



**Committee for the Evaluation of Biology/Life Sciences Study  
Programs**

**Weizmann Institute of Science  
Biology/Life Sciences Program  
Feinberg Graduate School (FGS)  
Evaluation Report**

**September 2010**

## **Contents**

### **Chapter 1:**

Background 3

### **Chapter 2:**

Committee Procedures 4

### **Chapter 3:**

Evaluation of Biology/Life Sciences Programs at Weizmann Institute 5

### **Chapter 4:**

General Recommendations and Timetable 15

### **Appendices:**

Appendix 1- The Committee's letter of appointment 18

Appendix 2- Schedule of the site visit 19

## **Chapter 1 - Background**

At its meeting on October 23, 2007 the Council for Higher Education (CHE) decided to evaluate study programs in the field of Biology/Life Sciences during the academic year 2007-2008.

Following the decision of the CHE, the Minister of Education, who serves ex officio as the Chair of the CHE, appointed an Evaluation Committee for the evaluation of the academic quality of biology/Life Sciences studies in Israel. The Committee consists of:

- **Prof. Michael Levitt, Department of Structural Biology, School of Medicine, Stanford University, USA - Committee Chair**
- **Prof. Ueli Aebi, M.E. Mueller Institute for Structural Biology Biozentrum, University of Basel, Switzerland**
- **Prof. Yigal Cohen, Faculty of Life Sciences, Bar Ilan University, Israel**
- **Prof. Nicole Le Douarin, Institute of Embryology, College de France, France<sup>1</sup>**
- **Prof. Shlomo Rotshenker, Department of Medical Neurobiology, The Hebrew University Medical School, Israel**
- **Prof. Daniel Simberloff, Department of Ecology and Evolutionary Biology, University of Tennessee, USA**

**Ms. Marissa Gross - Coordinator of the Committee on behalf of the CHE.**

Within the framework of its activity, the Committee was requested to submit the following documents to the CHE:

1. A final report for each of the institutions, which would include an evaluation of Life Science study programs, the Committee's findings and recommendations.
2. A general report regarding the status of the evaluated field of study in Israeli institutions of higher education.
3. Recommendations for standards in the evaluated field of study.

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

The first stage of the quality assessment process consisted of self-evaluation, including the preparation of a self-evaluation report by the institutions under evaluation. This process was conducted in accordance with the CHE's guidelines as specified in the document entitled "The Self-Evaluation Process: Recommendations and Guidelines" (October 2007).

---

<sup>1</sup> Prof. Le Douarin was unable to attend the second round of visits due to personal reasons.

## **Chapter 2 - Committee Procedures**

The Committee held its first meetings on May 8, 2009. At this meeting committee members were given an overview of higher education in Israel and a description of the Israeli CHE. They also discussed Biology/Life Sciences study programs in Israel and fundamental issues concerning the committee's quality assessment activity.

During May 2009 Committee members conducted full-day visits to two institutions, Hebrew University in Jerusalem and Tel Aviv University, out of the eight institutions whose Biology/Life Sciences study programs the committee was requested to examine. The committee visited the remaining six institutions, the Academic College of Judea and Samaria in Ariel, Bar Ilan University, the Open University of Israel, the Weizmann Institute of Science, the Technion- Israel Institute of Technology, Ben Gurion University, during March 2010.

During these meetings, the Committee met with the relevant officials at each institution, as well as with faculty members, students, and also conducted a tour of the campus.

***This report deals with the Biology/Life Sciences Program offered by the Feinberg Graduate School (FGS) at the Weizmann Institute of Science (WIS) in Rehovot***

The Committee's visit to the Weizmann Institute of Science took place on March 10 and 11, 2010.

The schedule of the visit, including the list of participants representing the institution, is attached as **Appendix 2**.

The members of the Committee thank the management of the institution and the Faculty of the Feinberg Graduate School for the frank self-evaluation report and for their hospitality towards the Committee during its visit.

## **Chapter 3 - Evaluation of the Life Sciences (Biology and Biochemistry) Program at the Weizmann Institute of Science\***

### **3.1 General Background**

The *Weizmann Institute of Science* (WIS) evolved from the *Daniel Sieff Research Institute* that was founded in 1934 by Chaim Weizmann. In 1949, in honor of Dr. Chaim Weizmann's 75<sup>th</sup> birthday, the Sieff Institute was expanded to a multidisciplinary research center and renamed for Dr. Weizmann. Today, some 2,500 people are engaged in research or work there, with about 245 of them being professors heading research groups that include some 850 scientists. At any given time approximately 1,000 students are working towards their master's or Ph.D. degree, and more than 250 postdoctoral fellows pursue their postgraduate training at the WIS.

