



The Committee for the Evaluation of Mathematics Study-Programs

The Bar Ilan University Evaluation Report

August 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 mathematics 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. Benedict H. Gross**, Mathematics Department, Harvard University, USA - Chair
- **Prof. Ronald Coifman**, Department of Mathematics and the Department of Computer Science, Yale University, USA
- **Prof. Hillel Furstenberg (emeritus)**, Department of Mathematics, the Hebrew University, Israel
- **Prof. Gerard van der Geer**, Korteweg-de Vries Institute for Mathematics, University of Amsterdam, the Netherlands
- **Prof. David Jerison**, Mathematics Departments, Massachusetts Institute of Technology, USA¹
- **Prof. Yakar Kannai**, Department of Mathematics, Faculty of Mathematics and Computer Science, Weizmann Institute, Israel

Ms. Noa Nof Steiner and Ms. Marissa Gross - Coordinators of the Committee on behalf of the Council for Higher Education.

Within the framework of its activity, the Committee was requested to:²

1. Examine the self-evaluation reports, submitted by the institutions that provide study programs in mathematics, 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 Prof. David Jerison did not participate in the second round of visits.

² The Committee's letter of appointment is attached as **Appendix 1**.

Chapter 2 - Committee Procedures

The Committee members received the self-evaluation reports in November, 2009, and discussed them via email.

The Committee held its first meeting on January 3, 2010, during which it discussed fundamental issues concerning higher education in Israel, the quality assessment activity, as well as Mathematics study programs.

In January 2010, the Committee held its first cycle of evaluation, and visited the Open University, the Hebrew University, Tel-Aviv University and the Technion. In May 2010 the Committee conducted its second evaluation cycle, and visited Bar Ilan University, Haifa University and Ben-Gurion University of the Negev. 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 Mathematics, at Bar Ilan University.**

The Committee's visit at Bar Ilan University took place on May 10-11, 2010. The participating Committee members were Prof. Benedict H. Gross, Prof. Gerard van der Geer, and Prof. Ronald Coifman. In order to avoid the appearance of conflict of interests, Prof. Hillel Furstenberg and Prof. Yakar Kannai, who have been members of the department, did not participate in the evaluation of this Department. The schedule of the visit, including the list of participants from the institution, is attached as **Appendix 2.**

The Department has provided the Committee in its Self Evaluation Report 2009 with an extremely thorough and frank assessment of its strengths and weaknesses, as well as the challenges it is currently facing. The administration at Bar-Ilan was also impressed with the departmental self-assessment. Many of the issues raised are present in other Israeli institutions. Some, like the pressing issues of space, were peculiar to the department.

Chapter 3: Evaluation of the Department of Mathematics at Bar Ilan University

** 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.*

Background

The Department of Mathematics was established in the mid 1950s with the opening of the university. It offers undergraduate and graduate degrees in Pure Mathematics and Applied Mathematics. Recently, a new program granting an M.Sc without a thesis was opened. In addition to the program for students who start their undergraduate degrees after high school matriculation, the Department offers a Pre-Army Program for talented high school students who finished the high school math matriculation exam by tenth grade.

During the 2008-09 academic year, Bar Ilan University's student population was approximately 18,600. The same academic year 321 undergraduate students, 113 Master's level students, and 51 doctoral students were enrolled in the Department of Mathematics, and it granted 148 B.Sc. degrees, 15 M.Sc. degrees and 6 Ph.D. degrees.

Faculty/Research

This is a department which takes research seriously. The faculty publish in journals of high mathematical quality, and have been extremely successful in obtaining research grants. There are at least ten active seminars, and the Noether center sponsors conferences. The atmosphere is very friendly and cooperative, and encourages collaboration.

The department provides a high level of education for its students. The best students come from the high school program, which is flourishing and has grown to a size of 80 students per year, about half of the undergraduates in the department. However, the general impression is that the level of mathematical preparation of the other entering students has declined over the past ten years. This was echoed at all the other institutions we visited in Israel.

The faculty have recently established a Master's program in financial mathematics, without the requirement of a thesis, and the program currently enrolls between 25 and 30 students each year. The lack of a research thesis is unusual among Master's degrees in science at BIU, but common in Master's degrees in other faculties, such as business administration and law. A few students in the program will be recruited to pursue a PhD degree, but most will finish in four semesters.

