and does not take account of any changes that may have occurred subsequently. The Report records the conclusions reached by the Evaluation Committee based on the documentation provided by the institution, information gained through interviews, discussion and observation as well as other information available to the Committee.*

### **Introduction**

The Department of Statistics in the University of Haifa was established in 1968 and operates in the Faculty of Social Sciences. The Department has 16 faculty members, whose research is classified in seven areas: Theory of Statistics, Applications of Statistics, Biostatistics, Applied Probability and Game Theory, Actuarial Studies, Logistics and Operations Management, and Quality Studies. The latter three are related to three professional programs offered by the Department.

During the 2008-09 academic year, The University of Haifa student population was over 17,000, of whom roughly 10,000 were at the undergraduate level and nearly 6,500 at the graduate level. The same academic year, 147 undergraduate students, 74 Master's level students, and 3 doctoral students enrolled in the Department, and it granted 113 BA degrees, 60 MA degrees and 3 PhD degrees.

Overall, the Committee had a very positive impression of the Department; most faculty members are very productive, a substantial number publish in highest level journals and the rest in journals of good quality. The collegiality and general atmosphere in the Department is excellent, and the word "family" came up on several occasions to describe it. The Department is also very entrepreneurial. For example, it saw a need to train actuaries since such a program did not exist in Israel. It filled that void by creating a sizable masters program of high quality.

The Department faces a problem common to the University of Haifa - a body of undergraduate students most of whom are poorly prepared, and who on the whole see the University as a training ground for government and industry. Their response in recent

practice has been to make appointments on the basis of research potential while fulfilling their training mission. In the past, some appointments have been driven by the development of specialized masters programs. We will discuss the extent to which the two models have served the Department and the University, as well as their weaknesses, in subsequent sections. The Committee feels that the dual mission of training students for academics and industry is not realistic, particularly given the quality of the students and the nature of the programs.

The self-evaluation report of the Department was written by various faculty members and overseen by the Department head. Faculty members had an opportunity to review the document and make suggested changes. Unfortunately, the report was, in parts, rather vague, terms such as “ineligibility for a degree after 3 or more years” were undefined and figures such as teaching loads were hard to interpret. However, we were able to clarify most of these matters in our conversations during the visit.

### **Environment**

The Department of Statistics at the University of Haifa resides within the Social Science Faculty. Consideration has been given to create a new school of Quantitative Studies that would include statistics along with economics, mathematics and information studies; however, such a plan is in an embryonic stage.

The administration of the University has very high regard for the Department. They feel that currently there is little constraint on faculty hires that the Department may consider (more to be said in the discussion of faculty). Any truly excellent applicant that is brought to the administration will be endorsed, and in fact three such appointments have recently been made.

Statistics is a field that is interdisciplinary in nature. Faculty members in the best international universities have research agendas that include: bioinformatics, machine learning, neuroscience, medicine and virtually all other disciplines. Unfortunately, University of Haifa does not have a medical or engineering schools, and so local

collaboration in these directions is difficult. Of course, the Technion has both, and the two institutions recently collaborated in an (unsuccessful) attempt to open a new medical school. Moreover, some collaboration has developed between faculty members and counterparts at the Technion. Finally, as is true in most departments, the junior faculty and most of the senior have collaborators in both applied and theoretical research. However, colleagues in allied disciplines to statistics (e.g., medicine and engineering) must be found outside of the University of Haifa. The fact that the university does not have faculty in these key areas remains a difficult feature of the environment.

### **Faculty**

The current faculty size of 16 includes three recent hires, two in biostatistics with bioinformatics interests and one with an operations research focus, specifically combinatorial optimization. These appointments have been opportunistic and we believe properly reflect modern developments in statistics viewed broadly.

The Department faces many retirements over the next six years. The programs in quality and actuarial sciences will be adversely affected by these retirements and to a lesser extent the program in logistics. What has happened in the past is that faculty members whose research interests were aligned with an area filled the void by at least teaching in that area. Both this model and the opportunistic hiring model should work well in actuarial sciences and in logistics, where operations research and statistics play an important role. The real issue that the Department faces is the Quality Major. This Major primarily serves a teaching function, which of course should not be minimized. Although the size of this program has been decreasing (from 78 in 2004/5 to 51 in 2008/9) it still serves an important teaching role in the training of professionals for industry. Our recommendation is to hire faculty on the basis of research quality and the extent to which they represent modern trends in statistics viewed broadly, in the expectation that they will contribute adequately to the training mission of the Department and maintain and elevate the level of its research.