The *Feinberg Graduate School* (FGS) was founded in 1958; it is the educational arm of the WIS. The FGS' goal is the advanced training (no undergraduate training; MSc and PhD degrees only, and postdoctoral training) of new generations of creative and original researchers in the natural sciences and mathematics. Hence, all FGD students are directly involved in the research conducted at the WIS. The WGS is chartered as a higher education institution in the State of New York, USA, and accredited by the *Council for Higher Education* (CHE) in Israel.

Studies at the FGS are conducted within the framework of research schools with programs being offered in five major fields of study: Life Sciences, Physical Sciences, Chemical Sciences, Mathematics and Computer Science, and Science Teaching. Roughly 50% each of the students (MSc and PhD), the postdoctoral fellows and the faculty (lecturers, mentors and instructors) of the FGS are engaged in programs in the Life Sciences. Similarly, about 50% of the financial resources of the WIS go into the Life Sciences.

The Life Sciences teaching program is run by the sister faculties of Biology and Biochemistry, both of which are headed by a Dean. In the Faculty of Biology there are four scientific departments: Molecular Cell Biology, Neurobiology, Biological Regulation and Immunology. In the Faculty of Biochemistry there are three scientific departments: Molecular Genetics, Biological Chemistry and Plant Sciences. In addition, there are two service departments affiliated with these faculties: Biological Services and Veterinary Services. Each department is led by a Head of Department.

During the academic year 2007-8 there were a total of 494 students enrolled in the Life Sciences programs, with 128 students studying for an MSc degree and 366 students working towards a PhD degree. In addition, there were 142 postdoctoral fellows registered.

---

\* *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, discussions and observations as well as other information available to the Committee.*

All the research activities at the WIS and the courses offered by the FGS are carried out on one 1,300,000 m<sup>2</sup> campus located in Rehovot.

### **3.2 Executive Summary**

The *Weizmann Institute of Science (WIS)* is first and foremost a cutting-edge research institution. Most significantly, while it is formally an institution for higher education, teaching is voluntary for its academic staff. Thanks to its strong international grant support and the many endowments and donations WIS receives from all over the world, its Life Sciences program is still in good financial shape. As a consequence, its research staff has access to state-of-the-art lab space, equipment and infrastructure and is highly motivated to produce innovative and original research at the cutting edge of biomedical sciences.

The Life Sciences study program at WIS aims to train capable scientists to conduct top-level biomedical research in universities, research institutions and industry. The study program is organized into two schools: the Research School of Biochemical Sciences and the Research School in Biological Sciences. It accepts Israeli and foreign students with a BSc degree for practical and theoretical MSc and PhD studies that culminate in the writing of a thesis and in most cases in one or several publications in international peer-reviewed journals. A generous stipend enables all WIS MSc and PhD students to focus solely on their research without having to work during their spare time. In addition, all students are freed from tuition fees, and each PhD student receives a personal grant of US\$ 4,000 to purchase a personal computer and/or travel abroad to attend scientific meetings.

Studies in the Life Sciences consist of courses (frontal lectures, lab courses and seminars) and practical research, with the primary focus of the studies being hands-on work within the approximately 120 active research groups. Importantly, all educational activities are performed in English at WIS. Since teaching is voluntary, the courses program in the Life Sciences does not include all fields of biology. Hence, students are encouraged - and supported financially - to attend the required courses in other universities. Taken together, the Life Sciences Program at WIS produced an average research output from 2004 to 2008 of 10.3 papers per faculty member with an average of 26 citations per paper. This research output was achieved at a total cost of US\$ 195,044 per paper or US\$ 7,459 per citation. Finally, it should be mentioned that WIS through Yeda Research and Development Company Ltd., the commercial arm of WIS, recognized early on the importance of protecting and administering the intellectual property of its scientists and of moving it from the bench to the global marketplace.

### **3.3 Goals and General Situation**

The mission statement presented clearly and concisely states the major goals of and the general situation at this institution:

*"The Weizmann Institute of Science is first and foremost a research institution. As a result, a major goal of the two Life Sciences faculties is to conduct cutting-edge research into key topics in contemporary life science. Additional goals are to train highly professional scientists and researchers at the MSc and PhD levels, with broad*

*knowledge and proven high research capabilities. The ultimate aim is to prepare these individuals to lead future scientific research in academia and industry."*

As the *Weizmann Institute of Science* is primarily an institution conducting cutting-edge research, it does not come as a surprise that it does not offer an undergraduate training program. Instead the emphasis of the *Feinberg Graduate School's* Life Sciences program is to train graduate students at the MSc and PhD level, and to offer post-docs a superb research environment both intellectually and in terms of instrumentation and facilities.

