The Committee for the Evaluation of Statistics Study-Programs

General 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:[1]

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).

[1] 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, Haifa University, the Hebrew University of Jerusalem 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 Committee's general impression of the field of statistics within the Israeli system of higher education.

The Committee wishes to thank the management of the institutions and the statistics departments for their self-evaluation reports and for their hospitality towards the Committee during its visits.

Chapter 3 - Evaluation of Statistics Study Programs within the Israeli System of Higher Education

Prologue

Programs leading towards a degree in statistics are held in five Israeli universities, all budgeted by the state: Tel-Aviv University (TAU), Haifa University (HU), the Hebrew University of Jerusalem (HUJ), Bar-Ilan University (BIU) and the Technion. Apart from the Technion, all programs offer undergraduate (BA/BSc) and graduate (MA/MSc with/without thesis, PhD) degrees. The Technion offers MSc and PhD degrees only, and has been exempted from the evaluation at its own request, as it will be evaluated internally in 2010/2011.

The reports of the Committee consist of a general report and four specific reports on the four statistics departments under review. The reports are based on the self-evaluations of the departments and site visits, which took place from March 8 through March 17.

We divide the general report on the status of the Statistics departments into three main Sections:

1. Introduction
2. Observations
3. Recommendations

1. Introduction

1.1. Statistics is a highly interdisciplinary field, and its importance is expanding.

Randomness is key to phenomena as diverse as phase transitions in polymer chains, resource demands in computer networks, or data variation in micro-array experiments. Statistics, used in a broad sense (encompassing statistics per se, probability and stochastic operations research) is the science of randomness. It is a branch of mathematics that builds general tools and theories that enable us to understand, predict, and often control, these and the numerous other phenomena that are subject to chance.

It is a multidisciplinary science that takes its motivation from a wide range of scientific fields and industrial applications. Examples are: aging in disordered materials, fluctuations of interest rates, congestion in telephone lines or road traffic, effect of air pollution on health, instability in logistic processes, climate change, or genetic determinants of diseases. Mathematical abstraction allows us to extract a common denominator for the chance mechanisms inherent in such phenomena. The building of a unified mathematical body of concepts and theories relating to randomness has turned out to be extremely useful: from constructing, understanding and analyzing to fitting and optimizing.

The field of statistics is inherently interdisciplinary, its boundaries with other disciplines are blurred, and its importance is expanding, particularly with the availability of high speed computing and the availability of large-scale data sets in many areas. Outside of Israel, statistics as an academic profession is gaining prominence, and all indications are that the same process will occur in Israel in the near future.

1.2 The general state of statistics in universities in Israel is currently very strong, but is at a crucial crossroads.

There are three universities in Israel with independent statistics departments: TAU, HU and HUJ. Each of these departments has faculty members functioning at a high to very high international level. While it is true that none of these departments can compete with the top US departments, this has more to do with their relatively small size and

corresponding inability to cover an appropriately broad class of subjects than it does with the quality of the individual researchers, which is typically very high and occasionally outstanding. Looked at the national level, however, the Israeli statistics community is currently very strong.

There are, nonetheless, serious problems facing the Israeli statistics community in the near future. The statistics department of HU has been steadily growing in size and breadth over the past few years to its current size of 16, partly as a result of its success in establishing large professional degrees in statistics, logistics, and the related fields of actuarial science and quality control. The story in the other three programs, which continue to concentrate on core statistics education, is quite different. The number of faculty members at both HUJ and TAU has dropped dramatically over the last decade, from 20 to 13.5 and 20.5 to 13, respectively. TAU is in a particularly precarious situation given the severity of the financial situation at the university and the retirements of 9 of their faculty members in the coming decade.

BIU, which never had more than 3-4 statisticians, currently has no full time faculty in statistics, although they do have two probabilists. Unless something is done to replace these retirements, the entire academic statistics community in Israel will drop to a size below that of a single major US department. This would be a tragedy not only for statistics in Israel, but also for all other disciplines and professions that rely on it.

