

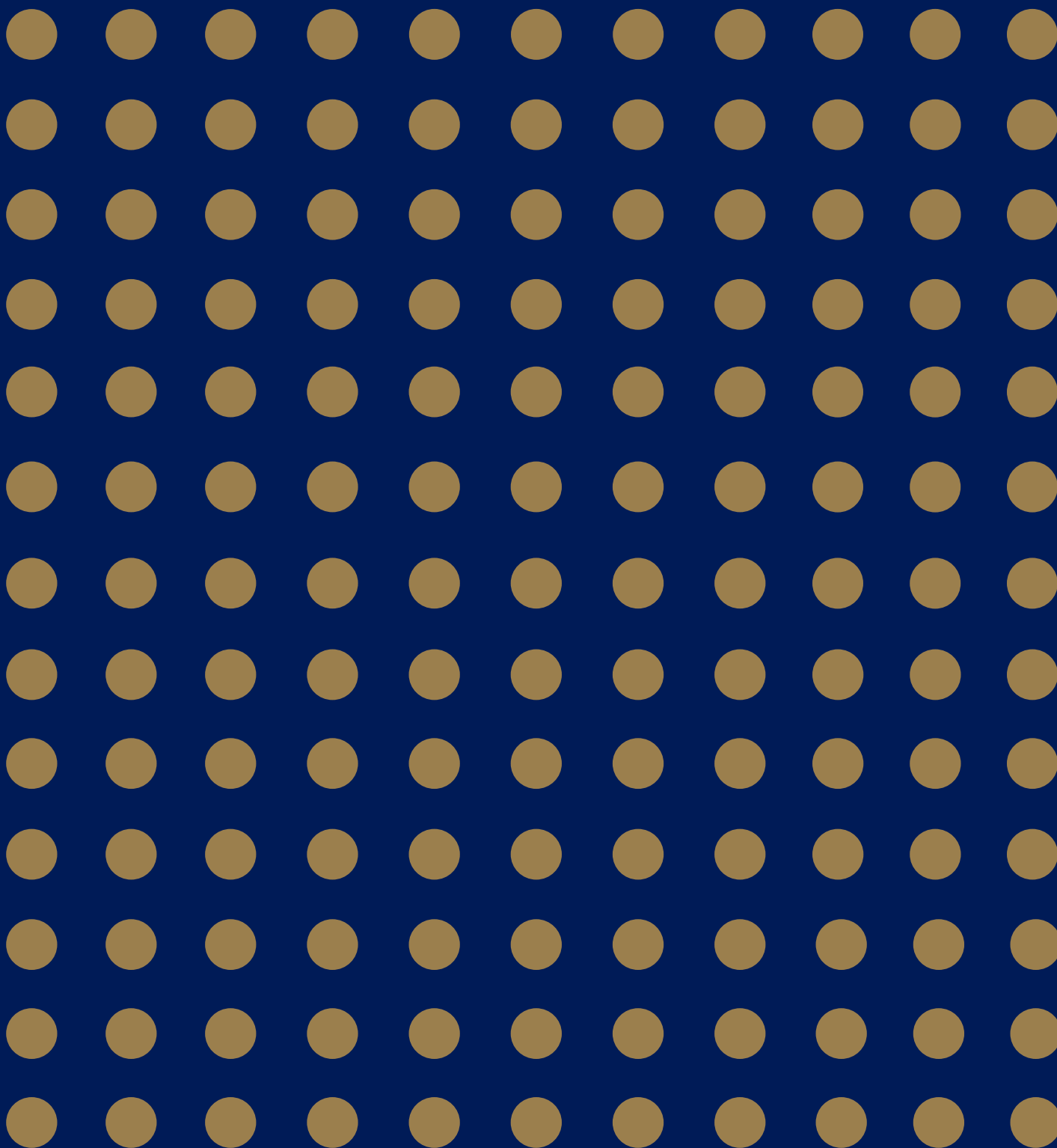
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Samuel Neaman Institute
FOR ADVANCED STUDIES IN SCIENCE AND TECHNOLOGY



Technion - Israel Institute of Technology



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POLICY FOR PROGRESS



Samuel Neaman Institute
FOR ADVANCED STUDIES IN SCIENCE AND TECHNOLOGY



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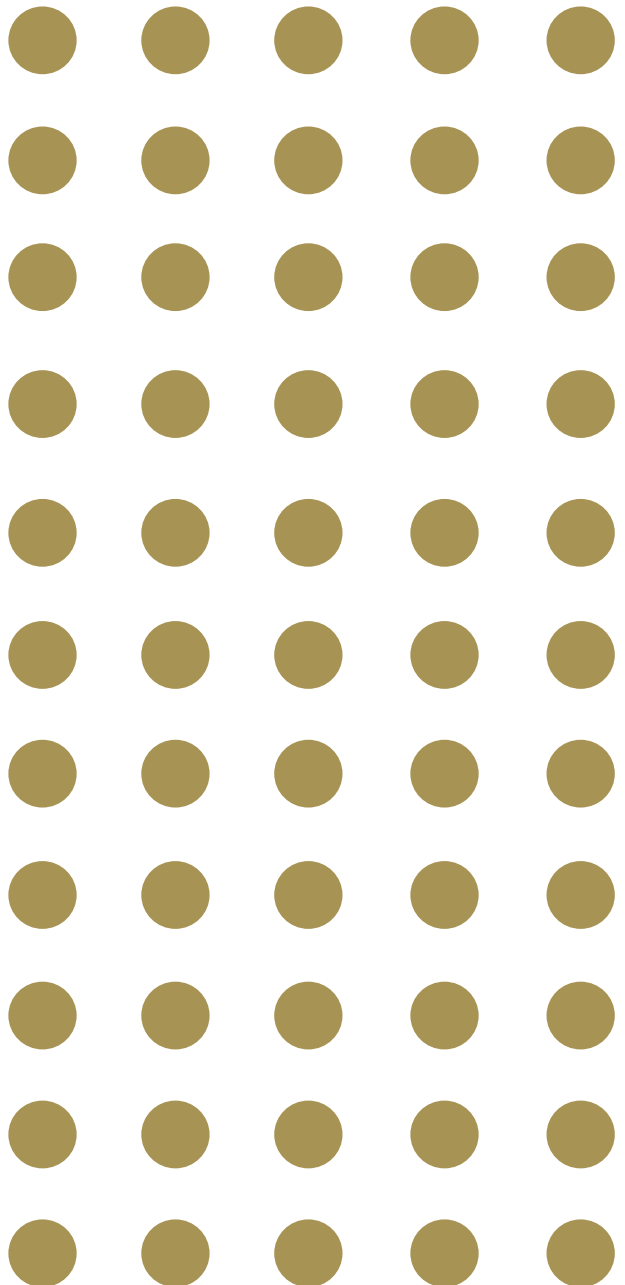


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THE SAMUEL NEAMAN INSTITUTE

The Samuel Neaman Institute for Advanced Studies in Science and Technology is an independent, interdisciplinary public-policy research institute, established in 1978 and located at Technion-Israel Institute of Technology. The mission of the Institute is to research, identify and evaluate solutions for national problems in the areas of science and technology, education, economics, industry, and social development. Through its sponsored research, workshops and publications, the Institute serves as a bridge between academia and decision makers in government, public institutions and industry.

The scope of focus for professional activity at the Samuel Neaman Institute is the interface between science, technology, economy and society. In Israel, as in many parts of the world, science and technology are major driving forces behind economic growth and prosperity, and are making a profound impact on almost all areas of society. As such, the Institute's multi-disciplinary research activity is more important than ever before.

To achieve its mission, the Institute undertakes sponsored research, organizes workshops and implements continuing education activities on topics of significance for the development of the State of Israel. It also maintains a publications program for the dissemination of research and workshop findings. Specific topics for research may be initiated by the Institute, researchers, government agencies, foundations, industry or other concerned institutions. As an independent not-for-profit research organization, the Institute does not advocate any specific policy or embrace any particular social philosophy. Each research program undertaken by the Institute is designed to be a significant scholarly study worthy of publication and public attention.



With its academic and national agenda, the Institute is ideally situated at Technion, Israel's leading scientific-technological university. The Institute draws on Technion faculty and staff, as well as scientists from other institutions in Israel, and specialists from abroad.

As befits a democratic society, choosing among policy alternatives is the prerogative and responsibility of the elected representatives of the citizenry. The Samuel Neaman Institute endeavors to empower the process of informed choice with the authority of academic research.

Origins

The initiative for establishing the Institute in Israel was undertaken by Mr. Samuel Neaman, who resolutely brought the idea to fruition with an agreement signed in 1975 between himself, the American Society for Technion and Technion. It was ratified in 1978 by the Technion Senate. Mr. Neaman, a prominent U.S. businessman noted for his insightful managerial concepts and innovative thinking, as well as for his success in bringing struggling enterprises to positions of fiscal and marketing strength, devoted his time to the activities of the Institute until he passed away in 2002.

Organization

The Director of the Samuel Neaman Institute, appointed jointly by the President of Technion and the Chairman of the Institute Board, is responsible for formulating and coordinating policies, recommending projects and appointing staff. The current Director is Professor Nadav Liron. The Institute Board of Directors is chaired by Professor Zehev Tadmor. The Board is responsible for general supervision of the Institute, including overall policy, approval of research programs and overseeing financial affairs. An Advisory Council made up of members of Technion's Senate and distinguished public representatives, reviews research proposals and consults on program development.



ABOUT SAM NEAMAN

"I was born in Rosh Pina in 1913, the eldest son of Esther and Pinchas Neaman. My mother was born in Rosh Pina and my father was a pioneer of the Second Aliyah. When I was three years old, my migrations began." Thus, Samuel (Sam) Neaman began telling the story of his life in the book "The Land of Israel from Inside and Out" (Ministry of Defense Press). This volume tells the fascinating story of Sam Neaman, following his life's path across Israel, to France, Syria, England, the United States, Canada, Mexico, and onward. Yet throughout all his life's journey, Sam never lost his identification with Israel, which led him, in the 1970's, to establish the Samuel Neaman Center at the Technion.