### **3.4 Curriculum**

#### **Strengths:**

- Both the MSc and PhD curricula in the Life Sciences are very research oriented with a strong emphasis on working in the lab, i.e., at the bench or on the computer, rather than in the classroom.
- The MSc curriculum includes three rotations in three different research groups of the students' choice. These can be anywhere at the *WIS* as long as they have been approved by the Life Sciences Board of Studies. The students like these rotations as (i) they don't have to immediately decide in what area to specialize, and (ii) they are exposed to the interdisciplinary nature of the research activities at *WIS*.
- In addition to the regular MSc-to-PhD track, the *FGS* offers a direct PhD track when one enters the *WIS* Study Program with a BSc. This track derives from the regular MSc program and is offered to *FGS* MSc students towards the end of their 2<sup>nd</sup> year. This combined program lasts 5.5 years instead of 6.5 years (2 years MSc + 4.5 years PhD) for the regular program. Mainly because of selective admission to this program drop-outs are very few.
- The *WIS* actively supports travel by PhD students to scientific meetings abroad, a program that has an immense effect on the students' scientific proficiency and personality. Support is in the form of US\$ 4,000 given by the *FGS* to each PhD student throughout his/her studies for this purpose.
- The Life Sciences program at the *WIS* also includes an MD/PhD program.
- The *WIS* created an MSc program without a thesis to train Israeli science teachers.
- Both the MSc and PhD curricula are taught entirely in English, thereby exposing the students early on to the international language of science and technology.
- The MSc and PhD curricula in the Life Sciences operate entirely on the single *WIS* campus in Rehovot with the program having been in operation continuously since the late 1950s.

#### **Weaknesses:**

- Since the *WIS* does not offer an undergraduate program, the *FGS* students don't have the option to take undergraduate classes to complement/expand their knowledge base in subjects/topics they have not been exposed to previously.
- Some lab and lecture courses that are a "must" for graduate students, for example, in microscopy, biochemistry and biotechnology, are not offered by the *FGS* Study Program.

- Mainly because it is not compulsory for the *WIS* faculty to teach, the *FGS* does not offer the same variety of teaching courses to their students that other institutions of higher education do.
- There are two major tracks in the MSc program: the Biology track and the Bioinformatics/Biology track. The issue arose as to why there is, for example, no immunology track.
- While there is great enthusiasm for the three lab rotations both among the students and the faculty, some students and junior academic faculty think that three months per rotation is too long as this amounts to nine months out of the 2-year MSc program.

#### Recommendations:

- For the sake of optimizing the breadth and depth of its Life Sciences curriculum, the *FGS* may want to critically and constructively reconsider the philosophy and principle that teaching at the *WIS* is not compulsory for its academic faculty.
- Since the *WIS* does not offer an undergraduate program, the *FGS* should make it easier for its graduate students to take undergraduate classes at other universities should they wish to complement their knowledge base in subjects they have not been exposed to previously.
- The *FGS* should find ways to offer all lab and lecture courses that are a “must” (e.g., microscopy, biochemistry and biotechnology) for its graduate students.
- While it is highly appreciated that the *FGS*’ Life Sciences curriculum is designed and optimized for its students to perform outstanding and internationally competitive biomedical research all the way from the bench to the application, by the same token the *FGS* should ensure that each student gets a broad intellectual training that goes beyond their specialty.

### **3.5 Teaching and Learning**

#### Strengths:

- The primary goal of the *FGS*’ teaching program is to train its students to perform practical research by becoming an integral part of the *WIS*’ scientific research groups.
- Towards the above goal, the most important factor in determining the students’ achievements is the level of research they conduct and hence the quantity and quality of publications in scientific journals that emerge from their studies.
- The hands-on research work experience becomes evident also in that often a student is sent abroad to spend time in the lab of a scientist who collaborates with the student’s mentor.
- The *FGS* provides each PhD student with up to US\$ 4,000 during the course of his/her studies for purchasing a personal computer and/or traveling abroad to attend practical courses or scientific meetings.
- Last but not least, *WIS* has a collaboration agreement with the International Schools in Molecular Biology and Neurosciences that are run by the *Max Planck Society* in Göttingen, Germany.

#### Weaknesses:

- Because of (i) the strong emphasis in doing practical research at the *WIS* and (ii) the somewhat limited variety of teaching courses offered by the *FGS*, there is the

danger that some of the students may miss acquiring a broad intellectual training that goes beyond their specialty.