1.3 The financial stress that universities face has greatly affected all fields. In particular, it has created barely tolerable and in some cases horrific conditions in statistics departments.

This issue pervades much of the discussion below in terms of faculty, class sizes, resources available to faculty and resources available to educate students.

2. Observations

The observations we make are divided into four areas: faculty and environment; research; teaching; infrastructure.

2.1 Faculty and Environment .

2.1.1 The school or faculty to which the statistics department should belong is an issue for discussion in each of the universities.

The statistics department is in the Faculty of Social Sciences for two of the four departments we evaluated. The statistics department is either in the mathematics department or in the faculty with mathematics departments for the other two programs. The current locations of the departments are consequences of historical decisions and do not always match current academic needs. As a result, the issue of relocation is at the forefront of strategic initiatives at all of the universities.

This issue has tremendous impact on the health of statistics departments in terms of collaborative research, nature of the students that departments can attract, flexibility to hire and nature of departments, particularly given the areas into which statistical research is currently moving.

This concern plays a key role in discussions about the position of the departments. Departments should be able to find their natural homes without concern for external issues. If, for example, faculty slots were allotted (perhaps roughly) to departments, that would ameliorate some of the concerns for being alongside mathematics or computer science.

The statistics program at BIU resides within the department of mathematics. This situation is a difficult one for statistics departments to thrive. In this case it has not been successful; the three statisticians have left.

2.1.2 There will be a need for at least twenty faculty members in Statistics to maintain the current minimal sizes of the departments in Israel.

The pipeline that needs to be filled for the universities to maintain its positions over the next decade is daunting. It should be noted that the current number of faculty members barely supports the discipline. Hopefully the universities will be able to get themselves out of the difficult financial situation that is currently plaguing them. Statistics departments should then grow, thereby requiring even more faculty members in statistics.

The demand for statisticians is even greater. The Technion, the Weizmann Institute and Ben Gurion University also need to hire statisticians. Furthermore, PhD statisticians are in demand in faculties of exact sciences and natural sciences. In addition, statisticians with doctorates are needed in government agencies and in industry.

Where are they to come from?

The Technion, the Weizmann Institute and Ben Gurion University might also be sources of candidates, particularly but not only applied probabilists. The interdisciplinary nature of statistics plays an integral role in providing young faculty members. Academics whose research is at the interface between the exact and natural sciences and statistics have found that statistics departments make excellent homes in which they can flourish. For example, many departments of statistics in the US have been hiring candidates with PhDs from computer sciences and electrical engineering departments. Indeed this has occurred in Israel as well.

2.1.3 The number of faculty positions is usually allocated to a school and divided amongst departments.

The fact that slots are not available to departments, but rather to schools plays a central role in the development of a department. Universities are going through difficult financial times. When a faculty member retires, this person is not necessarily replaced. At best, a position is given to the school and competition occurs for filling this slot.

This has created artificial conditions. It might be better for a department to be well-recognized as a member of the Faculty of Social Sciences (this is the case for HUJ and HU) than to be less well-regarded in a perhaps more natural location (such as the Exact Sciences). It is rare that a department brings two candidates to the hiring committee. This is constraining as it could occur that two excellent candidates are available in one year and none in another. This is particularly an issue at TAU where hiring needs to be at a rate of virtually one per year to maintain its size. The department may be inclined to jump at a target of opportunity even if this does not create the ideal balance across the various sub-disciplines.

Joint appointments – it is natural in statistics for faculty members to have joint appointments with computer science, mathematics or subject-matter departments. The current hiring structure makes this more difficult.

2.1.4 There is an implicit metric that the health of a department is measured foremost by the number of students it teaches.

This perhaps stems from the way funds are allocated to universities, The committee feels that this is propagated within the university as well.

Evaluating departments based on the number of undergraduate students they teach has the following negative impact:

i. This encourages setting the bar for admission too low. The lower the bar, the more students a department will typically enroll, but with compromised quality.
ii. It is difficult to plan particularly since the availability of resources is linked to class sizes.
iii. This in part motivates other disciplines to teach their own statistics courses even if it would be preferred academically for the courses to be taught by faculty in the statistics department.
iv. Tying resources to undergraduate students taught affects decision making. In some cases this is positive, such as the actuarial program at HU. But more often than not, it distorts proper planning. For example, BIU has an undergraduate statistics program without any statisticians that are full time faculty, a situation which is clearly undesirable and unsustainable in the long run.