Sam died on the 13th of November 2003 at the age of 89, and up to his final days he was involved in the activities of the Institute, making invaluable contributions through his innovative ideas and vision. Sam was a well known businessman and philanthropist, who always placed the State of Israel as an ultimate value. His vision, generosity and love for his homeland, which characterized him so well, are what brought him to the realization that Israel needed a research institution that would both support and leverage the advanced technology so impressively developed in the country. Most importantly, this research institution would create a link between researchers and policy makers, giving them the benefit of the wealth of knowledge available in the country's academic institutions.

Sam is no longer with us, but his vision continues to guide all of us at the Neaman Institute. As he would have wished.



Sam Neaman

FROM THE CHAIRMAN

This year we experienced a change of guards at the Institute. After five very productive years in office, the Director of the Institute, Professor Arnon Bentur, left for sabbatical abroad, with Professor Nadav Liron taking over in his stead. Arnon left a lasting mark on the Institute. He formulated a strong, coherent and innovative research program, effectively promoted the national and international standing of the Institute, and reorganized its administrative structure. The Neaman Institute is now recognized as the leading policy research institute on all issues dealing with the science-technology-industry-higher education-environment infrastructure complex. I would like to express my deep appreciation for his contribution. Yet Arnon stays on with the Institute in a different capacity. As a member of the Board of Directors of the Institute, he will be able to continue and contribute his vision and talents to the Institute.

Our new Director, Professor Nadav Liron, who is a Professor of Applied Mathematics at the Technion, brings with him many talents and great experience. Nadav served as Vice President of Academic Affairs at the Technion, and on the national scene, he heads the Compensation Committee of the Council of Presidents of Israeli Universities. I would like to warmly welcome him to the Institute and wish him great success in his new position as Director. Considering the staggering difficulties Israel is facing on so many fronts, most related to the focal areas of the Institute, Nadav indeed faces a formidable task. Yet, I am sure under his leadership the Institute will continue to flourish, fulfilling the wishes and hopes of our late founder, Mr. Samuel Neaman.



Professor Zehev Tadmor



FROM THE DIRECTOR

The formulation of national policy, under optimal circumstances, involves collection of data, research, in-depth evaluation and expert consultation. Yet we are all aware of how little national policy is actually formulated according to these ideals. The irony of the state of our nation, where the finest academic research facilities can exist in almost total isolation from the politicians and decision makers who stand to benefit from them the most, was not lost on Sam Neaman, the founder of the S. Neaman Institute.

The Neaman Institute was established for just that purpose, to create a bridge between the centers of knowledge and research, and the policymakers whose decisions are shaping the nation. Fortified with empirically researched and evaluated position papers, our country's government and industry leaders are better equipped to make the decisions that will influence the course of this country in virtually every area, for years to come. To that end, the Neaman Institute is sponsoring research and disseminating results in the areas of science and technology, education, economics, industry, and social development.

During the past year, we have been gratified to see the extent to which the Institute has succeeded in helping to shape national policy. The Position Paper on Priorities for Environmental Quality, prepared by the Institute, was the subject of a conference that was broadly attended by policymakers from a number of government ministries and industries. The Position Paper was also distributed even more extensively and many of its recommendations are already appearing on the public agenda. An analysis



Professor Nadav Liron

of the chemical industries, researched at the Institute and presented at a conference attended by industry leaders, is providing the background for an in-depth analysis to provide the perspective and insight needed to make sound strategic decisions in this major contributor to the national GDP.

We look forward to continuing in this exciting undertaking, bringing together the country's best minds from academia, government, industry and the private sector, and leveraging our extensive knowledge and research capabilities for the benefit of our nation.

RESEARCH PROJECTS AND ACTIVITIES OF THE S. NEAMAN INSTITUTE

I. Science, Technology, Economy and Industry

- STE
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 - Working Papers
 - Meetings and Activities
 - The Zvi Griliches Research Data Center
- Taxation in Israel
- User Involvement in R&D Consortia in Israel
- Evaluation of Magnetron Program
- Evaluation of the Israeli Technology Incubator Program
- Science and Technology Indicators

II. National Security

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- Economics of National Security Program

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- PRIME
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National Planning

- "From Israel 2020 to Israel 2050"
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Environment

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 - Environmental Education - Green Campus Project
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VI. Where Industry, Government and Academia Meet

- Activities of the S. Neaman Institute in the Magnet Consortia
Information Centers
Magnet Consortia
Magnesium Users Association
 - The Chemical Industry in Israel
 - Entrepreneurship Laboratory
 - Developing an Industrial and Biotechnology Complex in Haifa/N. Israel
-

Science, Technology, Economics) STE PROGRAM

Head of Program: Prof. Manuel Trajtenberg, **Academic Coordinators:** Prof. Dan Peled, Prof. Saul Lach

The Science, Technology and Economy Program is a core program aimed at developing national policy alternatives in the fields of science, technology and economics. Prof. Manuel Trajtenberg chairs and coordinates its activities, aided by Prof. Dan Peled and Prof. Saul Lach. There are about 15 additional researchers participating regularly in the program, mostly economists from various universities and research organizations. This is a novel program in several ways. First, it cuts across university boundaries, trying to bring under one roof the best researchers in the field; second, it is an attempt to harness the vast economic and technical knowledge of the team and apply it to practical policy issues; third, it is meant to educate a cadre of young policy research scholars for Israel, and fourth, it will help place the Neuman Institute and the Technion at the center of national policy making. The activities of this program started in late October 2000, so that we are now in the midst of the program's fifth year.

I. NEW RESEARCH PROJECTS

Following our Call for Proposals issued last year, we received a large number of high quality applications, a fact that reflects the reputation and scope achieved by the STE Program. The academic committee of the STE Program finally selected 11 new projects and three continuation projects, which represent interesting and valuable follow-up research plans. Altogether, we have an excellent group of researchers from various universities and disciplines (including for the first time researchers from Law and Medical faculties), covering a wide range of topics of interest to the Program. In particular, three of the projects focus on Innovation and Anti-Trust, which was a central theme in the Call for Proposals. Following is the detailed list of projects:

I. INNOVATION AND ANTI-TRUST:

1. **"Innovation and Anti-trust: Does the Israeli antitrust regime facilitate innovation"**
Michal Gal and Niva Elkin-Koren, Haifa University Law School
2. **"Antitrust Treatment of RJV for Israel: Survey and suggested guidelines"**
David Genesove, Department of Economics, Hebrew University
3. **"The Interaction of RJV, independent R&D, and market structure: A theoretical and empirical analysis"**
Joel Guttman, Nira Yacouel and Avi Weiss, Department of Economics, Bar-Ilan University

II. HIGH TECH, R&D AND POLICY

4. **"Subsidizing Industrial R&D: A Strategic Equilibrium Evaluation"**
Steve Heckman and Dan Peled, Department of Economics, Haifa University
5. **"Skilled Biased Technological Change: Evidence from the Israeli High Tech Sector"**
Yona Rubinstein, School of Economics, Tel Aviv University
6. **"ICT and Productivity Growth: Lessons for Israel"**
Saul Lach, Hebrew University, and Manuel Trajtenberg, Tel Aviv University

III. SECTORAL EMPIRICAL STUDIES (SEED PROJECTS)

7. **"Growth Profiles in the Israeli Enterprise Software Sector"**
Jonathan Menuhin and Niron Hashai, Business School, Hebrew University
8. **"Development of networks in biotech"**
Dafna Shwartz and Dan Kaufman, Ben-Gurion University

9. **"Technology Transfer by Leading Medical Centers in Israel – Current Situation and Milestones for a Comprehensive Policy"**

Miri Lerner, Tel Aviv University, Business School, and Michal Roll, Director of the Division of Research & Development, Tel Aviv Sourasky Medical Center

IV. DATA CREATION PROJECTS

10. **"Panel of Industrial Firms – long term"**

Haim Regev, Central Bureau of Statistics

11. **"Development of the new varieties database"**

Dan Rymon and Baruch Bar-Tal, The Volcani Institute

V. CONTINUATION PROJECTS

12. **"Justifying Targeted Policies of Strategic Industries: Insights from the Policy-led emergence of Israel's VC Industry"**

Morris Teubal and Gil Avnimelech, The Hebrew University

13. **"Complementary or Conflicting Assets in the Entrepreneurial Process? Theory and an empirical study of the screening process."**

Zipi Shperling, Technion, Faculty of Industrial Engineering and Management

14. **"Balancing Innovation, Quality and Efficiency in R&D Organizations"**

M. Erez, Eitan Naveh, and Ella Miron, Technion, Faculty of Industrial Engineering and Management

Several of the projects supported by the STE program in past years came to completion in the course of this academic year. The results were presented during the periodic meetings of the group, and published in the STE Working Papers series (see below).

II. SCHOLARSHIPS

Since its inception we understood at the STE Program that one of the limiting factors facing policy-oriented

research in this field is the scarcity of economists and researchers in related disciplines that specialize in Science and Technology. It was thus decided to support graduate students in order to encourage them to write dissertations in this area. Since 2000-2001 we have supported 13 students writing MA and Ph.D. dissertations at various universities, and this year we awarded scholarships to the following seven students, all of them pursuing doctoral degrees:

1. **Amiram Porath**, Ph.D. student, Business School, Tel Aviv University

"Creation of Effective Consortia – the Case of Magnet"

2. **Orna Serban Levy**, Ph.D. student, Business School, Tel Aviv University

"Cost of capital inequalities, and the choice between sources of financing"

3. **Guy Navon**, Ph.D. student, Department of Economics, Hebrew University

"Inter-Industry Heterogeneity and Human Capital Spillovers"

4. **Leonid Bakman**, Ph.D. candidate, Business School, Hebrew University

"Identifying Dynamic Capabilities as strategic search processes"

5. **Danny Breznitz**, Ph.D. candidate, MIT

"S&T Industrial Policy in Taiwan"

6. **Dozorev, Alexander**, Ph.D. student, Department of Economics, Hebrew University

"R&D investments: Government subsidies or private financing?"