- Many courses are offered only every other year, which sometimes makes it difficult for students to get enough credit points in the first year of their MSc program.
- The fact that teaching is not mandatory at the *WIS* creates the danger that the variety of lecture courses offered by the *FGS*' academic faculty may be sub-optimal for some of the students, particularly those who are looking for a broad intellectual training.

#### Recommendations:

- Find ways to increase the number and variety of courses offered by the *FGS* to its students such that a broad intellectual training is ensured in addition to top performance in practical research.
- Take the feedback and suggestions by the students seriously when faculty choose and optimize the course topics and their variety.
- Since teaching is not mandatory, ensure that the teaching faculty is motivated and challenged, for example, by offering incentives (e.g., rewards and awards) to keep the quality of teaching at the highest level. Ask the students to provide critical and constructive feedback that, in turn, should be taken seriously by the faculty.

### **3.6.1 MSc Students**

(130 MSc students were enrolled in the Life Sciences in 2008 or ~48% of all *WIS* MSc students)

#### Strengths:

- The lab rotations are highly appreciated by the MSc students. In fact, for many this was a major reason for having applied to the Life Sciences program at *WIS*.
- For many students the fact that *WIS* is not simply an ordinary university but an internationally renowned research Institution was an important criterion when they applied for admission to its MSc program in the Life Sciences.
- The large stipend offered by *WIS* attracts many students as it enables them to focus solely on their research without having to work during their spare time. This is in contrast to other Israeli Universities, which do not give their students the same privilege.
- For some students the primary reason for having chosen the direct PhD track is (i) to save one year to get a PhD and (ii) to get a PhD salary after one – instead of two - years.

#### Weaknesses:

- Most courses are offered only once every two years, meaning that the course program is asynchronous with the three lab rotations, the credit points the students have to collect and the research project they have to pursue in the course of their master's thesis.
- While appreciating the strong emphasis on research, some students feel that they are not offered the expected breadth in course work at *WIS*.

#### Recommendations:

- To make it easier for the MSc students to fit them into their tight 2-year schedule, more of the compulsory lecture and lab courses should be offered annually.
- The *FGS* should make efforts to offer the Life Sciences students at *WIS* a broader variety of lecture courses.

### **3.6.3 PhD Students**

(362 PhD students are enrolled in the Life Sciences in 2008 or ~52% of all *WIS* PhD students)

#### Strengths:

- The PhD students appreciate the fact that their entire curriculum at *WIS* is in English. This makes it easier for them to read original research papers, participate in conferences and directly communicate in the course of international collaborations.
- The PhD students are very excited about the international collaborations they get directly involved in during the course of their thesis research.
- The PhD students are very pleased with the superb research infrastructure, facilities and instrumentation, both those within their own research groups and shared facilities.
- PhD students get a great deal of useful information from seminars given by internationally renowned guest speakers that are invited to the *WIS* from all over the world.
- Evidently, some students are also doing an MBA while pursuing their PhD studies. *A priori* this is an added value, as it expands their horizon and broadens their base of professional expertise, thereby giving them the option to consider alternatives to a pure scientist's career.
- The PhD students at *WIS* receive respectable salaries, a condition they highly appreciate.
- The students expressed their satisfaction with the Administration, which they all found is very helpful.

#### Weaknesses:

- A major complaint by the PhD students was the rather limited variety of the course program offered by the *FGS*. In particular, some courses that are a "must" are not offered at the *WIS*, such as, for example, biochemistry, biotechnology as well as a practical course in microscopy (i.e. light, electron and scanning probe microscopy).
- Most PhD students find it impractical to take classes or courses that are not offered at *WIS* in another Israeli institution for higher education. Since they are usually not pressed to do so by the *FGS* faculty, they simply miss out on these courses.
- Many PhD students are unsure about their future career: on the one hand they would like to do a post-doc abroad; on the other hand they are afraid of finding a job upon returning to Israel. Also, some are afraid of the high costs of living abroad.

### Recommendations:

- The *FGS* should find ways to complement and expand its course program so that the *WIS* graduate students can take their “must” classes and courses within their institution or perhaps by organized distance-learning. Similarly, the students should be offered the possibility to broaden their intellectual training beyond their specialty.
- The *FGS* should install a formal counseling/mentoring program for its PhD students to help them in the early planning of their future career, in particular, to confront them with the prerequisites, pros and cons of (i) doing a post-doc abroad versus in Israel, (ii) pursuing a career in an institution for higher education versus in a biotech company, etc.

