

**Response to the Report of the Committee for the Evaluation of the
Chemistry Study Program**

**The Sackler School of Chemistry
The Raymond and Beverly Sackler Faculty of Exact Sciences
Tel Aviv University**

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Dear Committee Members,

On behalf of Tel Aviv University (TAU) and the School of Chemistry I wish to express our sincere appreciations and thanks to the distinguished members of the committee who agreed to participate in the process, for their fruitful comments and the very pleasant, friendly and constructive attitude during the meetings and the discussions. I am sure that the entire process and the valuable and important suggestions made by the committee will assist us in performing our mission and in strengthening Chemistry studies at TAU. We wish to refer to some of the points mentioned in the General Report then we will reply to each point raised in the specific report on the School of Chemistry of Tel Aviv University.

General Report

Evidently, we agree with the committee about the central role of Chemistry to any modern futuristic technological society. We indeed expressed our concern that the esteem of chemistry is declining in the eyes of the Israeli public. In addition we also expressed our concern because of the decline in recent years in the high school preparation in sciences in general and in chemistry in particular. We believe that one of the most important means to keep the high level of our program is to attract the best high-school students in the country into our programs. To achieve that goal please note the followings;

First, we believe that the statement in the general report and the call to governmental agencies to act is very important by itself. We should, on one hand, pressure the political and governmental institutions to act on this issue, and on the other hand we should collaborate more with the Ministry of Education and especially with those in charge on science education in high-schools. We believe that we need to participate more actively in the efforts to convince both the high-school students and their parents about the importance and the central role that chemistry has to play in modern society.

In the last years the School of Chemistry of TAU became more active in sending personnel to high-school. In the last three years our program "The wonder of Chemistry" reached about 12,000 high-school students. In addition, we started hosting high-school students for an open day meeting here at the TAU campus. Each year we were able to host on such a day about 300 high-school students. In addition we increased our participation in activities of the TAU Unit for Science Oriented Youth (SOY) and we started to work more closely with Dr. Dorit Teitelbaum (Chemistry Chief Inspector, Ministry of Education) on programs that will bring outstanding high-school students to start their Chemistry studies at TAU already during their high-school studies. This program is still awaiting a sponsor. We also collaborate with the SOY in a special program called "Scientists of the Future" which is designed for the very best middle school students who join it at the end of 8th grade and usually complete part of a university degree in physics by the end of high-school.

Tel Aviv School of Chemistry Report

In general both the strengths, weaknesses and the points raised by the committee were already apparent to us in the self-evaluation process and even before. The relatively small size of our school, the high level of our faculty members, and the fact that our faculties are in charge of nearly all the courses in our teaching programs, enable us to identify problems and appreciate the strengths and the weaknesses of our program relatively fast. The curriculum is under constant evaluation by our students through the students' evaluation process for all courses and through the annual meeting conducted by the Head of School. Each year the Head of the School meets with all the top of the class students, i.e. students who achieved an average grade of more than 85, to discuss the curriculum. This is done separately with first, second and third year undergraduate students.

To carefully study and verify how to implement the suggestions made by the Committee regarding the undergraduate program load the Undergraduate Teaching Committee of the School, together with the Head of School were

assigned to suggest possible changes in the curriculum of the undergraduate program. After the suggestions will be discussed they will be presented to the School Council. Once agreed the changes will have to be approved by all the institutional committees and then by the CHE.

In the following we wish to address the specific comments of the committee.

Undergraduate Program

Point 1: We agree with the committee that the load in our undergraduate programs is high and we wish to promote more undergraduate research during the summer. Please note that currently each student is entitled to *one semester of research* and the students who are enrolled on the research track (major in Chemistry) have to perform *two semesters* of research during their undergraduate studies. In addition, these students participate in the weekly research seminars from the second semester of the first year of their undergraduate program. During the summer, between the second and third year of the undergraduate program, the School offers a two weeks research experience but this is limited to only 15 students because of budget constraints. We will appreciate any assistance to enlarge this program which is now supported solely by the School budget. Please note that in the first semester of the third year we have a mandatory course called “Horizon in Chemistry” the aim being to expose the undergraduate students to “hot” research topics which are part of the research program in our School.

Point 2: We agree that more scholarships for BSc research should be allocated. Currently the School of Chemistry has a scholarship program to attract excellent students. Since, as stated in the general report, the esteem of Chemistry in the eyes of the Israeli general public is declining, the aim here is to attract excellent students to the Chemistry programs. Once they are here we need to have more scholarships to allow them to concentrate on their studies and to perform more research during their undergraduate studies.

Point 3: The drop-out rates are being monitored very closely in the last five years not only in the School but also in the university, and recent years have shown a reduction in the drop-out rates.

Points 4: The problems in the introductory courses in math and in the physics laboratory courses are addressed and discussed routinely between us and the math and physics Schools. In recent years there was a significant improvement in both the math courses and the physics laboratory courses. We believe, however, that some changes are still needed in the physics laboratory courses (for chemistry majors only) since that problem was solved for the Chemistry-Biology double major last year.

The renovation and reorganization of the advanced analytical chemistry laboratory is on the agenda of the School. After much improvement in the last two years in the laboratories of organic and general chemistry the analytical laboratory is the top priority of the School. We tried to get help from different industries in Israel to upgrade this laboratory.