7. **Guy Ben-Ishai**, Ph.D. student, Department of Economics, Hebrew University

"Mergers and RJV: A comparative study of R&D investment" – evidence from Israel"

III. WORKING PAPERS

One of the intended goals of the STE Program is to influence the national agenda and policy making in Science and Technology. Thus, dissemination of the research outputs resulting from the projects supported is key to the success of the Program. One of the main

vehicles to that end is the Working Papers Series, comprising the end results of STE projects, as well as other papers of related interest, written by researchers connected to the Program. This is the list of working papers published lately (several more are currently in the making):

- Lach, Saul and Mark Shankerman, "Incentives and Invention in Universities." STE-WP-18-2003.
- Miron E., Erez M. and Naveh E., "Do Personal Characteristics and Cultural Values that Promote Innovation, Quality and Efficiency Compete or Complement Each Other?" STE-WP-19-2003.
- Avimelech Gil and Teubal, Morris, "Evolutionary Venture Capital Policies: Insights from a Product Life Cycle Analysis of Israel's Venture Capital Industry." STE-WP-20-2003.
- Bresnitz, Danny, "Innovation and the Limits of State's Power: R&D and Industrial Policy in Taiwan in IC Design and Software." STE-WP-21-2004

IV. MONTHLY MEETINGS

The STE Program continued holding the traditional monthly meetings in which members of the group present and discuss ongoing projects. One of the significant advantages of this forum is that it allows feedback to be provided at earlier stages of the projects in a constructive, sympathetic academic environment, thus truly influencing and helping the researchers reach their stated goals. Such an environment is seldom encountered in traditional academic forums. Each meeting lasts over three hours, and typically includes three presentations, and discussions of additional topics of interest to the group.

In the course of the fall semester of this academic year (2003-04) four meetings were held, comprising presentations of ongoing research projects (including those by scholarship recipients), as well as academic talks. During the spring semester three meetings were already held, and we will have one more as a special session at the Annual Meetings of the Israeli

Economic Association. The latter is important in order to showcase the activities and research output of the STE Program to the wider community of economists. Presenters at the meetings also included senior officials from the Office of the Chief Scientist, and from the Central Bureau of Statistics: in both cases the intention was to strengthen the links with institutions that are key to the interests of the STE, to facilitate future research, and to perhaps influence policy making in this area.

V. OUTREACH ACTIVITIES

In April 2003, Prof. Manuel Trajtenberg presented his work on "Defense R&D Policy in the Anti-terrorist Era" at the conference on Innovation, Policy and the Economy held in Washington, DC; this work fits the interests of both the STE and the newly created Economics of National Defense Programs at the Neaman Institute. The presentation in Washington received a great deal of attention in wide circles.

In June 6, 2003 the STE Program held a high profile, day-long conference attended by over 100 participants from the government, the high tech sector, and academia, on the theme, "*Another Decade of High Tech-led Growth? Prospects and Perils*".

In August 2003 several STE members attended an international conference held in Paris in memory of the late Zvi Griliches, and presented papers supported by the STE program, a fact that was stressed there. In December 11, 2003, Manuel Trajtenberg organized and chaired a panel at the Annual Conference of the Office of the Chief Scientist (attended by over 1,000 people), on "R&D, High Tech and Growth in the Post-bubble Era"; the panel discussed issues that are core interests of the STE program.

The STE Working Papers can be downloaded at the S. Neaman Institute website.

THE ZVI GRILICHES RESEARCH DATA CENTER

The Zvi Griliches Research Data Center was established to promote economic research on R&D, innovation, human capital, commercial productivity and related topics, based on Israeli data. The Center includes data on R&D projects which were supported by the Israeli Chief Scientists, and on companies which carried out projects dating back to the 1980s. The Center has been operating for four years within the framework of the S. Neaman Institute's Science Technology and Economy (STE) group, and in cooperation with the Central Bureau of Statistics (CBS).

The main activities of the Zvi Griliches Center are:

- Establishment of comprehensive data sets, which enable research at the level of commercial entity.
- Assisting research based on data included in the Center, including confidential data in research rooms at the CBS.

Activities in 2003

- Haim Regev, the former Associate Director of the Central Bureau of Statistics, continued his outstanding work incorporating new data into the Center. As of late he has developed a unique data set tracing detailed information on industrial firms in Israel back to the 1930's.
- By the end of 2003, a series of detailed and processed data sets were available to researchers, some of which can be downloaded at the Center's internet site.
- Data sets related to national R&D expenditures, and surveys on industry and innovation, were entered into the Data Center.
- Establishment of an internet site, through the S. Neaman Institute website, which enables access to the Data Center.
- Collection of data on new plant varieties being developed.

TAXATION IN ISRAEL

Investigators: Prof. Efraim Sadka, Alon Cohen

A research project on taxation in Israel, prepared for the S. Neaman Institute, examined the overall tax burden on Israeli salary-earners of all levels. The effective tax rates on labor income were calculated, as distinct from the STATUTORY tax rates. The literature on tax equivalence was referenced, which suggests that an excise tax (including the VAT) is equivalent to a tax on labor income. The employee and employer contributions to national insurance (including the national health tax) were also taken into account. It was shown that the effective average tax rate is significantly higher than the statutory rate, rising progressively from about 26% at low incomes to almost 60% at very high incomes.

The full report can be found on the S. Neaman Institute website.



USER INVOLVEMENT IN R&D CONSORTIA IN ISRAEL

Investigators: Prof. Bernard Kahane, Dr. Daphne Getz

Consortia, and in particular R&D consortia, are one of the clustering forms used to bring together various relevant parties, in order to foster innovation and economic growth. Consortia have been, and still are, widely mobilized in different geographical (international, national, regional) and thematic areas by private or public operators. Often, their design restricts the participation to innovation producers (big and/or small, academic and/or private). Nevertheless, in a previous work, the investigators demonstrated the interest and potential of user involvement as a driving force in the innovation process. Building on that, they now take into perspective the diversity of the whole set of consortia established by the Israeli Magnet program.

Four forms of user involvement (no user involvement, external user involvement, secondary user involvement, primary user involvement) were identified and analyzed through case studies. These cases are discussed in relation to an "ideal type" classification that has horizontal integration industry building consortia on the one hand, and vertical

integration complex system consortia on the other. This division helps to define two models and their respective implications for user involvement. The first one, similar to a fountain or a spray, starts from one or a small set of technologies and proceeds to address many different users. In this case, user involvement can only be obtained through an external body, and/or a one-to-one relation between a specific user and a specific producer. Thus, focus and direction in the consortia requires strong motivation and integration on the part of one of the R&D producers. The second one, similar to a point-focused funnel, starts from many technologies to address a very small number of different users, sometimes only just one type. In that case, user involvement can act as a key driving force for the consortium, in its definition, construction and operation. Thus, consortia would benefit from user involvement at the starting point of their activity.. In conclusion, some potential user involvement developments for R&D consortia management are proposed.

EVALUATION OF THE MAGNETON PROGRAM

Project Leader: Dr. Daphne Getz, **Research Assistant:** Mariana Ardetz

The Magneton Program was established by the Chief Scientist of the Ministry of Industry and Trade to encourage cooperation between academia and industry. The program is based on matching one research group in academia and one in industry, as opposed to the Magnet consortia program where a number of industries and academic groups are partners in the consortium research program. The Magneton Program's objective as defined by the Ministry of Industry and Trade for 2003 is to increase the accessibility of Israel's industry to the achievements of economic-industrial oriented scientific research. The object of the Program is to conduct R&D to prove the transfer capability of a scientific invention to an industrial product.

In 2003, the S. Neaman Institute conducted research evaluating the Magneton Program, in order to analyze its effectiveness as a tool for encouraging technology transfer from academia to industry, and for commercialization of the technology and its application to products and services. The research also evaluates the impact of the Program on promoting innovation of companies and their growth. The results of this research provide important feed-back to investors (Government, Industry), participants (Academia, Industry, Government), and executives to support policy-making decisions.

Specific areas of research included measuring the Program outcomes and their consequences, i.e. patents registered or about to be registered as a result of the Program, development of new products and starting new product families as a result of the Program, development of the company, increase in sales, creation of new jobs, etc.; Identifying the connections between different parameters of the company, the academic group and the Magneton project's success; Examining the direct and indirect influences of the Program; and building an updated information resource about Magneton projects which will enable long-term tracking of the Program's effectiveness.

ISRAELI SCIENCE AND TECHNOLOGY INDICATORS (ISTI)

Investigators: Prof. Dan Peled, Dr. Daphne Getz, Research Assistant: Hani Mansour

This project involves the creation of a large and diverse database of indicators pertinent to monitoring and evaluating R&D activities, scientific capabilities and infrastructure, and funding of such activities in Israel. The database is being developed in close cooperation with the Israeli Central Bureau of Statistics according to the guidelines in the Frascati manual for S&T indicators, officially adopted by the EU. However, special modifications are included in light of the particular features, capabilities and scientific needs of Israel.

The systematic collection of comparable data series at the macro and micro levels on S&T and R&D will facilitate benchmarking and knowledge exchanges with international organizations, especially the EU and the OECD. In addition, it is becoming the main knowledge resource in Israel for evaluations and analysis of S&T and R&D support policies and the contact point that will keep and defuse the information on national data indicators.

The first level of the project, already in progress, focuses on the collection of data and on issues related to data handling such as: accessibility, aggregation and comparison of time series in three key themes concerning S&T:

- Public and private investment in R&D: The data collected in this theme covers R&D expenditure at the national level and the R&D activities in the business sector. The main indicators produced in this theme are: 1) Gross domestic Expenditure on R&D (GERD) as percentage of GDP, 2) Percentage of GERD financed by the main sectors (such as government, industry and higher

education), 3) Percentage of GERD operated by the main sectors, 4) the distribution of business R&D expenditures, etc.

- Scientific human capital: In order to produce indicators on scientific human capital, we needed to characterize and collect data on the human capital engaged in R&D activities (age, gender, level of education, level of salaries and type of involvement: researchers, technicians or other supporting staff). The second important source is data about university graduates (especially PhDs), field of study and institution. The indicators that were produced are: 1) Number of new S&T PhDs in relation to the population in the corresponding age group, 2) Women in S&T, e.g.: Number of women researchers in relation to the researcher population, 3) Total business R&D personnel as a percentage of national total, 4) Total business R&D personnel per thousand employed in industry.
- Scientific production: Mainly we have data on Israeli patents in the USA and Israel. From them we can compute indicators such as: the number of patents in the ICT sector and the biotechnology sector, and the number of patents per capita.