In view of the Administration's support and the change and development of the field we urge the Department to formulate plans with a view to the future.

### **Research**

The faculty members are engaged in good, and in some cases very high-quality, research in many areas of statistics and operations research. Publications are in journals ranging from the reputable to the premier. Active research, reflected in high productivity, is in many areas, including: mathematical statistics, statistical methodology, applied statistics, biostatistics, applied probability, operations research and operations management. In addition, there is research in allied disciplines that parallel the programs on the Masters level, most notably actuarial science and logistics. The new hires are involved in research in cutting edge modern areas, including bioinformatics and the borders of statistics broadly viewed, as well as computer science. Collaborators range all over the globe.

All of the faculty members we spoke to are very happy in the Department. There is a collegial and congenial atmosphere.

The teaching load in the Department is eight hours per semester, corresponding to two courses per semester. This is a heavy teaching load in statistics departments in top tier universities. The common teaching load is three semester courses each year where a semester course is generally 3 hours.

### **Undergraduate Programs**

The undergraduate program at the University of Haifa is large, dwarfing the sizes of the comparable programs at other universities in Israel. It is interesting to note that undergraduate statistics programs are rare in the US and when they exist they tend to be small (one of the largest, in Berkeley, has 60 students total). The size of the program at the University of Haifa is approximately 300 students (about 100 in each year).

The main issue is the quality of these students. Even though 2/3 are double majors (of highest quality with economics and computer science) it is felt that the level of the

students is much too low. The Departmental Council has decided to raise the minimum level of mathematics training in high school that is required from BA candidates, but the average Psychometric Test score of admitted BA students is still quite low. Several students with very low test scores are admitted in the framework of an affirmative action policy, as a service to the community.

The drop-out rate of about 40% is similar to other departments in Israel.  $2/3$  drop out of the university entirely, while  $1/3$  transfer to other departments. This is supported by comments made by the faculty who feel that many of their students are exceedingly weak. The aptitude of the students in the classes is therefore extremely heterogeneous, and some faculty felt that the level of courses was being dragged down by some very weak students. We also heard both at the University of Haifa and at other universities that even the stronger graduates from this program are not well-prepared when they enter masters programs.

The requirements for the double major (60 units of statistics courses) and single major (80 units) are reasonable. However, there are many required courses. In fact, the number of required courses for the double major in the second field is also approximately 60 units, leaving little room for electives. Even though there is an array of electives, students who want to fill requirements in their other major or take courses outside these dual areas are constrained. The University Administration would welcome it if the students would take more courses outside the Department. The students, however, would like to be allowed to take more elective courses from within the Department. Some students wish to take additional mathematics courses, and often face the problem that there are not enough open slots for students from outside the Mathematics Department.

One important component of the undergraduate program is the sequence of applied statistics courses. Students earning grades of at least 75 in the applied statistics course (the first course in the sequence) are permitted to enroll in a course to undertake an individual project. Students who perform well in the individual project are allowed to

take a course centered around the Statistical Consulting Unit (see section on the Statistical Consulting Unit), where they get to see first-hand what statistical consulting is.

An interesting new addition to the BA program is a single-major track in statistics with logistics. This program just started in 2009/10. A single-major track in statistics with actuarial studies is also being considered.

It is common for statistics departments to teach service courses around the university. Faculty might not prefer this assignment, but it is important to ensure that the standards of such courses are appropriate. Most statistics courses in other departments at the University of Haifa are not under the aegis of the Statistics Department. This is something that needs review.

The students expressed appreciation for the quality of the teachers, for their approachability and care; likewise, they were extremely positive about the attention of the support staff, which made them feel part of the family. For the students with double majors, this compared very favorably with the other departments in which they were enrolled.

A matter of concern reflecting the university's financial situation is the decreasing number of TA's per class and the lack of homework grading.

