

Response on General Report by the Committee for the Evaluation of the School Mathematical Sciences, Tel Aviv University

Faculty

¶1 When the Committee was at the School, four of our top faculty were abroad:
Ze'ev Rudnick, who has recently returned after two years at the Institute of Advance Study at Princeton;

Yehuda Shalom, who, after two years at UCLA, has rejoined the faculty as Full Professor for the academic year 2010/11; there was a real fear that he would not come back;

Leonid Polterovich, who has extended his stay at the University of Chicago for another year, and it is not yet clear if he will return to the School; and

Paul Biran, who has extended his stay at ETH, Zurich for another year and there is a fear that he will not return.

We are also very much aware that several of America's leading universities will offer tempting positions to some of our younger faculty.

¶2 The School is disappointed that a goal has been set to reduce the number of faculty to 45. This information was passed on to the School only informally by the Rector.

¶3 The main aim of each member of the School's faculty is to engage in mathematics as much as possible. Administration of the School reduces the time for mathematics and is a distraction from research, because of the heavy responsibility which falls on the Head of the School. This is the reason the School's Search Committee was unable to find a candidate to take on the position of Head for 2009/10, and turned to the undersigned to fill this position in his last pre-pension year at the School. The reason for this unwillingness to take on the position, in my opinion, stems from the very difficult demands on the School made by the University management with which former heads had to contend (at least in the last ten years). This difficult atmosphere came to a head in the year 2008/9 with the insistence of the Dean and the Rector that the School relinquish several rooms in Schreiber Building to it the School of Computer Sciences, and the former President's incessant hounding of on those responsible for teaching at the School.

¶4 The continuing erosion in the number of the School's faculty and funds has caused a reduction in the level of teaching. The School is doing its best in this respect, but has no choice other than, in some cases, to transfer teaching of courses from faculty members to instructors from outside the University or to research students; tutorials from research students to Masters students, and grading of exercises from Masters students to third year undergraduates, or to give up grading altogether.

Teaching and Learning

¶1 The School gives service courses to the following other units in the University: the Faculty of Engineering, the Faculty of Life Sciences, the Faculty for Management and School of Economics. Within the Faculty of Exact Sciences, the School of Mathematics gives courses to the Schools of Chemistry and Physics, the Department of Geophysics, and the School of Computer Science. In 2010/11, all responsibility for the service courses in mathematics in the Faculty of Exact Sciences will be transferred to the School of Mathematical Sciences.

The plan that the School has prepared for the transfer of responsibility for the different service courses, contains accurate numbers of students taking these courses. It is not clear why these numbers were not brought to the attention of the Committee (in fact I have not been aware that there was a specific request for this information). In any case, appended to these notes is an EXCEL table giving the numbers of students for the year 2008/9.

There are also a small number of mathematics courses given partially or in full by other departments (Physics, Economics, Business Administration, and, in the planning stage, also Life Sciences).

¶2 To assess the standard of teaching and to improve it, I assigned an advisor to each new teacher who is not a permanent faculty member. I also assigned an advisor to other non-faculty teachers about whom we have received complaints regarding their teaching. The advisors were senior faculty members. They sat in on classes given by junior faculty, talked to them and in the end reported to me on the findings. Most of the reports were positive. In cases where improvement was needed, I called the junior faculty member to a meeting and tried to advise him how to improve his teaching methods. A report on this project was given to the Dean of the Faculty. Despite the importance of this initiative, it is just a drop in the ocean and it is important to extend it significantly in the next few years.

¶3 As I wrote in my response to the fourth paragraph of the first section, the continuing drop in the number of faculty and funds, really has led to a lowering in

the standard of teaching, especially in the service courses, resulting in the number of students in each group has risen to an intolerable level and grading of exercises cancelled. On this point, I would like to remark that the School of Mathematical Sciences, in the year 2009/10 assigned 100,000NIS from its savings account, intended for research, for grading exercises in the second half of the first year. In addition, the Director of the University matched this amount. So one can say that we were able to cover the cost of grading all the exercises in the School. Exercises of the students in service courses were not graded in that year. I have to mention that the Faculty of Engineering has decided in 2010/11 to fund the grading of a quarter of the mathematics exercises.

¶4 The adjunct teachers were carefully chosen and do their job well.