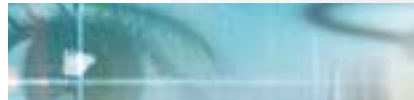
All the indicators in the mentioned themes will be gathered and published in a handbook that will be updated and expanded on a yearly basis. The second level of the project will be to perform policy analyses and to address their potential impact on the Israeli economy. The demographic trends on R&D personnel in various industrial sectors and governmental services, mobility of human capital, funding of public research institutes are some examples.

NATIONAL SECURITY RESEARCH FORUM

Chairman: General (Res.) Uzi Dayan, **Forum Members:** Prof. Moshe Arens, Dan Meridor, General (Res.) Amos Horev, Prof. Zehev Tadmor, Prof. Nadav Liron, Prof. Manuel Trajtenberg, Prof. Dani Peled, Prof. Nehemia Friedland.

The National Security Research Forum was established as an independent research body under the auspices of the S. Neeman Institute. The purpose of the Forum is to create a research infrastructure addressing areas of national security, utilizing and integrating the existing potential at research institutes in the country, with the intention of basing a body of knowledge on in depth and systematic research.

At the first stage two working groups have been established, focusing on "Economy and National Security" and "Society and National Security". The Forum will determine preferred research areas, however, the specific research subjects will be defined by the researchers. The research will be academic and its findings public domain.



SOCIETY AND NATIONAL SECURITY

Chairman: Prof. Nehemia Friedland, **Advisory Board:** Prof. Miriam Erez, Prof. N. Levine-Epstein, Prof. A. Nadler, Prof. G. Keinan, Prof. B. Nevo, Prof. S. Breznitz

The concept of national security rests on a broad and complex foundation. The importance of factors such as economic strength, infrastructure and technological capabilities, and the size and quality of manpower available to the defense system, are accepted by one and all. Yet psychological and social conditions and processes, whose influence on national security is relatively slow, are nonetheless extremely important as well. Study and research of national security issues must, therefore, also include an in depth examination of the social and human infrastructure on which it is based.

What is the social-human infrastructure of national security? Or what are the needed psychological and social “resources” needed to maintain a proper degree of national security? The answers to these questions are not easy. One might say, perfunctorily, that maintaining a proper level of national security is conditioned by social strength just as it is conditioned by economic strength. However, while “economic strength” has agreed definition and indices, even though agreement may not be full, this is not the case for “social strength”. Because of the complexity of the term “social strength” and the absence of an established means to measure it, the Advisory Committee decided that the first year of research (2003/4) will be devoted to conceptual-infrastructural research, aiming to define the term “Social Strength”, develop indices for measuring it and formulate theories on the factors and processes influencing it. A call for research proposals in these areas was issued.

ECONOMICS OF NATIONAL SECURITY

Chairman: Prof. Dan Peled, **Advisory Committee:** Prof. Manuel Trajtenberg, Daniel Tsiddon

This is a new research program which was launched at the end of 2003 as part of the Research Forum on National Security at the Neaman Institute, headed by Maj. Gen. (Res.) Uzi Dayan. The Program is chaired by Prof. Dan Peled of the Department of Economics at the University of Haifa, and the Program Advisory Committee includes Profs. Manuel Trajtenberg and Daniel Tsiddon from the Berglas School of Economics at Tel Aviv University. This is an inter-mural program which seeks to initiate, encourage, and facilitate high quality academic research on the much neglected interconnections between economics and defense. The close ties between economic strength and development on one hand, and defense capabilities and security on the other, while being well recognized, have not been studied closely in quantitative ways by the academic community. There is grave concern that important decisions with critical implications are undertaken by policy makers without proper background research or attempts to quantify their impacts. Moreover, there is a shortage of skilled researchers whose interests and expertise encompass the links between economics and security in Israel.

The ENS Program was established to try and bridge these gaps. It will do so by gathering researchers from academic and research institutions in Israel, who will discuss and perform research on a broad range of defense-economics topics of both theoretical and empirical nature. These researchers will hold periodic meetings where research ideas,

results and methodologies will be discussed and debated, and authoritative outside speakers will be invited on an ad-hoc basis. Modest funding is provided on a competitive basis for research and scholarships to encourage graduate students conducting research on defense economics. Links between the research group and key decision makers in the defense and non-defense public sectors and defense industry are being set as well.

During the first six months of its existence, the Program held several research meetings, and met with high ranking officers from most of the IDF services. A "call for proposals" was circulated among relevant academic departments in Israel, resulting in 17 research applications submitted. After a careful refereeing process, about 10 proposals and scholarship applications were selected to receive some funding from the Program. The research group is still growing, with over 40 participants from institutions including Tel Aviv University, Hebrew University, Bar-Ilan University, University of Haifa, the Technion, Bank of Israel, National Security Council, actively participating in the research meetings and activities.

RETHINKING THE RESEARCH UNIVERSITY OF THE 21ST CENTURY AND THE ISRAELI HIGHER EDUCATION SYSTEM

Investigator: Prof. Zehev Tadmor

In the past two decades the Israeli Higher Education System has undergone profound restructuring. From a highly selective, relatively small, university-dominated system, it has been transformed into a mass education system spread out into every corner of the country. The two main driving forces for this change have been the demand for expanded access to higher education, and the massive Russian immigration. At the same time Israeli society as a whole is in the midst of major social, cultural, economical and political flux. Within this context, the various segments of the higher education system, including research universities, public and private colleges and other higher education institutions, are struggling to redefine their missions, specific roles, and positions within the system.

In order to study these developments in depth, an international working group was assigned to critically examine the Israeli system of higher education in general, and the research university, in particular.

The following reports summarize the work carried out so far:

1. Z. Tadmor, "The Golden Age of the Scientific Technological Research University" 2003.
2. N. Ben Zvi, E. Kochva and Z. Tzahor, "Rethinking Higher Education in Israel – The Colleges", 2003.
3. M. Trow, "On Mass Higher Education and Institutional Diversity", 2003.
4. Z. Tadmor, "The Triad Research University Model or a Post 20th Century Research University Model, 2003.
5. E. Leibowitz, "The Role of the Research University in the 21st Century Democratic State", In preparation
6. M. Yaari, "A Novel Funding Model for the Higher Education System", In preparation.
7. H. Gutfreund, "Some Thoughts about University Structure and Governance", In preparation
8. H. Gutfreund, "The University Structure: Centralized vs. Distributed Governance" In preparation.

An International Colloquium entitled "Transition to Mass Higher Education Systems: International Comparisons and Experiences" will take place in November 2004 at the Technion, under the auspices of the S. Neaman Institute, the Fulbright Foundation and the ESF. The conclusions of the working group were presented at this Colloquium.

A NATIONAL SURVEY OF ISRAELI MEDICAL SCHOOL GRADUATES

Project Head: Dr. N. Bitterman

The first survey ever conducted of medical school graduates in Israel was supported and published by the S. Neaman Institute. The survey was conducted during the years 1981-2000, with the support of the Chief Scientist of the Ministry of Health and the deans of the four medical schools in Israel. It included the graduates of all four schools of medicine who completed their studies during those years. Its purpose was to examine present fields of employment of graduates of all medical schools in Israel.

The survey characterized the academic-professional training of medicine graduates and examined additional academic degrees the physicians acquired as well as the work they did during the various stages of their professional specialization. The survey serves as a basis for policy building and decision making related to promoting and fostering medical schools in Israel.

The full survey may downloaded from the S. Neaman Institute website.



WOMEN IN COMPUTER INDUSTRY PROFESSIONS

Investigator: Dr. Orit Hazzan, Project Team: Dr. Dalit Levy, Tami Lapidot, Larisa Eidelman

This research project, which started three years ago, focuses on promoting women's participation in the high-tech sectors, starting with actions that need to be taken at the high school level. Two distinct research projects were carried out so far, addressing women's approaches to computer sciences at the high school, college and professional levels.

Female high-school pupils studying computer science: Formal and informal data indicate that the percentages of female high-school pupils who study computer science at the A level for the matriculation exam remain relatively low (about 25%). Surveys in the United States indicate similar findings. Furthermore, certain factors that discourage women from choosing computer science as their professional career have been identified in the US.

The Israeli high-school curriculum in computer science is one of the world's top programs. This fact, together with the data mentioned above, led us to start examining, with the support of the Neaman Institute, the study of computer science by female high-school students. To increase the impact of this research, it is being conducted in collaboration with "Machshava" ("Thought") – The Israeli National Center for High School Computer Science Teachers, within the framework of the "Tmura" ("Change") project. The results of this research will be summarized in September 2004.

Undergraduate women students studying at the Department of Electrical Engineering of the Technion: For the last three years, the Department of Electrical Engineering has organized a one-day conference for female high school students, in order to attract more women to study there. Currently, the percentage of women at the department is about 15%. This year, supported by the S. Neaman Institute, research was conducted to evaluate the influence of this activity on female students' attitudes towards studying at the Technion in general and at the Department of Electrical Engineering in particular. Results showed that, when questioned just before the conference started, only 19 out of 124 students (15%) positively considered the study of Electrical Engineering; at the end of the day, 65% of the students indicated that they would consider studying at the Technion's Department of Electrical Engineering. A full report from this research is now available.

More information on this project can be found at:

<http://cse.proj.ac.il/tmura/index.htm>.

<http://www-swiss.ai.mit.edu/~hal/women-enrollment-comm/final-report.html>

THE SCHOOL + PROJECT

Project Leaders: Prof. Miriam Erez, Ilana Hayer. M.Sc.

The "School+" project is an R&D project within the Information Society Technologies program, approved by the European Commission Research Directorate General, under the Fifth Framework Program. The project started operating on September 2001.

The main aim of the "School+" project is to design, develop, demonstrate and evaluate a comprehensive teaching and learning environment by integrating a progressive educational perspective with information technologies, to help schools (teachers, students, parents...) to acquire and develop knowledge and skills required both by future and present citizens of the "Information Society".

The "School+" project ventures to re-engineer the school environment, to tackle the issue of computerized information technology in schools from its "roots", and to integrate, adapt, enhance and fine-tune the technology to the schools' changes and needs to educate learning citizens in the Information Society and not vice versa.

In order to achieve the objectives described, while relating to the European dimension, the "School+" project's consortium includes 10 partners from five different countries: Spain, Greece, Israel, the Czech Republic and Finland. It includes partners from academia and industry, as well as from five schools, one from each country. The schools are full partners in the project. The participating Israeli school is the "Alliance" Junior High in Haifa. The project is based on expertise and experience

brought by the partners, and tries to handle the various needs of Eastern as well as Western Europe.