### **Graduate Programs**

There are five programs at the Master's level: statistics, biostatistics, actuarial studies, logistics, and quality. Only four students out of 14 applicants were admitted, but none enrolled in the statistics program in 2008/9, and the biostatistics program had 2 students in the first year class. These students are not strong, and, in fact, most dropped out in the first few weeks of the program.

In contrast, the actuarial program had 16 Master's students in the first year class in 2008/9. This is from 52 candidates, approximately 50% of whom were admitted. These

students are the strongest across all masters programs. The actuarial program is unique in its kind in Israel, and is a major reason to join the statistics program.

In 2008/9 there were 21 new students and 35 new students respectively in the quality and logistics majors programs. Both these programs face the problem that some of the students have a too weak background. The logistics program is four years old, and is constantly being improved. Many of the courses in the quality studies program are not statistics courses.

The three programs of actuarial science, quality and logistics are professional in nature. This is underscored by the fact that very few of the courses that comprise the program are being taught by standing faculty members in statistics. Many of the courses in these three programs are being taught on Fridays, to accommodate students with full-time jobs. Each of these programs requires a delicate balancing act; for the real world there is a lack of practice-oriented courses, for research, there is a lack of mathematically-oriented courses.

The students expressed a need for more computer courses and a course in Technical English. Like the undergraduate students, they were extremely positive about the faculty members and secretarial support staff. The students we interviewed, who were all among the best in the Department, indicated that there was considerable heterogeneity in background knowledge in their classes as well.

The Department should consider instituting mentoring and tutoring graduate students with weaker preparation by more advanced students in the same way they do for undergraduates. Such programs have been very successful in some US universities.

There are 11 PhD students registered in the Department. While the PhD students are receiving excellent training in their specific areas of research (due to the quality of the faculty), their broader statistical education is somewhat lacking compared to that available in large US departments.

### **Statistical consulting unit**

The faculty's Statistical Consulting Unit serves two main roles. One is to provide a service to other units within the University in terms of assisting with data collection and statistical analysis, as well as doing external consulting. The second is in the training of graduate students from the applied statistics and biostatistics programs in the applied aspects of statistics and in statistical consulting. This is done in a case studies project and a consulting project. Excellent BA students are also allowed to enter an elective course in which they analyze actual data from the Statistical Consulting Unit.

### **Infrastructure**

The support staff of the Department appears to be very dedicated and efficient, and is much appreciated by both academic faculty and students.

The Department's computing needs exceed those of the average social sciences department, and computing support is insufficient. Not all classrooms have a computer, but the Department does have an extra laptop for teaching purposes.

The Committee visited the library, and was impressed. The library is very good, and much attention is given to purchasing books in statistics.

Overall, the infrastructure appears to be very good. There is a need for more computing support, and for large enough classrooms, with computers; this holds in particular for recitation sessions.

### **Summary and recommendations**

The Department is much appreciated by the University Administration, and is receiving its full support. We were impressed by the vision of the Administration, and its determination to further improve the quality of the University. Likewise, we were impressed by the quality and spirit of the faculty members, by the atmosphere in the Department and the relatively good facilities.

Major concerns are the low average quality of the undergraduate students, and the future of the quality studies program. Our recommendations are:

1. In view of the Administration's support and the change and development of the field we urge the Department to formulate plans with a view to the future. As they have done, in hiring new faculty members, the Department should first and foremost aim for excellence. It should not focus too strongly on hiring for a particular program. The collaborative atmosphere of the Department and the environment are such that strong researchers are likely to gravitate towards one of the key programs of the Department.
2. If no person is hired who is able to lead the quality studies program after the retirement of the present program leader, then one should consider the option of discontinuing that program in the Department of Statistics. The program is running well and is attracting a fair number of students, but it does not fit very naturally in the Department, and is not a critical program.
3. The Department should take additional measures to handle the strong heterogeneity in background knowledge and quality of students, in both the BA and Masters programs. In the BA programs, we recommend to have honors classes for excellent students. In the Masters programs, good students could be paid to tutor student who are weak or lack background. As a side benefit, this will create a stronger sense of community.
4. The Department of Statistics should seek a bigger involvement in service courses for other departments; faculty members of the Department should at least review the syllabi and material of statistics courses in other departments, but these courses would be best taught by the Department of Statistics.
5. All efforts should be made to increase the number of PhD students interested in academic careers. This is important not only for this Department, but for all statistics departments in Israel. Only this will ensure the continuity of statistics and related subjects, so crucial to all areas of research, in Israel.