2.1.5 All three statistics departments have a very collegial environment.

The relationships among faculty are excellent. Caring support people provide a congenial workplace that is appreciated by faculty and students.

2.2 Research

Although the number of academic statisticians in Israel has dwindled, the impact of these statisticians on statistical research and practice remains impressive. There are faculty who have contributed in fundamental ways to the theory and methodology of statistics (e.g., semi-parametric models, sequential analysis and the false discovery rate for dealing with multiple tests). There are faculty who are at the forefront of new developments in statistics (e.g., bioinformatics—for example genome analysis). There are faculty whose research is prominent in classical statistical methodology and applications that motivate these methods (e.g., biostatistics). Faculty serve as editors and associate editors of leading journals in statistics.

Israeli Operations Research is internationally operating at the forefront. There are strong groups in particular subfields of OR in the Statistics departments at HUJ, TAU and HU, but also in Industrial Engineering departments (in particular, at the Technion). Queueing Theory is particularly well-represented; during the review period, five of the 36 associate editors of the flagship journal Queueing Systems had Israeli affiliations. Two of the faculty members in HUJ as well as two of the faculty members of HU are queueing theorists.

2.3 Teaching

2.3.1 There are relatively few undergraduate students majoring in statistics. The quality of these students is in general low.

All of the departments complained about the quality of their undergraduates, particularly in terms of their mathematical backgrounds and skills, and dropout rates hover around 50%. This tradeoff between quantity and quality was often discussed. Of course, one way to increase quality is to increase the standards for admission, however, this would have a deleterious effect on the number of students. Since all central administrations seem aware of the number of students that are being taught, departments are reluctant to increase admission standards.

One initiative which we favor that has been used successfully in other programs to reduce the number of drop-outs is the mentoring of first year students by third year students.

2.3.2 Mission of the Undergraduate Program

The mission of undergraduate programs in statistics is primarily to train students for the workplace. Academics in statistics generally major in other disciplines at the undergraduate level (e.g., mathematics and computer science).

The common primary objective of all of four statistics undergraduate programs seems to have become one of training students for the workplace rather than preparing them for further study. While some students do go on to higher degrees, most higher degree students in statistics actually major in other disciplines at the undergraduate level (e.g., mathematics and computer science).

2.3.3 Service courses

Most Statistics departments teach service courses for other departments. These classes are growing in size and are affected by the lack of resources. Credit for these courses also impacts quality, particularly since the teaching resources of faculty members are strained.

It is educationally sound for statistics courses to be taught by statisticians. However, this places a big burden on statistics departments. The lack of resources has affected service teaching greatly in a variety of ways:

a. There is little tangible benefit provided to statistics departments for teaching these courses. Nevertheless, departments do commit resources to these courses, and this is laudatory.

b. Theses courses are often taught by adjunct faculty members, but without adequate supervision by the department.

c. The class sizes are much too large. This is not only true for the lectures, but even more so for problem sessions (tutorials). These sessions are designed to be of size 15-30, but often exceed 50.

d. Grading of homework is a necessary component to proper learning in statistics. Due to budget cuts, graders are often unavailable and hence homework is not graded. This point is also relevant to the courses for the statistics programs themselves.

2.4 Infrastructure

2.4.1 The availability of support personnel and support resources is at a critically low level, predominantly at TAU but also at HUJ. The conditions are better at HU.

HUJ has one and a half administrative support personnel, and TAU has one to run the whole department. The computing support is also weak. In fact, there are only 1.5 positions at TAU in the School of Mathematical Sciences to meet the needs of 49 faculty members in three departments. The libraries at HUJ and BIU have limited funds to purchase books, and the TAU funds are empty. Nevertheless, the support personnel are extremely dedicated and make a real difference.