During 2003, a first version of the "Microcosmos" computerized platform was developed, and a first pilot was conducted in the five participating schools at the secondary age level. Following evaluation of the pilot, improvements to the pedagogical methods and the platform were made, and a second version released.

The team at the Neaman Institute has been engaged in the design and development of an innovative computerized module of questionnaires with multi-language characteristics that is to be used to evaluate the second pilot.

The project's goals for 2004 include completion of the second pilot evaluation and implementation of the necessary improvements

During the project, all the partners have been engaged in various dissemination activities of the project's results through the project's website, film, etc.

More details appear in the project's website:
<http://www.school-plus.org>

PRIME

Investigators: Dr. Daphne Getz, Prof. Dan Peled, Prof. Morris Teubal, Dr. Amnon Frenkel, Hani Mansour, Dan Breznitz

Within the EU sixth framework program, the Neaman Institute has joined along with 42 other institutions from 16 different countries in a network of excellence called PRIME. The network started its official actions in January 2004. During 2003 major efforts were invested in preparing the proposal for the EU. The proposal was accepted and highly rated by the examining committee.

PRIME stands for Policies for Research and Innovation in the Move towards the European Research Area. These policies are facing major transformations. The first relates to the changing dynamics of knowledge production, with the new search regime of the new leading (NBIC) sciences, and with the research intensification of many industries and services. The second is linked to the changing relationship between science and society, with the burgeoning controversies and public debates over priorities and research practices (such as GM field trials). The third concerns the growing importance of both regional and European public authorities. This means that one can no longer simply equate public intervention with national policy, and that we must fundamentally reassess our accumulated knowledge on R&I policies.

The project has certain key characteristics. It is truly international and interdisciplinary, bringing together over 200 researchers (half with established

international reputations) and 150 PhD students from four main disciplines, over 40 institutions and 16 countries. A Joint Program of Activities that balances three research actions was constructed. These activities are dedicated to producing world-class research and three structural actions aimed at achieving lasting effects in terms of structuring the field at the European level, those structural actions focusing on database and indicators issues, training, and interactions with the full range of stakeholders.

Among the ongoing and ad-hoc research programs conducted at the S. Neaman Institute, several programs are relevant to PRIME:

- (1) STE – The Science, Technology and Economy Program.
- (2) ISTI - Israeli Science and Technology Indicators Project.
- (3) The Future University Project.
- (4) Magnet R&D Consortia Management: managing several industry specific government supported infra-structural R&D consortia of industrial interests and academic research institutions in Israel.

ORGANIZATION FOR THE PROMOTION OF ENERGY TECHNOLOGIES (OPET)

OPET is a project of the European Union, operating in the framework of the S. Neaman Institute, whose goal is to promote the efficient use of energy in Israel and sustainable economic growth through the use of advanced energy production technologies. Three organizations participate in OPET Israel: the S. Neaman Institute at the Technion, the Manufacturer's Association of Israel and the Interdisciplinary Center for Technological Analysis and Forecasting.

OPET Israel Activities 2003:

- Managing the Israeli consortium and maintaining contact with OPET branches in other countries.
- Conducting energy consumption surveys in industrial, education and municipal sectors, including evaluation of energy systems in buildings at the Technion campus.
- Assistance in introducing emerging energy technologies – especially wind energy and “Energy Towers”
- Creating an information database of the key factors in Israel's energy economy. Initiating annual seminars to discuss Israel's energy policies.
- Establishment and operation of an Energy Forum for decision makers in the field of energy in Israel.
- Determining forecasts for new energy technologies such as fuel cells and biogas.
- Promoting energy saving in schools in cooperation with OPET Germany.

OPET Israel Events

- Conference on “Taxation of Externalities in Environmental Policies” held on March 16th, 2003.
- Conference on “Fuel Cells”, held on March 27th, 2003.
- Meeting of the Israel Energy Forum, held on April 3rd, 2003.
- Conference on “Wind Energy Technologies”, held on May 26th, 2003.
- Awards ceremony for outstanding works in energy, June 10th, 2003.
- Energy Day 2003, June 12th, 2003.
- “Savings in Energy” conference, June 22nd, 2003.
- Energy Forum meeting No. 2, July, 2003.
- Solar-Thermal energy technologies in the European and Israeli markets.
- Regulations and standards for energy-saving construction in Israel and the EU.
- Brain-storming session on the Energy Economy in Israel, March 19th, 2003.

NATIONAL PLANNING

FROM "ISRAEL 2020" TO "ISRAEL 2050"

Project Leader: Professor Adam Mazor

National long-range planning is desirable for any country. But for the State of Israel, which, on the one hand is developing into a gigantic mega-city and on the other, has a web of complexity due to an inevitable intertwining with the Palestinian Authority and its neighboring states, it is essential!

The Technion took the first step in this direction when over a decade ago it initiated Israel's current master plan – "Israel 2020". This was the result of a broad planning and research effort never before undertaken in Israel. For over six years, more than 250 leading professionals and members of the academic community in Israel, along with well-known international experts, collaborated on this large-scale planning project. It is aimed at describing an economically, socially, and environmentally integrated concept for the development of the State of Israel and identifies the policy means for its implementation.

Following the success of the "Israel 2020" project, which profoundly affected current national planning practices, and the knowledge and planning tools accumulated during this project, the S. Neaman Institute is continuing this huge research effort, expanded to include coordination with the Palestinian Authority and Israel's neighbors and extended to the 100th anniversary of the State of Israel in the year 2050.

Three major activities are now in progress:

1. "Israel 2020" and "Palestine 2015" – *Coordinating the Palestinian and Israeli long-term plans*

The overall aim of this project is to create a basis for long-term planning cooperation between Israeli and Palestinian teams, using existing long term planning by both Israelis and Palestinians as its point of departure. The Israeli plan is "Israel 2020"- Master Plan for Israel in the 21st Century, and the Palestinian plan is "Palestine 2015", which was carried out by the Palestinian Ministry of Planning and Cooperation (MOPIC) between 1994-1998. As part of the preliminary phase of the project dedicated to the optimal coordination of the Israeli and Palestinian long-term plans, an inaugurating workshop was conducted with the overall goal of bringing together Israeli and Palestinian planners in order to initiate professional dialogue. The main output of the workshop was a jointly agreed-upon set of preliminary understandings on Israeli-Palestinian cooperation in long-term planning. These understandings were summarized and defined by a list of 11 integrated planning issues into a written report.

2. Master Plan for Cross-Border Cooperation between Israel and its Neighbors

Following the conflict resolving approach, in the framework of its peace-building efforts, The Israeli Ministry of Regional Cooperation asked the S. Neaman Institute, in the framework of "Israel 2050", to prepare an inclusive cross border master plan for Israel and its neighbors. The work began in August 2002. Here Israel's national goals will be coordinated with those of its neighbors, formulating principles for the

planning stage and a policy appropriate to the target years, in order to locate the means for fulfilling an overall future regional picture. Stage 1 funded by the Ministry for Regional Cooperation has been completed. The outputs of the first stage include: Database of 480 proposed projects for cooperation between Israel and its neighbors; Detailed review of cross border case studies; Comparative analysis of Israel and its neighbors; and Development of economic criteria for analyzing the cooperation projects.

3. Equal Opportunities for All in Israel

The overall aim of this project is to close existing gaps among Jewish and Arab communities in Israel and improve the quality of life for all. The significance of this step became self-evident in the wake of the violent Arab demonstrations in October 2000 that ended with a dozen Arab Israelis dead. Within the long-range planning, 2030 is the target year for reaching mutual goals and objectives. Accordingly, a strategic comprehensive plan will be formulated. The initial phase includes agreement on terminology and definitions of issues. The project, which is contracted by the Economic Cooperation Foundation (ECF) and the Arab Center for Alternative Planning (ACAP) and funded by the Kahanov and Goldman funds, is jointly directed by Prof. Adam Mazor, head of "Israel 2050" project and Dr. Hanna Swaid, head of ACAP, with the participation of Jewish and Arab experts in a variety of relevant fields. "Israel 2020" findings and database serve as a platform for

the plan that began in June 2002. The first stage of the work has almost completed and its outputs include: Statistics and Digital Mapped Database of Israel planning and spatial inventory; International bibliographical survey of Minority-majority relationships; Position papers of Arab and Jewish Philosophers who represent a wide range of equality attitudes and aspects.



NATIONAL PLANNING

CROSS-BORDER FORUM

Project Leaders: Prof. Rachelle Alterman, Prof. Marshal Kaplan

In 2003, the S. Neaman Institute decided to serve as host to the Planning Post Peace Forum, considered to be one of the most important forums for Israeli-Palestinian cooperation. The forum convened in July at the prestigious Aspen Institute, which specializes in the settlement of international conflicts.

The central aim of the forum, as defined by its initiators, is to “crystallize practical and long range strategies in economics, housing and environment, in order to provide answers to challenges resulting from the signing of a peace treaty and the establishment of the Palestinian State”. This forum, which is the first of its kind, is the result of joint efforts by Prof. Marshal Kaplan, an expert on conflict settlement and public policy at the University of Colorado, and Prof. Rachelle Alterman, an expert on urban planning, land and housing at the Technion. The Fund for Economic Cooperation joined the initiative and arranged the contacts with the Palestinians. The Palestinian delegation, identical in size to the Israeli one, was headed by Walid Najeb and Kamal Hussein, founders of the Palestinian Economic Forum.

The success of the forum is attributed by its initiators to its definition as a purely professional—not governmental or political – forum, which brought together 14 leading figures from each of the Israeli and Palestinian economies. Another reason for the forum’s success is its stubborn insistence on avoiding current political issues. Thus, only professionals were invited to the forum - economists, businessmen, mortgage experts,

investors and experts on infrastructure, housing and environment.

The basic assumption behind the forum’s deliberations is the future establishment of a Palestinian State alongside the State of Israel. The initiators explained that this assumption commits them to formulate a meaningful and practical vision for the Middle East in an era of peace. Therefore, the meetings of the forum members dealt with the development of feasible and financially possible strategies aimed at an economic rehabilitation and appropriate physical development of the region. Between meetings, Israel-Palestinian teams work on subjects related to economics, housing, infrastructure, and environmental planning, with the intention of advancing and promoting common economic goals.