## **3.7 Academic Faculty**

### Strengths:

- Between 01-Jan-05 and 31-Dec-09 the *WIS* hired 52 new academic staff members at the rank of senior scientist (= senior lecturer or higher). Of these, 20 were hired by the two Life Sciences (Biology and Biochemistry) faculties. In the same period, 27 academic staff members left the *WIS*, 12 of which were in the Life Sciences. This number includes mostly faculty who retired, but also those who left the *WIS* because they were refused tenure.
- Both the Senior and Junior Faculty we met consider their primary mission at *WIS* to pursue cutting-edge basic and in some cases applied research at the forefront of Biomedicine and the Life Sciences more generally.
- The Senior Faculty we met found the three lab rotations by far the best and most effective part of the *FGS*’ Study Program.
- Most of the Senior Faculty at the *WIS* consider teaching a privilege rather than an obligation.
- Most of the teaching faculty we met were very enthusiastic about their teaching activities, despite the fact that most of these had a fairly heavy teaching load.
- Most of the Junior Faculty have a strong desire to teach because they (i) want to be exposed to the students and (ii) have a mission to educate the next generation of scientists.

### Weaknesses:

- The Senior Faculty we met expressed the need for a basic course in immunology. It is currently taught online.
- Most of the teaching by the Senior Faculty is done by six or seven PIs plus a few emeriti.
- Some of the Junior Faculty felt that, while essential, the three lab rotations (three months each) were too long in view of the fact that the MSc study program is limited to two years.
- The Junior Faculty appear to have difficulties recruiting post-docs since most Israeli post-docs go abroad or prefer to join the labs run by Senior Faculty PIs.
- For many Junior Faculty the criteria for obtaining tenure appear to be ill described. Furthermore, they are missing a formal mentoring program that brings them up for tenure. Last but not least, there appears to be no forum for the Junior Faculty to have a conversation with the President of *WIS* in the process of coming up for tenure.

### Recommendations:

- The *FGS* should ensure that the teaching load is more evenly distributed among its Senior Academic Faculty members.
- The *FGS* should install a structured mentoring program for the Junior Faculty members to prepare them for getting tenure. For example, each Junior Faculty member should have a mentor recruited from the Senior Faculty.
- The *FGS* should help its Junior Faculty to recruit post-docs, for example, the Dean should advertise open post-doc positions at *WIS*. Along the same lines, the Dean should make a specific effort to also attract post-docs from abroad, in particular from the USA and Europe, to come to the *WIS*.

## **3.8 Infrastructure**

### Strengths:

- Overall, the infrastructure at the *WIS*, including lab space and equipment, instrumentation and shared facilities, is absolutely state-of-the-art and the best we have encountered among the institutions for higher education visited in Israel. In fact, it compares very favorably with that of some of the best research institutes in the USA, Europe and Japan.
- We were particularly impressed by the *Israel Structural Proteomics Center (ISPC)*. The *ISPC* is supported by the *Divadol Foundation* and is part of the *Integrated Structural Biology Infrastructure* in Europe. It provides service for studying protein structures that are important to the research of individual PIs within the *WIS*' Life Sciences program.
- We were equally impressed by the new *Facility for Genetically Modified Animals*, one of a small number of similar centers worldwide, dedicated exclusively to the production and phenotypic analysis of genetically modified mice. The Facility provides cell lines, tissue culture facilities and expertise to train and assist scientists from the *WIS* and other Israeli research institutes in the production of targeted stem cell clones. A sophisticated *Microscopy and Digital Imaging Unit*, including stereo-, brightfield and fluorescent microscopes with dedicated cameras, and a state-of-the-art confocal microscope, is available for morphological studies and documentation.

### Weaknesses:

- There were no obvious weaknesses spotted

### Recommendations:

- As resources allow, maintain, improve and expand the infrastructure to the extent that it ensures *WIS* scientists to continue staying at the forefront of basic and applied biomedical research and the Life Sciences more generally.

### **3.9 Research**

We evaluated research at Life Science Faculties in a consistent manner using the total number of the citations to all the papers published by current faculty during the five year period 2004 to 2008. This involved web harvesting from the Web of Knowledge (downloading all papers for 2004-2008), data curation (ensure names are correct, eliminate duplication), and special purpose programming (sum the citations for the current faculty of Life Sciences). Using the cumulative Impact Factor of the journals in which each paper was published gives a very similar result although the numbers are different as many journals are not assigned an impact factor. These data as well as other summarizing data are given in Table 1 below.