The department's previous attempt to establish a Master's program in this area failed. There was an overloading of the personnel with thesis advising, and the faculty member who had been recruited to run the program left in the middle of the academic year. The present attempt seems more promising, and the department is committed to its success. The committee was specifically asked by the administration for its opinion on this program. We feel it is worthwhile and should be supported. The current faculty members who have established the program deserve a great deal of credit. However, they are not experts in this emerging area of mathematics, and a high priority for the department should be to hire a leader in the field to run it. The very existence of this program gives the undergraduates at Bar-Ilan some idea of what they can do with a degree in mathematics.

The faculty has had many discussions on future hiring, without coming up with a real consensus. There is always the debate between representing a general area of mathematics (or statistics, to help cover the financial math program) or hiring the best candidate available, irrespective of field. This has made the process very slow, and

together with the additional time required to get an appointment through the faculty, it has resulted in the loss of several possible candidates. However, we should emphasize that the junior appointments made in the past five years have been outstanding, and represent the real future of the department.

The junior faculty with whom we met were all excited to be at Bar-Ilan, and praised the department for their support.

Teaching

We were surprised to discover that not all teaching of mathematics at Bar-Ilan is done by the mathematics department. The physics department, for example, teaches its own mathematics courses. This is something the University should reconsider, as the mathematics in neighboring scientific fields, such as physics and engineering, is constantly evolving. The basic mathematical tools that a working engineer needs to know in the 21st century are distinct from what he needed to know in the past.

About one third of the teaching in mathematics takes place in other departments at BIU. It was not clear to the committee that the department is getting full credit for this.

The number of undergraduates in mathematics has declined seriously, from 858 pursuing the BSc in 2004 to 322 in 2008. The department doesn't understand the reason for this. Perhaps it is a result of the divorce from computer science. The drop out rate is also quite high. This may be a result of the declining levels of preparation of the entering class. At Bar-Ilan and elsewhere in Israel, the committee recommends a reconsideration of the basic material covered in the first year, with adjustments made to get the students up to speed. This cannot be done by one institution alone, but should be a nation-wide effort.

The undergraduates with whom we met were very happy with the general student atmosphere at Bar-Ilan. Some stressed the convenient location, others the religious orientation.

Infrastructure

A major problem for the department, which was mentioned by all of the groups with whom we met, was the lack of space and the quality of the existing space in the mathematics building. The exterior of the mathematics building is impressive, but the interior spaces have not been properly maintained and are getting run down. The faculty are doubled up in very small offices, with no place to meet with students if a colleague is present. We saw faculty members having conferences with their students in the corridors of the building. The graduate students have almost no space whatsoever, and consequently do all of their work at home. This issue needs to be addressed immediately - the department cannot wait until the CS department moves into a new building. Perhaps some temporary space can be found in one of the buildings on the new campus.

The library should provide some space and resources for the needs of the students and the faculty, but a budget for the purchase of new books is non-existent. Since a good working library is an indispensable research tool for mathematicians (it functions as our laboratory), the inadequate book budget needs to be addressed.

Summary and Recommendations

The Committee recommends as follows:

1. The chair and the vice chair of the department need to become more assertive with the Rector and the Dean about their needs.
2. In particular, the issue of office space for faculty and graduate students is critical, and needs to be resolved immediately.
3. Many of the recently appointed junior faculty should be recruited to join the appointments committee, which should come up with a definite plan of appointments over the next few years. This does not mean that they should be involved in their own tenure decisions. But junior faculty are a tremendous

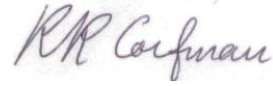
resource for identifying the most promising mathematicians in their generation, and should be encouraged to do so.

4. The department needs to communicate more efficiently with its undergraduates, explaining to them where they can go with mathematics and setting up contacts in industry.
5. The first year curriculum in mathematics needs to be adjusted to the level of preparation of the entering class.
6. The department and administration should commit to the new Master's program in financial mathematics. The first step would be hiring (and retaining) a leader in the field to run it. This is an innovative program, with tremendous potential for the department, the University, and the financial community of Tel Aviv. A Masters thesis should not be required; it is not required for similar programs in the States, or for similar degrees such as law in Israel.
7. The deans and rectors need to work with the Department on a long range plan for the hiring of faculty, and in particular, to accelerate the process of junior hires. This is critical, as retirements will begin to accumulate in the next few years.
8. The department should obtain a larger budget for the purchasing of library books.