NATIONAL PLANNING

A PROPOSED PUBLIC FORUM ON ENERGY

Project Leaders: Prof. Nadav Liron, Amnon Einav

In 2003 the Ministry of National Infrastructures issued a call for a proposed master plan for Israel's energy economy, the object being the formulation of a long term energy policy. In parallel, the S. Neaman Institute conducted and published a survey of the energy situation in Israel. The survey, conducted by Amnon Einav, former Chief Scientist of the Ministry of National Infrastructures, indicates the need for improvements in the planning the energy complex in Israel. For instance, the survey indicates a worsening in the ratio between energy consumption and the GNP, a trend which already began in 1997, before the outbreak of the global crises.

In view of the survey's findings, the S. Neaman Institute proposed to establish a professional forum which would be able to conduct an unbiased, in depth and extensive examination of all energy subjects in Israel. The forum would not be limited by interests and would enable objective studies of each of the subjects related to Israel's long term energy policy, with the aim rational planning of the energy economy in the future. In general, the survey identified four strategic targets by which Israel's energy supply systems may be developed:

1. Increasing energy use efficiency in order to strengthen the economy (more practical products using less energy) and improve quality of life.
2. Reducing the exposure of Israel's economy to changes which are expected to take place in the international energy supply systems, in the short and long term.
3. Preventing environmental damage by all energy supply systems, in production, delivery and distribution to consumers.
4. Minimizing security risks stemming from present and future use of energy.

The proposed forum will deliberate on issues of a highly public nature. For example, is the introduction of alternative energies into Israel's economy really necessary, and what is the real return expected as a result of operating a national plan for energy saving? In the framework of these examinations, other parameters will also be looked into, such as creating opportunities and markets for private entrepreneurs; prevention of intentional distortion of energy products' prices; assistance in promoting new technologies by supporting introduction of new technologies which have been proven elsewhere; support of local technologies up to the stage of technological maturity, in a way that will enable their introduction to the market without distorted support; assuring fair prices and attitude to consumers, etc.



NATIONAL PLANNING**MOLECULAR EPIDEMIOLOGY OF COLORECTAL CANCER**

Project Leader: Prof. G. Rennert

MECC is a large population-based case-control epidemiologic study aimed at studying the causes of colorectal cancer in the Israeli population. Specifically the study is evaluating interactions of genes and environmental / behavioral exposures (such as dietary habits, reproduction, hormone use, smoking, occupational exposures, physical activity, medication use and more). Specific genes such as the 11307k polymorphism in the APC gene, and phenomena of microsatellite instability (MSI) will be sought with regard to their relation to colorectal cancer risk. In the first phase, 2,200 consecutive new cases of colorectal cancer are being recruited from a defined geographical area in Northern Israel. Another 2,200 controls, matched on a variety of demographic parameters, are being sampled from the general, non-affected, population.

The first phase of the study is nearing its end after 5 years. The second phase will include three new components: follow-up of the study population for clinical outcomes, search for important polymorphisms related to colorectal cancer development and a study of a cohort of children of cases detected in the original MECC cases. A variety of results have been published thus far with data emerging from this project. This study is conducted by Dr. Gad Rennert of the CHS National Cancer Control Center at Carmel Medical Center together with Dr. Steve Gruber of the University of Michigan, Ann Arbor. Other members of the Israeli Team are Dr. Ronit Almog, Mr. Marcelo Low, Mrs Hedy Rennert, Dr. Mila Pinchev, Dr. Yoram Chaiter and others.



ENVIRONMENT ENVIRONMENTAL POLICY

Among the myriad organizations dealing directly or indirectly with the environment, The S. Neaman Institute has assumed a leading role in placing environmental quality issues on the public agenda, and in establishing rational environmental policy. Determining environmental policy that prevents environmental problems before they happen, while taking into account both economic and social perspectives, benefits not only the environment, but offers important social and economic opportunities as well.

The S. Neaman Institute's work in the area of environmental policy developed over the last several years with an emphasis on the external benefits of sound environmental practices. For example, in the First Policy Paper on Environmental Priorities, published by the S. Neaman Institute, the issue of preserving the country's limited open spaces was presented as one of Israel's main environmental challenges. The idea of maintaining sustainable agriculture, which is compensated for the environmental contribution it makes to the nation, is another policy concept where the profits are compounded – preserving open spaces and preserving the country's agricultural heritage.

Another example is our work towards promoting the economic opportunities inherent in Israeli environmental technologies, for both the Israeli and worldwide markets. A national policy that supports development of environmental technologies will lead us to a "win-win" situation – the economy will benefit from the enormous export potential, the environment will benefit from

the new technologies, and society will benefit from the creation of new jobs and a better environment.

The work of the S. Neaman Institute in the area of environmental policy includes initiation of research projects and preparation of working papers, initiating and carrying out environmental projects, initiating collaborative efforts with relevant organizations (Ministry of the Environment, the Israel Export Institute, experts in the field, universities, etc), establishment and operation of an environmental data base, and initiation of academic and community outreach programs such as seminars, conferences and lectures.

ENVIRONMENT

**NATIONAL PRIORITIES IN ENVIRONMENTAL POLICY POSITION
PAPER NUMBER THREE**

Project Leaders: Prof. Y. Avnimelech, Dr. O. Ayalon

The third National Environmental Priorities report, published in 2003, includes recommendations and creative directions for thoughts that heretofore have not received sufficient attention, and is intended to serve as a tool for promoting action in these directions. The Report covered three main areas:

- 1) The interrelationships between demography, agriculture, water policy and the environment.
- 2) The environmental responsibility of public transportation companies in Israel.
- 3) Reviews of central environmental subjects:
 - Environmental Taxation in Environmental Management
 - Social-Environmental Justice
 - A survey of the Knesset Commissioner of Future Generations

In the previous National Environmental Priorities reports, it was determined that the subject of open spaces and a policy to preserve them is one of the most critical issues in Israeli environmental policy, where unsuccessful planning and faulty management of land resources threaten to cause irreversible damage. The current document addresses this issue once again in the hopes that the different governmental Ministries and public and environmental organizations will mobilize public support to prevent wasteful use of forestland and open urban spaces for construction. In addition, a study was commissioned which analyzes the demographic processes in Israel, and presents conclusions regarding environmental quality in the future. A Master Plan for Water Resource Planning was also integrated into the report.

In the area of public transportation, the report emphasizes a need to reinforce the environmental obligation of all public transport suppliers – city and inter-city. A discussion of measures at the disposal of transportation companies for promoting environmental concerns is included.

Environmental taxation is discussed, including the need to establish a fund for remedying environmental damages, administered jointly by Ministry of the Environment and the Treasury. A seminar, sponsored by the Neaman Institute and the Department of Natural Resources and Environmental Management at Haifa University on “Environmental Taxation in Environmental Management” focused on two areas in which environmental taxes could be applied: the Waste Management System and the Energy System (including transportation).

The report concludes that the most just and efficient approach to financing environmental damage compensation is to incorporate external costs in the price of products or services that generate environmental damages.

The Third Position Paper on National Priorities in Environment Policy can be obtained from the S. Neaman Institute.

ENVIRONMENT

**GLOBAL ENVIRONMENTAL MARKET –
BUSINESS OPPORTUNITIES FOR ISRAEL**

Project Leaders: Mr. Yitzhak Goren, Dr. Ophira Eylon,
Professor Yoram Avnimelech

Approximately \$570 Billion is invested in environmental quality worldwide. The growth rate for this market is 1%/year in developed countries and 8% in developing countries. The world environmental market includes essential infrastructures, production of clean and renewable energy, monitoring and control of air pollution, water production and supply, sewage purification and use of its byproducts, advanced treatment of dangerous urban waste, and more. The environmental market also includes technologies enabling the use of substitutes for fertilizers and pesticides, and for treating hazardous materials.



Israel has a strong technological knowledge-base in the areas of environmental quality. Its expertise is particularly strong in the field of utilization and management of water resources, including marginal water and wastewater. Israel also has the know-how and the research and practical infrastructure for the development and application of technologies in the areas of desertification (including desalination and advanced irrigation systems), and utilizing solar and geothermal energy.

On the basis of the existing Israeli potential in this field, the S. Neaman Institute and the Israel Export Institute, in cooperation with the Ministry of the Environment, are preparing recommendations for how to take advantage of the global opportunities for Israeli technological enterprises.

ENVIRONMENT

SUSTAINABLE AGRICULTURE

How may the potential positive external values of agriculture be integrated into the Israeli farmer's income?

Investigators: Dr. Haim Zaban , Prof. Yoram Avnimelech, Dr. Ofira Ayalon

Agriculture takes a relatively marginal place in Israel's economy today. The future of agriculture demands public intervention, and care. Beyond its function in the production of food and fibers, agricultural activity has significant potential external benefits, including: **aesthetics associated with the green spaces it generates; social contributions** in preserving the values of the contact between man and the land; **ecological contributions**, such as increased water infiltration, absorption of CO₂, outlet for organic waste and recycled water. Often, these potential benefits go unrealized because of unsustainable practices that damage the environment: These benefits justify the preservation of agriculture as a productive activity.

There is a clear need to create a public system that will encourage the positive values of agriculture, and reduce its negative impacts. Governmental bodies, together with "green" organizations, which, until now, dealt mainly with natural areas, will be asked in the future to contribute to the protection of agriculture. A

system of supports for the positive external values of agriculture is prevalent in many countries in the world. In order to adopt such strategy in Israel, there is a need to measure the economic value of these external influences.

Our research has found that the total external value of agriculture is 260 million \$US per year, with the average external value of one hectare being \$7.3. The external value of agriculture amounts to 8.4% of its production value. It may be assumed that around 20% of the agricultural land of Israel will realize its external value, for a total sum of 52 million \$US per year. The research presents a wide range of organizational tools which may be used in the realization of payment to farmers. Realization of such tools may be the key to strengthening sustainable agriculture in Israel.

The summary of this research can be found on the S. Neaman Institute website.