#### **Strengths:**

- The research performance in the Life Sciences at *WIS* is at the cutting-edge according to international standards. Most impressive, the output in terms of publications in high-impact journals compares with that of some of the top research institutes in the USA, Europe and Japan. As expected, such top performance has its price: US\$ 195,000 per publication (see Table 1). This includes all salaries, student support, expenses for supplies and infrastructure, publication costs etc.
- Both the students and the faculty are very productive in research, so they live up fully to the mission statement made by the *WIS* of being first and foremost a research institution.
- In addition to their intensive lab training, the students receive in-depth experimental and conceptual instructions in research by their supervisors.
- Worth mentioning is *Yeda Research and Development Company Ltd.*, the commercial arm of the *WIS*. *Yeda* initiates and promotes the transfer of research findings and innovative technologies developed by *WIS* scientists to the global marketplace. Since 1971, *Yeda* has registered over 1,500 patents in Israel, Europe and the USA. *Yeda* holds an exclusive agreement with the *WIS* to market and commercialize its IP and generate income to support further research and education. In 2008 this income has amounted to 15-20 million. US\$ or about 7% of the *WIS* budget.

#### **Weaknesses:**

- The highest priority for the students is their research activities. Most of them are less concerned about getting a broad and in-depth intellectual education.
- Since the *WIS* is an institution for higher education, the academic faculty should encourage its students to acquire broad intellectual knowledge.
- Because of their strong focus on research, many PhD students don't think as broadly as they should; for example, they don't put their field of research into a broader perspective.

#### **Recommendations:**

- The *WIS* should continue making all efforts possible to stay at the forefront of basic and applied biomedical research in the years to come. This requires constant critical evaluation of its research portfolio in terms of quality, actuality and priorities. This also means that the financial resources have to be secured in time and complemented if necessary.

- *WIS* via *Yeda* should continue to proactively protect and aggressively market its IP to generate income so as to strongly support its ambitious research portfolio and superior higher education programs.

Table 1: Quantitative Analysis of the Biology/Life Sciences Program at the Weizmann Institute of Science

Topics Evaluated (CHE Appendix)	Evaluation Criteria	Values	Topics Evaluated	Evaluation Criteria	Values
The Academic Faculty	Number of faculty (PI): All	109	Research	<u>Period Analyzed (2004-2008):</u>	
	Lecturers	0	Papers	Total Self-reported	1,418
	Senior Lecturers	27		Total Web of Science	1,126
	Associate Profs.	30		Number of Papers per Faculty	10.3
	Full Profs.	52		Number of Citations per Faculty	270.1
	Active Emiriti	35		Annual Publications per PhD/yr	0.62
	New faculty in last five years	20		Annual Faculty Publications /year	2.06
Retired faculty in last five years	12				
The Students	Number of students: Total (2008)	494	Impact	Number Papers	1,126
	BSc (2006)	NA		Number Citations	29,442
	BSc (2010) as percent of 2006	NA		Total Impact Factor	7,323
	BSc (2008)	NA		Total Impact Factor/PI	67.2
	MSc (2008)	128	Total Support (\$x1000)	Papers with 2 or more Pis	13.9
	PhD (2008)	366		Total Grant Funds (dollarsx1000)	200,000
	Postdocs (2008)	142		Total Graduate Student Funds	19,620
Student / Faculty Ratios	BSc students per faculty (2008)	NA	Resource/ Faculty	Total Research Funding	219,620
	MSc students per faculty (2008)	1.2		5 Year total (US dollars)	\$1,834,862
	PhD students per faculty (2008)	3.4		5 Years PhD Funds per faculty	\$180,000
	Postdocs per faculty (2008)	1.1		Total Research Funding	\$2,014,862
	Ratio of TAs / Faculty	NA		Lab. Space per faculty (m2)	200
The Study Program	Number of Teaching Assistants	NA	Effectiveness	Cost of a Paper	\$195,044
	MSc Student Stipend (NIS/month)	4,600		Cost of a Citation	\$7,459
	PhD Student Stipend (NIS/month)	6 890		Relative Cost of Paper	1.63
				Relative Cost of a Citation	0.87

## **Chapter 4 – General Recommendations and Timetable**

### Strengths:

- Thanks to its significant international grant support and its many endowments and donations WIS continues to operate on a strong financial base so that its research program in the Life Sciences has remained very effective and internationally competitive.
- The *WIS* is an internationally renowned research institution producing an impressive number of high-impact publications in basic and applied biomedical research and the Life Sciences more generally.
- Many highly motivated faculty producing a substantial amount of high-impact research.
- Enthusiastic students at the MSc and PhD levels.
- WIS graduates are internationally very competitive in finding postdoc and eventually even faculty jobs at top institutions in Europe and the USA.
- Yeda Research and Development Company Ltd., the commercial arm of WIS, protects and administers the intellectual property of its scientists and moves it from the bench to the global marketplace.