Signed by:



Prof. Benedict Gross, Chair



Prof. Ronald Coifman



Prof. Gerard van Geer



Prof. David Jerison

Appendices

Appendix 1- Copy of Letter of Appointment



December 12, 2009

Prof. Benedict H. Gross
Mathematics Department
Harvard University
USA

שר החינוך
Minister of Education
وزير التربية والتعليم

Dear Professor Gross,

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 Mathematics Studies.
The composition of the Committee will be as follows: Prof. Benedict H. Gross – Chair, Prof. Ronald Coifman, Prof. Hillel Furstenberg, Prof. Gerard van der Geer, Prof. David Jerison, Prof. Yakar Kannai. 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- Site Visit Schedule



The Committee for the Evaluation of Mathematics Study Programs

Schedule of site visit

Spiegel Building 216 – Room 201

Monday, May 10, 2010 (26 Iyar 5770)

| Time | Subject | Participants |
|-------------|--|---|
| 08:00-08:45 | Opening Session: The heads of the institution and of the faculty | Prof. Haim Taitelbaum, Vice Rector Prof. Benjamin Ehrenberg, Dean |
| 08:45-09:45 | Meeting with the academic heads of the department | Prof. Ron Adin, Chair Prof. Uzi Vishne, Vice-Chair |
| 09:45-10:45 | Meeting with senior faculty and representatives of relevant committees | Prof. Mark Agranvosky Prof. Louis Rowen Prof. Malka Schaps Prof. Jeremy Schiff Prof. Mina Teicher |
| 10:45-11:30 | Meeting with KAMEA representatives | Prof. Tania Bandman Dr. Yakov Krasnov Prof. Eugeny Plotkin |
| 11:30-12:15 | Tour of campus (classes, library, offices of faculty members, etc.) | <u>Guide:</u> Prof. Malka Schaps |
| 12:15-13:15 | Light lunch in the meeting room | Prof. Kenneth Hochberg Prof. Boris Kunyavskii Prof. Stuart Margolis |
| 13:15-14:00 | Closed-door working meeting of the committee | |

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אוניברסיטת בר-אילן (ע"ר)

לשכת סגן הרקטור

BAR-ILAN UNIVERSITY (RA)

OFFICE OF THE VICE RECTOR

Tuesday, May 11, 2010 (27 Iyar 5770)

| Time | Subject | Participants |
|-------------|--|---|
| 09:30-10:30 | Meeting with junior academic staff | Dr. Gil Ariel Dr. Reuven Cohen Dr. Shahar Nevo Dr. Tahl Nowik Dr. Michael Schein Dr. Boaz Tsaban Dr. Yaniv Zaks |
| 10:30-11:00 | Meeting with undergraduate students | Eran Alouf, Haim Bourla, Liron Cohen, Batel Dahan Moshe Etzioni, David Feldman, Odelia Jakovi, Ohad Navon |
| 11:00-11:45 | Meeting with graduate students and postdocs | Dr. Mira Gonen, Dr. Arkadius Kalka Adi Niv, Luie Polev, Erez Sheiner, Gary Vinokur |
| 11:45-12:15 | Meeting with adjuncts | Prof. Frank Assous Dr. Boris Kriheli Dr. Roni Bitan |
| 12:15-12:45 | Meeting with administrative staff | <u>Offices:</u> Rivka Wolberger Malka Bachar, Miriam Beller <u>IT:</u> Doron Kurzberg, Pinchas Weisberg, Yisrael Yedidya |
| 12:45-13:45 | Lunch and closed-door working meeting of the committee in the meeting room | |
| 13:45-14:30 | Summation meeting with the heads of the department | Prof. Ron Adin, Chair Prof. Uzi Vishne, Vice Chair |
| 14:30-15:15 | Summation meeting with the heads of the institution and of the faculty | Prof. Haim Taitelbaum, Vice Rector Prof. Benjamin Ehrenberg, Dean |

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