The situation at HU is much better. There are more computer support people, and three very caring secretaries provide an excellent environment. The library has a very good collection of books in the field and is up to date on such purchases.

3. Recommendations

3.1 Initiate a graduate network for statistics, that provides high-level courses on a national basis.

Given the relatively small size of Israeli statistics departments, it is difficult for them to cover all the areas of expertise required for a first class graduate education. A similar situation existed some 20 years ago in the Netherlands, a country similar in physical and population size to Israel, in the related discipline of Operations Research, and we propose to adopt their successful solution to Israel for statistics.

We propose setting up a central body for the teaching of upper level masters and PhD level courses in statistics, to which selected students from all universities would be able to come for part of their graduate education. The center would give 2-3 courses a semester, all on the same day, either in a permanent central location or a location that

varies from semester to semester and rotates among the participating institutions. The choice of courses and lecturers would be determined by a committee made up of members of all the participating institutions, and the students would receive credit in their home institutions for courses taken in the center.

We further recommend that this program be open to students from all universities in Israel and not just the four which were the subject of this evaluation. Both the Technion and the Weizmann Institute would have much to contribute (both students and lecturers) in the way of both Applied Probability and to some extent Statistics, while the Technion and Ben Gurion University would similarly have much to contribute in Operations Research. Furthermore, such courses, if planned appropriately, should be attractive to students in disciplines related to statistics, and thus enhance statistics' natural interdisciplinary nature.

While we leave details for the various departments of statistics to formalize, we recommend that the courses in this program be made available only to selected students with an appropriate background, on a competitive basis. By making the courses prestigious they will also become desirable, thus overcoming the natural reticence of Israeli students to travel (within Israel) for their education. In the same vein, we recommend a modest investment from the Planning and Budgeting Committee of the CHE to support this program. The support would be needed to compensate the lecturers and, more importantly, to provide modest scholarships to some of the students, with, again, the aim of adding to the prestige of the courses.

In addition to this easily implementable and low cost program, we also recommend the establishment of a national research center similar to the Eurandom Institute in the Netherlands, and the Statistics and Applied Mathematics Institute in the US. Such a center would significantly broaden and strengthen research in statistics in Israel, enabling the Israeli statistics community, as an integrated entity, to compete with the very best in the world as well as serving as a natural home for the national courses described above. It would also provide an attractive re-entry place for returning Israelis, as well as providing

training for Israeli and foreign postdoctoral fellows, both needed in order to alleviate the problem of a shortage of faculty over the next decade.

Appendices, describing the relevant Dutch programs and institute, are attached to this report.

3.2. The number of faculty members in statistics departments in Israel should be expanded to keep up with the growth in the field

The statistics departments in Israel have been very successful, out of proportion to their size. The leading departments in the US, with similar responsibilities to those of the three departments in Israel, typically have between 15 and 18 faculty members in terms of full-time equivalents. These departments, however, usually have a number of joint positions, which increases the number of permanent faculty associated with a department and significantly adds to its academic breadth.

The historical success of the Israeli departments is being seriously threatened by the ongoing reduction in faculty size. The current sizes of the departments are smaller than they have been, and the departments have reached a point where critical masses are questionable, particularly in view of the points made above regarding the ongoing rapid expansion of the field of statistics.

3.3. The statistics departments should develop long-term plans which include positioning within the university, research-orientation and recruitment strategy.

There is relatively little strategic planning both at the department level as well as at the faculty and higher administration levels that filters down to the department. For the last five years the statistics departments have been struggling with shrinking faculty sizes and deteriorating conditions. In this environment, it is nearly impossible for the departments to engage in discussions about the various sub-areas of the field, efforts to recruit and other strategic initiatives. Nevertheless, it is crucial that strategic planning takes place, particularly since the field of statistics is expanding, resources are limited, there are many retirements, competition for new faculty is fierce and consideration for the location of the department is critical at this time.