### Negative points:

- It almost appears that the ethos of the *WIS* is NOT to teach but to put all its human resources, infrastructure etc. into running a cutting-edge research institution.
- Since teaching is not a factor in the decision of whether or not to hire an individual at WIS, and since teaching is not mandatory at WIS, the teaching staff among the academic faculty may not be as responsive to feedback by the students as is the case in more typical institutions for higher education. Hence, it does not come as too much of a surprise that several attempts in the past to offer WIS scientists an organized program of mentoring in teaching have not been successful due to insufficient cooperation by the teachers.
- It was noted that almost 50% of the FGS teaching faculty have received a PhD from WIS. Although the quality of hires is obviously very good, this degree of inbreeding may tend to embed certain programs and approaches in the FGS based more on tradition than merit.
- It was noted that the group performing cutting-edge research on “Biosphere-Atmosphere Interactions” stays in the Department of Environmental Sciences and Energy Research which is not part of WIS’ Biology/Life Sciences Program. As this is a very small Department that houses just one other person working in the general area of ecology, this appears to be a rather suboptimal working environment for the researcher and his group of students. Unfortunately, we did not meet this group during our visit to get their input on this seemingly odd situation

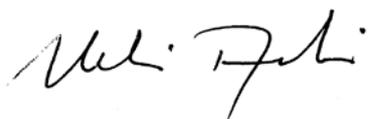
### Recommendations:

- WIS should reconsider its concept that teaching is not mandatory for its faculty. The considerations for this recommendation are explained in the General Report on the subject of “the importance of teaching being compulsory at Israeli institutions for higher education”.
- The FGS should make efforts to offer its graduate students the best possible training, not just to perform cutting-edge research but also to acquire a broad

intellectual education that allows them to address challenges going beyond basic biomedical research.

- The FGS should continue its efforts to organize and run a more effective mentoring program for its teaching staff.
- In preparation of coming up for tenure, the FGS should organize a more structured counseling/mentoring program for its tenure-track faculty.
- The FGS should consider the possibility that the degree of internal faculty hiring (inbreeding) is not optimal in terms of its mission. The considerations for this recommendation are explained in the General Report on the subject of “inbreeding”.