ENVIRONMENT

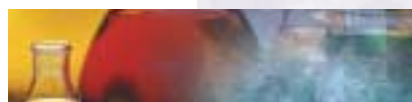
**ENVIRONMENTAL DATA BASE:
ENVIRONMENTAL RESEARCH AT THE TECHNION**

Project Leader: Dr. Ofira Ayalon, **Research Assistants:** Mariana Ardetz
Orly Nathan-Shats

The initial purpose of establishing the Environmental Data Base was to present to the general public an up-to-date picture of research in this field taking place at the Technion. Specific groups which the Data Base target include: researchers, funding organizations (Ministry of the Environment, Science, Agriculture, Industry and Trade, and others).

The Data Base includes research conducted at the Technion on Environmental topics since 1999, with links to the researchers websites, environmental groups, and relevant articles

The Data Base can be accessed through the S. Neaman Institute website.



ENVIRONMENT

ENVIRONMENTAL EDUCATION – THE GREEN CAMPUS PROJECT

Project Leaders: Prof. Yoram Avnimelech, Dr. Ofira Ayalon

Science, technology and engineering are key means to reach environmental sustainability and to ensure development that is not environmentally damaging and destructive. The Technion, as an education institute for engineers and scientists, is committed to incorporate the environmental perspective in all its operations and to mobilize the best of its knowledge and talent so as to lead in Israel's sustainable development, an environmentally-responsive development. In order to achieve this goal, the Technion launched the Green Campus project, at the initiative and with the support of the S. Neaman Institute

The project's objective is to challenge the entire Technion's community – faculties, students and administration - in carrying out its activities, which are reported through the campus newspaper and its own website.

The Green Campus activities and projects embrace a broad range of issues, including:

- Water Conservation in the campus buildings and as part of the campus landscaping;
- Energy Conservation in buildings throughout the campus;
- Recycling and Resource Conservation, of paper, toner and ink cartridges, bottles, etc;
- Pollution Prevention, promoting public and bicycle transportation within the campus, and collecting used batteries.

The Green Campus program also includes a sponsored "Green Day", lectures and discussions, and an Ecological Garden, designed to develop environmental awareness among its visitors.

Additional information on the Green Campus project can be found at:

<http://techunix.technion.ac.il/~greenweb>

NEAMAN INSTITUTE ACTIVITIES IN MAGNET CONSORTIA



The S. Neaman Institute has been active in the MAGNET program for over 10 years. MAGNET is a unique, nationwide program responsible for encouraging the development of innovative, generic, pre-competitive technologies and R&D, and promoting the collaboration between industrial companies and scientists from Israeli research institutes. It was launched in 1992 by the Office of the Chief Scientist of the Ministry of Industry and Trade; MAGNET currently includes 15 active consortia and supports three additional channels for the development of technology rich industry, using the reservoir of knowledge in the Israeli academic institutions.

The S. Neaman Institute was instrumental in developing the program together with the Chief Scientist, and acted as a bridge between academia and industry to foster joint R&D and technology transfer between the two sectors. Currently, the S. Neaman Institute fulfills two functions related to the MAGNET program. First, the Institute represents researchers from the Technion in a number of MAGNET consortia. In addition, the Institute has established and operates one of the largest information centers in the country on behalf of many of the consortia.

MAGNET CONSORTIA INFORMATION CENTERS

Information Center Manager: Dr. Daphne Getz

The MAGNET Consortia Information Center was established to fulfill the information needs of the consortia working in the framework of the MAGNET program. It is based on a dedicated system, designed according to requirements of the S. Neaman team in cooperation with the consortia. Eleven such centers are active within the framework of the Neaman Institute:

Information Center Goals:

- Knowledge collaboration among consortium members.
- Managing relevant internal information.
- Information supply from international databases.
- High accessibility via web interfaces.

Internal Information Site

The internal information of each consortia includes reports of researchers and project managers. An Internet site is designated to store and retrieve all the documents produced in the consortium, as well as to enable technical administration of its activities. The knowledge management system has a web interface which enables user-friendly access to information, while ensuring the necessary protection of data.

External Technical and Scientific Information Supply

The site is designed to keep consortium members updated with information published about their subjects of interest. This information is retrieved

from technical and scientific databases as well as free Internet sites. It includes standards, patents, proceedings, articles and relevant daily news.

Information Retrieval

Users may access information by three methods:

- Using the search engine of the knowledge management system.
- Surfing via libraries and categories.
- Notification by personal profile defined by each user.

Consortia's Open Internet Sites

The open web site of each consortium is designated to publicize its activities worldwide. It includes links to consortia companies and the MAGNET web site.

Human Resources

At present, six information specialists supply information and maintain the Information Center of the consortia: E. Barzani; O. Berl; E. Gilad; O. Malberger; O. Nathan-Shats; K. Tonciulescu; Computing infrastructure: Golan Tamir.

MAGNET Consortia

Nano-Functional Materials (NFM) Consortium

NFM is a consortium of 14 companies and 12 academic research groups in Israel for research and development on nano materials. The NFM consortium's goal is to become a leading platform for building a technological infrastructure in the field of nano materials, enabling the Israeli chemical industry to improve existing products, develop new products and penetrate into new markets. The consortium promotes cooperation and information sharing among large established industrial companies, fast growing technology start-ups and academic research groups as a key for the development of new capabilities crucial for future markets.

The NFM consortium is seeking new ways to fabricate and use nanoparticles in industrial processes and products. Nano-materials will provide enhanced performance for the end-user and enhanced value to the producer. NFM combines the efforts and expertise of different disciplines to shorten the time for commercialization of innovative products based on the unique features of nanoscale materials.

Industry Members of the NFM Consortium:

Ahava Dead Sea Laboratories, B.G. Polymers, Carmel Olefins, Cerel Ceramic Technologies, DSBG, EOp, Kafrit, Makhteshim, NanoPowders Industries, Nano Size, Nilit, Scitex Vision, Sol-Gel Technologies and Solubest.

Academic Members of the NFM Consortium:

The Technion Foundation (Technion), Yissum (Hebrew University), Bar-Ilan University.

The S. Neaman Institute established and maintains an Information Center for the NFCM Consortium.

Consortium for Biotechnological Infrastructure Systems (BIS)

The BIS Consortium was established to provide the biotechnological infrastructure needed to develop sophisticated agricultural products using molecular genetic tools. Development goals of the consortium include: increasing crop yields and quality, improving nutrition quality, extending shelf-life, quality presentation at the end-user level, products that can survive in sub-optimal areas, prevention of health and environmental damages resulting from the use of chemical pesticides, and others. Developing these methods will enable the utilization of an extensive genetic pool, without inter-species limitations. The consortium assists participating companies in adhering to strict international standards in order to compete in international markets.

Industry Members of the BIS Consortium:

Hazera, Tarbiot RHN, and Compugen

Academic Members of the BIS Consortium:

Bar-Ilan University, Hebrew University, Weizmann Institute.

The S. Neaman Institute established and maintains an Information Center for the BIS Consortium.



Streaming Rich Media Messaging (STRIMM) Consortium

STRIMM is a consortium for Streaming Rich Media Messaging, consisting of nine companies and three research institutes. Established in 2000, STRIMM promotes generic technologies for efficient delivery of rich media (audio and video) messages over the Internet and next generation wireless networks. In its first three years, STRIMM succeeded in solving complex problems, otherwise unsolved, in the area of rich media messaging systems that handle and transmit large files to various wireline and wireless user terminals. Based on the fruitful cooperation among the consortium members, a framework for rich media messaging that supports delivery of various media formats (e.g. MPEG2 and MPEG4) to fixed and mobile terminals was recently demonstrated.

In the next two years STRIMM plans to continue its R&D towards removing barriers in messaging of rich media. Among the issues to be handled are rich media messaging for MMS; enable optimal service in GPRS, EDGE, Cables and DSL networks; combining and synchronizing multiple media types in the same message etc.

Industry Members of the STRIMM Consortium: Emblaze, InfoWrap, Cellcom, Comverse, Mediagate, Mobixell, Optibase, Scopus Network Technologies and VCON.

Academic Members of the STRIMM Consortium: The S. Neaman Institute (Technion), Ramot (Tel Aviv University), Ben Gurion University.

The S. Neaman Institute established and maintains an Information Center for the STRIMM Consortium.

Wafer Fab Cluster Management (WFCM) Consortium

WFCM seeks to develop architectures, algorithms and communication infrastructures for process control that will facilitate the integration of process and control equipment (wafer FAB clusters) with an automated management control system. The vision is to implement production processes in future FABs for the manufacture of semiconductors autonomously and automatically, thereby optimizing the chip production process and maximizing equipment usage and material yield.

The consortium's activities are concentrated in four principal directions: Process control; Infrastructure – adaptation and implementation of communication protocols, information transfer and standards; Industrial engineering – scheduling workflow and developing tools for production management; Data fusion between the various metrology tools and the process control equipment.

Industry Members of the WFCM Consortium: K.L.A. Tencor, Nova, Optum, Applied Materials (Israel), AMAT (USA), Tower Semiconductors, and Intel (participates as an observer).

Academic Members of the WFCM Consortium: The S. Neaman Institute (Technion), Ramot (Tel Aviv University).

The S. Neaman Institute established and maintains an Information Center for the WFCM Consortium.

Consortium for Industrial Software Tools (CONSIST)

The goal of CONSIST is to develop a generic software infrastructure for most, or all, software applications used in the various stages of the industrial process. This framework will enable the development of a new generation of web-centric applications and intelligent tools, enabling a quantum leap in ease of use and accessibility of production line information.

The infrastructure will be built on the solid technological foundations and proven experience of the CONSIST members in the following domains: Computer-Aided Production Engineering (CAPE); Optimization of processes; Diagnostics and maintainability analysis; Knowledge management; Intuitive hyper-relational information navigation; Integrating distributed systems; Computer Aided Design/Manufacturing (CAD/CAM).

Industry Members of CONSIST: Tecnomatix, SAP Portals, SolidCAM, ESI, ClickSoftware, IAI

Academic Members of CONSIST: The S. Neaman Institute (Technion), Ramot (Tel Aviv University), B.G. Negev (Ben Gurion University).

Information Super-Highway in Space Consortium (ISIS)

The ISIS Consortium was established in 1999 to provide Israeli communications satellite industries a technological advantage in anticipation of the "revolution" which will probably change the role of satellite systems in telecommunications and international services. The consortium comprises five leading satellite communication companies and three academic institutes, cooperating in the development of generic technologies that will be integrated into low cost satellite ground terminals and the appropriate networking systems for the future, space-based broadband public networks.