6. In order to improve the education of research MSc and of PhD students in statistics throughout Israel, the committee is proposing the establishment of a country wide series of advanced courses. Treating the small size of Israel as an advantage rather than a problem, the committee believes that such a series will do a lot to overcome the "critical mass" problem that most Israeli statistics departments are facing. More details on this will be given in the general report.
  
7. To increase the mathematical level of the Department's students, arrangements should be made to help them take courses in the Mathematics Department when they desire to do so.

**Signed by:**

*Abba M. Krieger*

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Prof. Abba M. Krieger,  
Chair

*Robert Adler*

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Prof. Robert Adler

*Peter Bickel*

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Prof. Peter Bickel

*Onno Boxma*

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Prof. Onno Boxma

# Appendices

# Appendix 1





שר החינוך  
Minister of Education  
وزير التربية والتعليم

September 8, 2009

Prof. Abba M. Krieger  
Statistics Department  
Wharton School, University of Pennsylvania  
USA

Dear Professor Krieger,

The State of Israel undertook an ambitious project when the Israeli Council for Higher Education (CHE) established a quality assessment and assurance system for Israeli higher education. Its stated goals are: to enhance and ensure the quality of academic studies; to provide the public with information regarding the quality of study programs in institutions of higher education throughout Israel; and to ensure the continued integration of the Israeli system of higher education in the international academic arena. Involvement of world-renowned academicians in this process is essential.

This most important initiative reaches out to scientists in the international arena in a national effort to meet the critical challenges that confront the Israeli higher educational system today. The formulation of international evaluation committees represents an opportunity to express our common sense of concern and to assess the current and future status of education in the 21<sup>st</sup> century and beyond. It also establishes a structure for an ongoing consultative process among scientists around the globe on common academic dilemmas and prospects.

I therefore deeply appreciate your willingness to join us in this crucial endeavor.

It is with great pleasure that I hereby appoint you to serve as the Chair of the Council for Higher Education's Committee for the Evaluation of Statistics Studies in Israel.

The composition of the Committee will be as follows: Prof. Abba M. Krieger – Chair, Prof. Robert Adler, Prof. Peter Bickel and Prof. Onno Boxma.

Ms. Noa Nof-Steiner will coordinate the Committee's activities.

In your capacity as the Chair of the Evaluation Committee, you will be requested to function in accordance with the enclosed appendix.

I wish you much success in your role as the Chair of this most important committee.

Yours sincerely,

*Gideon Sa'ar*  
Gideon Sa'ar

Minister of Education,  
Chairperson, the Council for Higher Education

*Enclosures:* Appendix to the Appointment Letter of Evaluation Committees

cc: Ms. Riki Mendelzvaig, Secretary of the Council for Higher Education  
Ms. Michal Neumann, Head of the Quality Assessment Unit  
Ms. Noa Nof-Steiner, Committee Coordinator