3.4 The horizons for hiring need to be expanded to meet the future needs.

The size of departments is a critical issue. This is exacerbated by future retirements, an issue that we discussed above. Some initiatives need to be explored to ensure that the pipeline of potential candidates for recruitment is filled. One suggestion is to look to computer science PhDs as a source of faculty members. The borders between statistics and machine learning are fuzzy, and many statistics departments in the US have been hiring PhDs in the exact sciences and computer scientists with interest in stochastic modeling and data analysis to understand empirical outcomes. HUJ has recently done the same.

Statistics as an academic profession is gaining prominence outside of Israel. Efforts need to be made to encourage excellent undergraduates in the exact and natural sciences (perhaps with majors in mathematics and computer science) to explore the richness in range, intellectual depth and practical importance of statistics research.

3.5 Statistics courses that serve other departments should be taught/overseen by the statistics department.

It was mentioned above that statistics courses in various fields are often taught within the department of that field, often due to budgetary concerns. There is generally a lack of appreciation of concepts in statistics. Statistics is not about how to do say a t-test, but rather which test should be used. More fundamentally, statistics is often misused to arrive at causal statements. Inappropriate analyses leading to erroneous conclusions abound in many areas. Courses need to be designed and taught by statisticians; these courses should be on a conceptual level and engage in the proper analysis of data.

3.6. The statistical laboratories in statistics departments serve dual roles that are invaluable. They have all been hit by the financial crunch. Seed money should be given to these laboratories so that their potential is realized.

HUJ, TAU, HU and BIU all have a statistical laboratory. These laboratories should be performing two important functions. At least one undergraduate and one graduate course

should be centered around the lab for both undergraduates and graduates. Students often find such courses to be the most valuable one, as it gives them a real taste for an application of statistics in the workplace. The consulting courses also serves as a wonderful way of integrating previous studies capstone course.

The other function the statistics laboratory should serve is to provide high quality statistical consulting to members of the research faculty at the university and in some cases to industry and government. There is an almost unlimited demand for such services. The financial constraints universities have been facing have had a real impact on all of the statistical laboratories. They are understaffed both in terms of statisticians and support people. A modest investment of some seed money over the next 2-3 years should provide a real return. In the long run these statistical laboratories should be financially self-sustainable.

Signed by:

Prof. Abba M. Krieger,
Chair

Prof. Robert Adler

Prof. Peter Bickel

Prof. Onno Boxma

Appendices

Appendix 1

שר החינוך
Minister of Education
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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 21st 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

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Appendix 2

APPENDIX 2: The Dutch Graduate Network for the Mathematics of Operations Research (LNMB)

LNMB, the Dutch Graduate Network for the Mathematics of Operations Research, was established in 1987 to facilitate courses for PhD students on a national basis; since 2004 it also offers a sizable number of MSc courses in operations research.
All Dutch universities, including the CWI institute, have joined the initiative from the beginning, making lecturers available without asking a reimbursement, and providing a small annual contribution to facilitate the organization.

The Dutch Ministry of Education, Culture and Science was willing to provide a starting grant. This grant covered the salary of a part-time director, the rent of lecture rooms in a central location of The Netherlands, and five four-year PhD positions.

During the period 1988-2000, four courses per year were given, two in the Fall and two in the Spring. All courses were given on Mondays, one in the morning and one in the afternoon. Each course contained 12 lectures of 120 minutes, and after two years, the cycle of eight courses was repeated. The lecturers were internationally leading specialists on their subject. The average number of participants per course was 23.

Gradually, professors also began to send their best MSc students to some courses. On some occasions, guest lectures (e.g., by researchers from industry) were also provided.

From 2000 till 2004, three courses per day were offered, lasting 90 instead of 120 minutes. Since 2004, LNMB also offers an extensive program of MSc courses.
Presently, three such courses are offered per semester (12 weeks, 90 minutes) next to the PhD courses. The average number of participants for the MSc courses is 50.

PhD courses are concluded with some assignments; and the PhD students receive a certificate after having successfully completed a set of courses. MSc courses are concluded with a written exam. The exam is part of the Master programs of the participating universities.

LNMB has given a strong boost to Dutch OR. As a side benefit, a community of graduate students has been built, and the PhD students have become a more coherent group.