Point 5: Efforts will be made with the university officers to increase the catch-up courses in math and science.

Graduate Program

Point 1: We agree that stipends should be raised to account for the very high cost of living in the Tel Aviv area. This is why the School of Chemistry offers a 200% fellowship to excellent students that enter into their Master or “Direct PhD track” in Chemistry.

Point 2: Regarding the “Direct to PhD” program the committee wants us to adopt the American structure to which we agree in general terms. In fact the School of Chemistry has one of the highest if not the highest rate of “Direct PhD track” students in the University. Currently 35 % of our PhD students are on the “Direct PhD track” program.

Point 3: The number of courses offered is, in our opinion, reasonable and may increase even more if some advanced courses from the undergraduate program will be shifted to the graduate programs. In many of the graduate courses the number of students is small since the number of graduate students is not very high. Increasing the number of courses even more will reduce the number of students in each course to unviable numbers.

Point 4: Indeed we agree with the Committee that graduate courses should emphasize self-learning and we believe that this is the case in many of our graduate courses and we will try to increase it further.

Point 5: Career consulting is given to graduate students by their mentors.

Point 6: The committee recommend: “Graduate student admission should not be linked to the financial consideration of any specific faculty member.” We do not completely understand that point and we cannot agree with the Committee on that matter. All graduate students are entitled to do research and if their mentor cannot support his/her research then this student cannot be admitted. A graduate student can be admitted into a specific research group only if the head of the lab can provide the students with financial support and scientific infrastructure to conduct his/her research. It is the responsibility of each researcher to make sure that he/she accepts students under his/her supervision according to his/her funding possibilities. In special cases where a faculty member undergoes a funding crisis and cannot contribute to his continuing student's scholarships, the school head may consider special financial help from school resources.

Point 7: This issue is under debate in the School Council. To clarify the issue please note that currently on a five years program of “direct PhD track” the student should perform a qualifying project (after one year of research) which the student has to write-up and defend orally before a committee of three faculty members (the student’s mentor and two additional referees). At the end of the second year the student has to write a research proposal to be defended before the same committee. At the end of the third and fourth year of the program the student has to submit a written progress report which is checked by the members of the committee to assess the progress of the research. At the end of the fifth year the student has to give a seminar to the faculty members and the graduate students of his department and write up the Thesis. Just recently (few weeks ago) the School Council voted for a PhD defense. Therefore it is debatable if another meeting is indeed required. Taking into account that we have on the average about 5 PhD students per faculty member this also considerably contributes to our teaching load.

Faculty

Points 1&2: In the last 6 years The School of Chemistry has hired 8 faculty members, so we have many excellent junior faculty members. The average age of our tenure track faculty members, is below 50, which is acceptable. We agree with the committee that hiring the most talented junior faculty members is of extreme importance to maintain the high level of our program. We agree that we need to be more aggressive on that issue and ensure better start-up and infrastructure to conduct high level research. We may need to announce our opening in a way that will reach the broadest population of potential candidates for tenure track. It should be noted that start-up money has improved considerably in the last 7-8 years. Because of the specific geopolitical situation of Israel we think that efforts should be made to bring back home the best Israelis from abroad as a first stage, try to recruit also non-Israeli Jews. Unfortunately our ability to recruit other faculty is very limited given the specific geopolitical state of Israel and other issues.

Point 3: We cannot agree more with the Committee on this point. The number of female faculty members is indeed a problem in the School of Chemistry. Currently only 5% of our faculty members are female a situation that we must change. This is even more of a problem in view of the fact that more than 50% of our PhD students are female. Until now it was mandatory to have a post-doctoral training outside Israel to apply for a tenure track in the School of Chemistry at TAU. It may well be that we need to reconsider this mandatory requirement.

Point 14: We agree with the Committee that the timing of tenure decision should be extended and this was indeed changed by the University which extended it only a few months ago from 5 to 6 years.

Research

Point 1: We agree with the Committee that the advanced analytical instructional laboratory should preferably be in an unshared space and this will be corrected in the next years. The renovation of this lab (including update of the analytical instruments) is on the agenda of the School. After renovation of the organic and general chemistry labs this is the highest priority of the School.

Point 2: We agree that this is indeed a problem. We are negotiating this point with the Vice-President for Research of TAU who is willing to speed up the process. Our Vice-President for Research already started to act on that.

Point 3: Indeed the start-up money at TAU is generally adequate, but we will be more than happy if we could complete the renovation for the new faculty members within 3 months after the arrival of the candidates. We indeed will negotiate with TAU officials to allow that the renovation, or at least some stages of the renovation, will be performed before the arrival of the new faculty member.

Points 4&5: As mentioned the start-up money at TAU is generally adequate, but mid-career funding and funds for updating of departmental instruments is lacking. Both in TAU and nationwide, i.e. the Israel Science Foundation (ISF), more money should be allocated for mid-career renovation and instrumental upgrade. This situation needs to be improved globally as pointed out in the general report.

Point 6: Many of the facilities that contain asbestos were replaced in recent years. We agree that some schedule of the replacement of all asbestos should be made.