רח' שבטי ישראל 34 ירושלים מיקוד 91911 • טל' 02-5602330 • פקסמיליה 02-5602246

34 Shivtei Israel St' 91911 Jerusalem. Tel. 02-5602330. Fax 02-5602246

شارع شبطي اسرائيل 34 . اورشليم القدس 91911 . هاتف 02-5602330 فاكس 02-5602246

כתובת אתר ממשל זמין: <http://gov.il>

כתובת אתר המשרד: <http://www.education.gov.il>

# Appendix 2

**Schedule of Site Visit**  
**10<sup>th</sup> – 11<sup>th</sup> March 2010**

**Wednesday March 10<sup>th</sup>, 2010:**

<b>Time</b>	<b>Subject</b>	<b>Participants</b>	<b>Room / Location</b>
09:30-10:15	Opening Session:  The heads of the institution and department	<b>Prof. Yossi Ben-Artzi</b> , Rector <b>Prof. Arye Rattner</b> , Substitute Dean of Faculty of Social Sciences <b>Prof. Avner Halevy</b> , Head of the Department of Statistics <b>Ms. Ruchama Elad-Yarum</b> , Assistant to the Vice-Rector <b>Ms. Michal Daloya</b> , Office of the Rector	Rabin Building 8 <sup>th</sup> Floor Room 8068
10:15-10:45	Meeting with the academic head of the department	<b>Prof. Avner Halevy</b> , Head of the Department of Statistics	Rabin Building 8 <sup>th</sup> Floor Room 8068
10:45-12:15	Meeting with senior faculty and representatives of relevant committees (teaching/curriculum committee, admissions committee, appointment committee)*	Prof. D. Perry, Prof. Ben Reiser (head of the Biostatistics program), Prof. G. Weiss (head of the Logistics program), Prof. Udi Makov (head of the Actuarial Studies program), Prof. Ester Frostig (head of the MA committee), Prof. Alex Goldenshluger (head of the teaching committee), Dr. Yuval Nov, Dr. Anat Reiner, Dr. Danny Segev.	Rabin Building 8 <sup>th</sup> Floor Room 8068
12:15-13:15	Lunch	A. Halevy, D. Perry, B. Reiser, Y. Nov, E. Frostig, A. Reiner, G. Weiss, A. Goldenshluger, D. Segev	Restaurants Plaza Main Building
13:15-13:45	Tour of campus (classes, library, offices of faculty members, computer labs etc.)	A. Halevy, A. Goldenshluger	The Library
13:45-14:30	Closed-door working meeting of the committee		Rabin Building 8 <sup>th</sup> Floor Room 8068

**Thursday March 11<sup>th</sup>, 2010:**

<b>Time</b>	<b>Subject</b>	<b>Participants</b>	<b>Room / Location</b>
09:30-10:15	Meeting with adjuncts*	Ms. Adva Abadi, Ms. Elena Kleiman, Dr. Gil Luria, Ms. Efrat Yaskil, Dr. Nitza Barkan, Dr. Yonit Barron, Dr. Merav Dahan, Mr. David Sagee, Ms. Dvora Melnik	Rabin Building 8 <sup>th</sup> Floor Room 8068
10:15-11:15	Meeting with undergraduate students *	Mr. Yitzhak Pitaro, Ms. Noa Yosef, Mr. Assaf Pazy, Ms. Yasmin Lala, Mr. Eliyahu Cohen, Ms. Rina Graf, Ms. Liron Sekorka	Rabin Building 8 <sup>th</sup> Floor Room 8068
11:15-12:15	Meeting with graduate students and junior academic staff*	Ms. Dafna Beeri, Mr. Itay Datner, Ms. Sophie Rosen, Mr. Aviad Rotboim, Ms. Nafna Nelgabetz, Mr. Bassem Hejazi, Mr. Adi Fuchs, Mr. Alon Peer, Ms. Carine Chen, Ms. Avital Shenhar, Ms. Shiran maor, Mr. Vladimir Landau, Mr. Pavel Goldstein	Rabin Building 8 <sup>th</sup> Floor Room 8068
12:15-12:45	Meeting with administrative staff and IT personnel	Hana Abraham, Administrative Assistant to the Head of the Department; S. Kradstein, secretary; Nadav Azoulay, head of the Faculty's computing team; Igor Gofeld, computer support	Rabin Building 8 <sup>th</sup> Floor Room 8068
12:45-13:45	Lunch and Closed-door working meeting of the committee	Light lunch at the meeting room	Rabin Building 8 <sup>th</sup> Floor Room 8068
13:45-14:30	Summation meeting with head of the department	Prof. Avner Halevy and members of the department staff	Rabin Building 8 <sup>th</sup> Floor Room 8068
14:30-15:15	Summation meeting with heads of the institution and of the department	<b>Prof. Yossi Ben-Artzi</b> , Rector <b>Prof. Arye Rattner</b> , Substitute Dean of Faculty of Social Sciences <b>Prof. Avner Halevy</b> , Head of the Department of Statistics <b>Ms. Ruchama Elad-Yarum</b> , Assistant to the Vice-Rector <b>Ms. Michal Daloya</b> , Office of the Rector	Rabin Building 8 <sup>th</sup> Floor Room 8068

\* The heads of the institution and academic unit or their representatives will not attend these meetings.