The collaboration between faculty members from various institutes has also be strengthened, as often two persons from different universities jointly give a course. The course program is being discussed by the general board of LNMB, which is composed of representatives from all universities and CWI. Daily matters are being discussed by the executive board, which consists of the director and five other persons.

We finally mention two other activities of LNMB:

1. Once every three years, LNMB awards a prize for the best PhD thesis of the past period;
2. LNMB has organized a few workshops, and once a year it organizes the national OR conference (with lectures by invited speakers from abroad, and also presentations by PhD students).

Details about LNMB may be found in:
http://www.lnmb.nl/general/whatis.html
See also the detailed report "Review of the Educational Activities of the LNMB (1988-2009)" in:
http://www.math.leidenuniv.nl/~kallenberg/ReviewLNMB-1988-2009.pdf

Appendix 3: European Institute for Statistics, Probability, Stochastic Operations Research and its Applications (EURANDOM)

EURANDOM was founded on 30 June 1997 as a European research institute in stochastics. The purpose of the institute was to carry out research in stochastics and its applications on a larger scale than is customary in European universities. Leading scientists in stochastics in The Netherlands felt that, compared to the US, Europe was lacking a concentrated research activity in this important field of mathematics.

Through visits to several countries, international funding agencies and scientific peers were consulted on Europe's need for such an institute, with a sizable junior research staff and extensive workshop and visitor programs. Based on the positive outcome of this inquiry, the Dutch Science Foundation NWO recommended the Ministry of Education, Culture and Science (OC&W) to award EURANDOM with a five-year start-up funding, through a special budget for international facilities (4.54 M Euro). This was supplemented with a start-up funding by NWO (0.45 M Euro) and by the host of EURANDOM, viz., Eindhoven University of Technology (TU/e; 3.13 M Euro).

EURANDOM started as a separate foundation established by NWO and TU/e, with a Board appointed by the two partners. The Board appoints the directors and is assisted by a Scientific Council, advising on matters of scientific policy and strategy. EURANDOM is located on the campus of TU/e and is amply facilitated by TU/e.

Mission statement

The mission of EURANDOM is to foster research in the stochastic sciences and their applications. It achieves this mission by:

1. recruiting and training talented young researchers and helping them to find their way to tenured positions in academia and industry;
2. carrying out and facilitating research through postdoctoral and graduate appointments, visitor exchange and workshops;
3. taking initiatives for collaborative research at the European level.

At the start, strategic choices had to be made to strike an optimal balance between goals formulated in the founding document and available budget. One of the most important contributions of EURANDOM to stochastics is the delivery of well-trained junior researchers. The research staff at EURANDOM consists of internationally recruited postdocs (PDs) with temporary appointments (typically for 2 years). In addition, some PhD students are appointed (typically for 4 years). The choice for a majority of PDs was taken to allow for maximum flexibility in terms of research and supervision. The basic funding allowed for setting up an institute with 20-25 junior researchers, a workshop series of 10-12 per year and a visitor plan for 15 visitor months per year. Except for a full-time scientific director, it did not allow for tenured positions for senior scientists.

Through the involvement of some 10 senior scientists as scientific advisors on a one-day-a-week basis, a wide range of topics could be covered and guidance for the junior staff in the different research programs could be provided. After an initial period of preparation, the first PD arrived in the summer of 1998, and EURANDOM quickly got underway.

Research at EURANDOM is interdisciplinary and is organised in thematic programs around carefully chosen topics that change on a medium-term basis. There is an intensive program of seminars, workshops and visitors. Research progress is reported at scientific conferences and in a series of technical reports, submitted to peer reviewed journals.

After the start-up period, most of the funding for the institute has come from TU/e, NWO, and a large number of grants from the EU, from various foundations, and from industry.

EURANDOM has so far housed 114 postdocs and 31 PhD students, and has organized 101 workshops. Its present programs are:

1. Multivariate Risk Modelling
2. Queueing and Performance Analysis
3. Random Spatial Structures

4. Statistical Information and Modelling

More information on EURANDOM may be found in: http://www.eurandom.nl