**Signed by:**



---

Prof. Ueli Aebi



---

Prof. Yigal Cohen



---

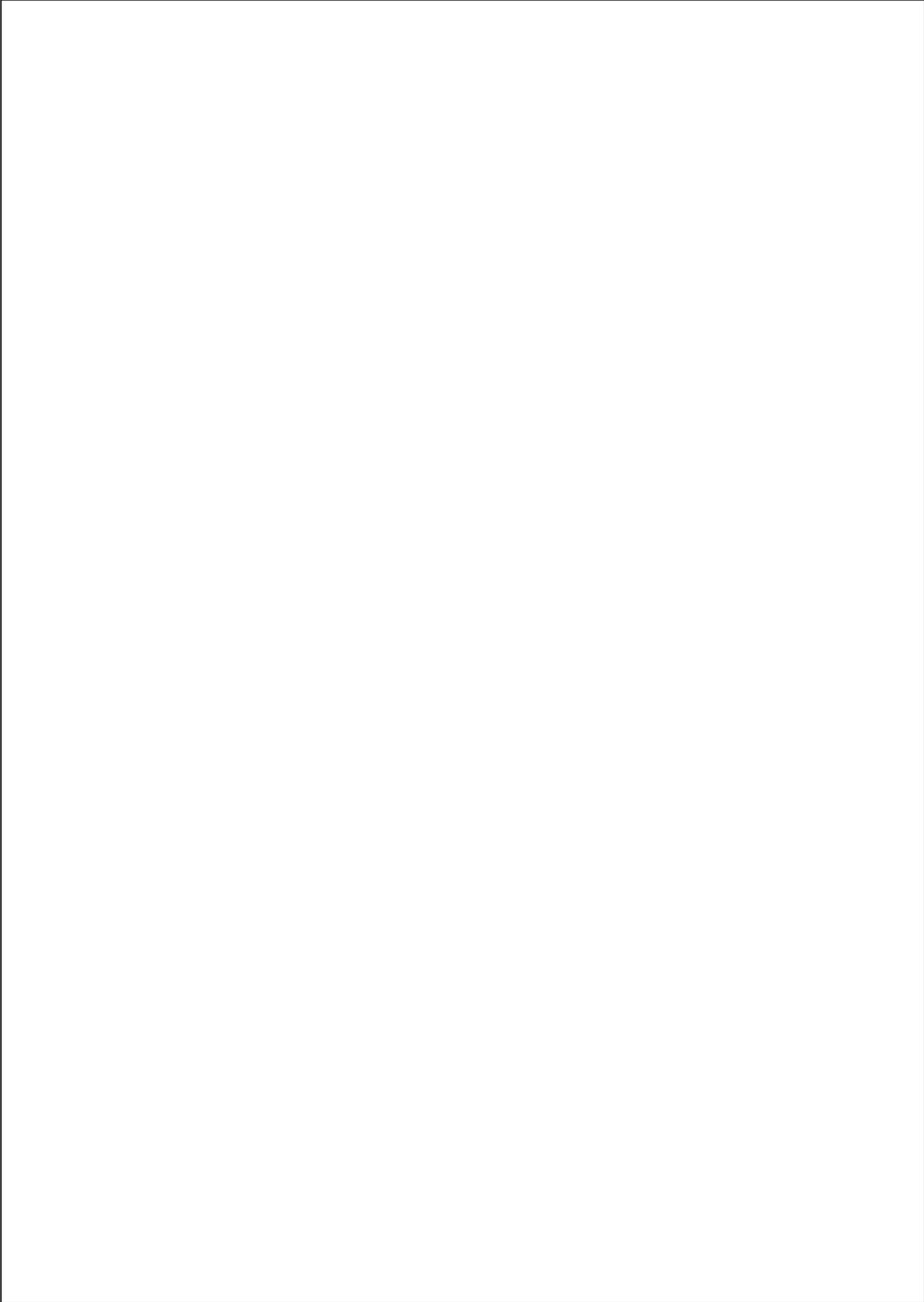
Prof. Shlomo Rotshenker



---

Prof. Daniel Simberloff

Appendix 1: Letter of Appointment (Sample)



## Appendix 2: Schedule of the Weizmann Institute of Science On-Site Visit

### DAY 1

<b>Time</b>	<b>Location</b>	<b>Subject</b>	<b>Participants</b>
09:00-12:15	FGS Conference Room	Closed Committee Meeting	
12:15-13:15	San Martin VIP Dining room.	Lunch	
13:15-14:00	FGS Conference Room	Opening session	<ul style="list-style-type: none"> <li>▪ Prof. Lia Addadi, FGS Dean</li> <li>▪ Prof. Ari Elson, Chair of the Board of Studies in Life Sciences</li> <li>▪ Dr. Ami Shalit, FGS Director and Academic Secretary (appointed to deal with quality assessment)</li> </ul>
14:00-14:45	FGS Conference Room	Meeting with academic leadership of Faculty	<ul style="list-style-type: none"> <li>▪ Prof. Michal Neeman, Dean of Biology;</li> <li>▪ Prof. Zvi Livneh, Dean of Biochemistry</li> </ul>
14:45-15:30	FGS Conference Room	Meeting with the Chair of the Board of Studies in Life Sciences.	<ul style="list-style-type: none"> <li>▪ Prof. Ari Elson, Chair of the Board of Studies in Life Sciences</li> </ul>
15:30-16:15	FGS Conference Room	Meeting with senior academic Faculty*	<ul style="list-style-type: none"> <li>▪ 4 Senior Faculty members</li> </ul>
16:15-17:00	FGS Conference Room	Meeting with Junior academic Faculty*	<ul style="list-style-type: none"> <li>▪ 4 Junior Faculty members</li> </ul>
17:00-18:00		Closed-door working meeting of the evaluation committee	

## DAY 2

<b>Time</b>	<b>Subject</b>	<b>Participants</b>	<b>Room/Location</b>
09:00-09:45	FGS Conference Room	Meeting with M.Sc. students***	<ul style="list-style-type: none"> <li>▪ 4 MSc students (2 first year and 2 second year)</li> </ul>
09:45-10:30	FGS Conference Room	Meeting with PhD students***	<ul style="list-style-type: none"> <li>▪ 4 PhD students (at different stages of their studies)</li> </ul>
10:30-13:00	Tour of campus (Including classes, laboratories, offices of faculty members, computer labs etc.)		The tour will be lead by a Faculty member
13:00-14:00	San Martin VIP Dining room.	Lunch	
14:00-15:00	FGS Conference Room	Closed-door working meeting of the evaluation committee	
15:00-15:30	FGS Conference Room	Summation meeting with heads of the institution and of the department	<ul style="list-style-type: none"> <li>▪ Prof. Lia Addadi</li> <li>▪ Prof. Ari Elson</li> <li>▪ Dr. Ami Shalit</li> </ul>

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

\*\* Please make sure that these are different students than those meeting with the committee the next day.

\*\*\* The visit will be conducted in English with the exception of students who may speak in Hebrew and anyone else who feels unable to converse in English.