¶6 In contrast perhaps to other subjects, mathematics has not changed much over the years. What was once correct remains correct. What has changed is the emphasis on certain directions and the small details. Some of the changes are introduced by the instructors of the various courses. Sometimes it is found necessary to make small changes in the structure of studies. For example, we realized that the “Discrete Mathematics” course given by the School of Computer Science, is not so suitable for the School of Mathematical Sciences. So we exchanged it for two courses, “Introduction to Set Theory” and “Introduction to Combinatorics and Graph Theory”. Also, we added a course in “Probability for Mathematicians” which is based on Measure Theory. These two changes were made on the initiative of some faculty members and with the approval of most of the faculty.

Research

¶1 Another indication of the School’s high standard of research is its placing in the Shanghai rating of mathematics departments world wide. Tel Aviv University’s School of Mathematical Sciences is in 25th place. This is compared with the Hebrew University which was placed between 50 and 75 on the list. Another interesting point is that four of the candidates for a position in the Department of Pure Mathematics have published articles in “Annals of Mathematics,” which is considered the most prestigious mathematics journal in the world.

¶2 The very high level of our faculty (especially in the Department of Pure Mathematics) is the reason why they are “head-hunted” by the leading maths departments in the world. As I mentioned in a previous section, Polterovich and Biran may de-

cide to stay abroad. In addition I have received information that one of our younger faculty may (or will) receive offers from the world's leading mathematics schools.

¶2 The reduction of the Department of Applied Mathematics both in number of faculty and in standing is not only a result of the retirement of several of its members (this also occurs at the same rate in the Pure Maths Department), but also because three of its prominent members left. The late David Gottlieb left for Brown University many years ago; Eytan Tadmor went to UCLA (also several years ago); and Gregory Sivashinsky has taken early retirement. In addition, the Department only rarely finds suitable candidates to recruit. In the year 2009/10 the Department did not put any candidates forward.

As the Committee notes, two new young faculty members are joining the Department of Pure Mathematics in 2010/11, Yaron Ostrover and Ron Peled. Ostrover researches in probability, and in many places (for instance in Germany) probabilists are part of applied mathematics departments. In 2009/10, however, only one new member, Yoel Shkolnitzky, joined the faculty, as part of the Department of Applied Mathematics.

¶4 I agree with the Committee's assessment that the discipline of applied mathematics (or as it should really be called, applications of mathematics) has undergone a significant changes in character over the past twenty years. In my point of view, the change is not only expressed in the applications of mathematics to computer vision, but first and foremost in its application to cryptography and encoding. I am speaking about areas such as Number Theory and Arithmetic Geometry that were considered aspects of pure mathematics only, with no connection to applications of mathematics. The situation today is entirely different. For example, research into Public Key Cryptology problems, now requires knowledge of Group Theory, the Theory of algebraic functions of one variable and in particular the Riemann–Roch Theorem, Rigid Cohomology, the theory of complex multiplication of elliptic curves, Tate Duality, the Weil Restriction, and the theory of abelian varieties over finite fields. p -adic number fields, and number fields.

Finding mathematicians who specialize in these directions can best be done by means of cooperation between faculty members from the Department of Applied Mathematics and the Department of Pure Mathematics who are close to the subject. The most suitable framework for achieving this objective is a combined mathematics department with faculty consisting of members of both the current departments.

STUDENTS

¶1 The high standard of mathematics undergraduates must not be taken for granted, and efforts must be made to preserve it. In particular the core of outstanding students, numbering perhaps fifteen each year, should be nurtured. This should be done by the teachers identifying those students in their first or second year (or in their third year at the latest), and providing them with individual guidance.

¶3 As already said, the School made a special effort in 2010 to provide graders for every undergraduate course needing them. The Committee is right in noting that proper grading can only be achieved if the number of exercises that a grader has to mark is reduced significantly. This requires a further financial effort.

¶3 Following the recent strike of junior faculty their salaries were increased. The University offset this by increasing their teaching workload as much as possible. This was especially notable in the increase in the allocation of exercises per grader, a step which of course was ill-received by them.

¶3 Everything said in the previous paragraph regarding graders applies equally to Master students. It is clear to me that in the University's ongoing sorry financial situation it is very difficult to increase the level of students' financial support. Maybe ways can be found of compensating those students who devote all or most of their time to their studies (similar to the payment made to senior faculty for devoting all their time to the University).

Infrastructure

¶1 In 2009/10 the School recruited one new young faculty member (Yoel Shkolnitzky), and in 2010/11 two new young faculty members (Yaron Ostrover and Ron Peled). Each was assigned his own room. In order for this to be possible, we had to move emeritus faculty into shared rooms. Also, all the research students were moved out of the unpleasant "Barracks" near the library and into the Schreiber Building. In addition, two of the faculty, Zeev Rudnick and Yehuda Shalom, returned to activity in the School. All these changes passed without major upsets. I should note that the School is beginning to feel the need for more rooms, and in the near future, there will be a real shortage. This problem can only be solved by building a new School for Computer Science, and moving that School into it. Unfortunately, the plan to build that building has a very low priority.

¶2 It seems odd to me that the management of the University seems to accept the lack of library funds for the Exact Science Library.

Summary and Recommendations

¶1 I thank the Committee members for its complementary words about the School, and I am worried with them that our very high standards will not be maintainable.

¶2 In the year that I stood as Head of the School, I did my best to correct what needed to be corrected. Despite my efforts, I am aware that what I did was just the beginning. I hope that my successor will continue with these efforts.

Comments on the Committee's recommendations

1. In my view, great things are usually achieved by individuals. The result of a committee's deliberations is the average of the actions of its members, and sometimes tend towards mediocrity. Because of this, I would be inclined to leave most of the work in the hands of the Head of the School. Of course, he is not able to do everything. Therefore, the Head will need to pass on responsibility in certain areas to individual faculty members, who will each agree to take on one assignment.

2. In one sense, the School already has a hiring plan for the next two years. Asaf Shapira has already be appointed Senior Lecturer in Mathematics for 2011/12, and Ruth Heller is well in the appointment process as Senior Lecturer in Statistics for 2012/13. In addition, the Department of Pure Mathematics has its eye on several young mathematicians for 2012/13.

On the other hand, in contrast to other maths departments in the world, the School of Mathematical Sciences of Tel Aviv University has a serious problem in preparing a plan to build up its faculty in the next few years. First, we have not had new appointment slots for many years. For each new appointment we wanted to make, we had to enter into debate with the University authorities, and explain why a particular candidate was so strongly recommended that the University could not do without them. In addition, as the language of teaching in the University is Hebrew, most of our candidates for positions come from the restricted pool of students from mathematics departments in Israel. To our good fortune, this pool contains exceptional candidates. This enables us to maintain the high level of our candidates, but narrows the range of directions they represent. For example, it is difficult for us to find suitable candidates for Arithmetic Geometry.

3. I hope that the flow of funds from the Government to the University, that we have heard of recently, and the declarations heard regularly about the extreme

importance of excellence in academics in the University, will reach the School and enable it to at least hold on to 48 faculty members.

4. Ditto.

5. In my opinion, the best way to maintain the level of the Department of Pure Mathematics and to raise that of the Department of Applied Mathematics is to merge the two departments. Without this merger, I cannot see what motivation there is for applied mathematicians to search for people who can bridge between the two disciplines, as the Committee suggested.

6. The School of Mathematical Sciences can give the best service to the other Faculties in the University who require mathematics only if it is solely responsible for the courses it gives. To reduce the numbers of students in lectures and tutorials, and thereby remove the largest obstacle to good teaching, it is very important that courses be given at different levels and not in units, as they are now. A modest start in this direction has been made by the Faculty of Exact Sciences. I hope this idea will spread in 2011/12 to other Faculties.

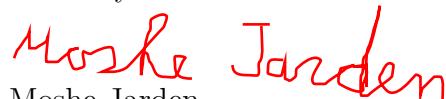
7. In line with the Committee, I hope that the University will take into consideration the important contribution that the School of Mathematical Sciences makes outside the confines of the School to the rest of the University. The University must recognize the importance of the teaching of mathematics the School gives in its service courses, and allocate appropriate funding.

8. I wholeheartedly agree with every word the Committee write in this item.

9. The Committee's recommendation to move the research students out of the "Barracks" next to the library, has already been carried out.

10. Please see what I have written about review of the study programs, in the 6th point of subsection 2.

Sincerely



Moshe Jarden

Head of the School, 2009/10