Industry Members of ISIS: Gilat, Satellite Networks; Orbit; Microkim; Scopus, and Shiron.

Academic Members of ISIS: S. Neaman Institute (Technion); Ramot (Tel Aviv University) B.G. Negev (Ben Gurion University)

The S. Neaman Institute established and maintains an Information Center for the ISIS Consortium.

The Israeli Software Radio Consortium (ISWR)

ISWR represents a broad array of communications techniques which can be implemented in a wide range of products and applications. The use of common SWR hardware and software can reduce time-to-market, development costs, and unit cost of tomorrow's wireless systems. Furthermore, software upgrades can prevent premature obsolescence of these products and systems as new standards are adopted. Software radios can support multiple standards and flexibility in the quality of service.

The Consortium strives to: Develop and implement cost-effective generic technologies; Reduce R&D costs and time-to-market; Increase worldwide marketing ability; Promote wide-ranging collaboration between Israeli companies and academic research institutes; Present Israeli companies as a leading international force for developing integrated breakthrough technologies and marketing advanced products.

Industry Members of ISWR: 3G.com, Alvarion, Commil, MicroKim, NICE, ParthusCeva, Runcom, Shiron, Tadiran Comm., Tadiran Spectralink, Telematics Wireless, Wavion.

Academic Members of ISWR: The S. Neaman Institute (Technion), Ramot (Tel Aviv University).

The S. Neaman Institute established and maintains an Information Center for the ISWR Consortium.

Pharmalogica Consortium (RA)

The Pharmalogica Consortium (Registered Association) was established to develop a set of novel generic tools for predicting the pharmacokinetics (i.e., bioavailability, clearance, volume of distribution, stability and toxicity) profile of drug candidates prior to their submission to costly clinical trials. Two sets of tools will be developed by the Pharmalogica Consortium, namely, experimental tools and computational tools. The experimental tools will be developed within the framework of four projects, which are dedicated to Bioavailability; BBB permeability; Metabolism; and Toxicity. These projects will provide the required data for the Algorithm project that will concentrate on developing in silico tools for predicting these properties.

Industry Members of Pharmalogica: D-Pharm ,Peptor ,HPBM ,Harlan Biotech Israel, ProteOptics, Compugen , Agis Industries, TEVA Pharmaceutical Industries.

Academic Members of Pharmalogica: Yisum (Hebrew University), (Ramot) Tel Aviv University, B.G.Negev (Ben Gurion University), Sheba Medical Center.

The S. Neaman Institute established and maintains an Information Center for the Pharmalogica Consortium.

The Israeli Consortium for the Development of Micro Optical Electro Mechanical Systems (MOEMS)

The goal of the MOEMS Consortium is to study and develop new technologies as a basis for developing new micro electro mechanical systems and manufacturing methods, which will position the members as leaders in the MOEMS product market. The consortium is active in creating, directing and supporting the academic research infrastructure with industrial vision, to support long-range new ideas and technologies.

Specific areas of interest for the consortium include: Developing and implementing cost-effective generic technologies; Establishing infrastructure, labs and manufacturing process facilities that strengthen Israeli industry's technology; Identifying future market trends and customer needs; Defining technologies and breakthroughs in advanced stages, by which new products will be developed; Analyzing critical technological gaps; Fostering development of generic solutions, tools and infrastructure; Establishing long-term cooperation between Israeli industry and academic institutions to pioneer cutting-edge technological achievements; Achieving successful and short time-to-market products; Positioning Israeli companies as an international force that leads new solutions for the MOEMS technology.

Industry Members of MOEMS: Elbit, Elop, Flixel, Opgal, Rafael, SCD, Shellcase, Teraop.

Academic Members of MOEMS: B.G. Negev (Ben Gurion University), Technion Foundation (Technion), Ramot (Tel Aviv University).

The S. Neaman Institute established and maintains an Information Center for the MOEMS Consortium.

IZMEL Consortium for Development of Generic Technologies for Image Guided Surgical Therapy

The IZMEL Consortium was established to develop technologies that will serve the operating room of the future, in: therapy, intra-operative imaging (MRI, US, nuclear medicine), tissue viability (end point for tumor destruction), tracking and registration, and augmented visualization of surgical-relevant data. IZMEL is the first consortium embracing medical centers (and not only universities) as essential partners.

Industry Members of IZMEL: Algotec, Applied Spectral Imaging, Biomedicom, Contec Medical, DENX, Elgems – GE Medical Systems, Envision – Visionsense, Galil-Medical, GE- Ultrasound, Lumenis, Peptor, ODIN

Academic Members of IZMEL: Technion Foundation (Technion), Ramot (Tel Aviv University), Yisum (Hebrew University).

Medical Center Members of IZMEL: Ha'Emek, Rambam, Sheba, Ichilov-Tel Aviv Medical Centers

The S. Neaman Institute established and maintains an Information Center for the IZMEL Consortium.



Digital Printing Consortium (DPI)

The DPI Consortium was established to develop and study new digital printing technologies as a basis for developing new products, systems and perishable materials. Their goal is to place the consortium members in leading positions, with control of over 20% of the world market. Furthermore, the consortium is creating an academic research infrastructure with industrial vision, to support long-range new ideas and technologies.

Specific R&D efforts focus on the following areas: digital printing engines; inks for digital printing engines; digital printing workflow; CMOS and color image capture, on-line color and printing quality control; electro-optical subsystems and components.

Industry Members of DPI: Aprion Digital, Creo, EVS, HP (Indigo), NUR, Scitex Vision, Shira, Tower, VioNet.

Academic Members of DPI: Technion Foundation (Technion), Bar Ilan University, B.G. Negev (Ben Gurion University), Ramot (Tel Aviv University), Yissum (Hebrew University).

The S. Neaman Institute established and maintains an Information Center for the DPI Consortium.

Large Scale Rural Telephony (LSRT) Consortium

The LSRT Consortium is engaged in developing technological infrastructures that will enable the large-scale deployment of communication networks in rural areas. The consortium's vision is to achieve an advantage for the Israeli industry in the developing LSRT market, and to enable the installation of millions of lines over vast areas, using Israeli technology.

Industry Members of LSRT: TTI; Telrad Networks; Gilat, Satellite Networks; Alverion.

Academic Members of LSRT: Neaman Institute (Technion); Ramot (Tel Aviv University) B.G. Negev (Ben Gurion University); Yeda (Weizmann Institute); Society for Industrial Mathematics.

The S. Neaman Institute established and maintains an Information Center for the LSRT Consortium.

THE ASSOCIATION OF MAGNESIUM TECHNOLOGIES USERS

The Association of Magnesium Technologies Users began operating in March 2003 from its headquarters located at the S. Neaman Institute, with 15 members from industry and academia. The aim of the organization is to establish a forum for users to assist in introducing novel magnesium technologies, increase synergy between the industries, reduce costs, increase productivity and increase the added value from magnesium products developed and manufactured in Israel and marketed worldwide.

The members of the Consortium for the Development of Magnesium Technologies, which recently completed its activities, were joined, in the framework of the Users Organization, by additional companies in different and complementary areas such as: aviation, space and communications. The main activities conducted by the Users Organization during its first year were:

1. A report by the Professional Committee on the characterization of mechanical characteristics and corrosion of magnesium, aluminum alloys and other magnesium composites, was finalized.
2. At the S. Neaman Institute's Information Center, a special unit gathered information and news on magnesium in Israel and the world, which were delivered in special information kits "tailored" to the needs of each member company. A printed quarterly and CD containing the collected information were sent the members of the Users Organization.
3. The Users Organization held meetings at member companies around the country to disseminate magnesium related information, with the purpose of teaching and introducing the technologies at first hand and exchanging information between the companies. Six such meetings were held during the first year.
4. Five new companies have joined the Users Organization as a result of efforts to increase its membership.

Industry members of the Magnesium Users

Organization: Israel Magnesium Corporation – Segal Ltd; SHL Alubin; Ortal, Elgat, Electroterm, Palbam, Israel Aircraft Industry Ta'as; Rotem Industries; Polsar; Interflight; Dead Sea Magnesium.

Academic members of the Magnesium Users

Organization: The Technion, the Technion Metals Institute, Ben-Gurion University.

The S. Neaman Institute established and maintains an Information Center for the Magnesium Users Organization.

THE FUTURE OF THE CHEMICAL INDUSTRIES IN ISRAEL

Project Leaders: Prof. Zehev Tadmor, Dr. Gili Fortuna

The Chemical and Pharmaceutical Industry of Israel is an important pillar of the Israeli economy. The total contribution of this industry to the GDP is about 2.5B\$ with 5.1B\$ in exports, and a workforce of 26,500. It is less volatile than the high-tech industry and therefore is an important stabilizing force on the economy. The industry has a very solid scientific and technical knowledge base and highly developed global marketing skills. In addition, the research universities excel in the sciences of chemistry and biology, and serve as a constant source of new and innovative technologies. Yet while the industry holds great promise for the future, at the same time it is faced with a series of difficulties and obstacles.

In order to critically review the industry, a team of experienced industrial and academic leaders was appointed in 2002. Their mandate was to examine trends in the global chemical industry, review the Israeli chemical industry, evaluate the current financial situation and business plans, analyze environmental issues, and explore alternative options for development. A draft report was prepared and circulated to a significant number of CEOs from the industry, who were subsequently interviewed regarding the initial findings and their perceptions of the challenges facing the industry.

The main findings of the draft report were:

- The contribution of the chemical industry to the national economy is stable and very significant.
- The efficiency of the industry has improved greatly and reached international benchmarks.
- Emerging new technologies must be adopted as new growth engines.
- Effective mobilization of the knowledge in academia for industrial development must be encouraged.
- The industry faces environmental constraints that can be resolved only by a new compact between Government and Industry.
- The industry that is based only on the local natural resources is limited.
- The industry faces great difficulties due to the numerous disruptions of basic services and infrastructure (e.g. transportation, excessive governmental red tape, unfavorable financial environment, and multiplicity of environmental agencies).
- The deteriorating quality and prevalence of high school chemistry studies is a subject of great concern.

Based on the preliminary study and its findings, a final draft was prepared and distributed to the key decision makers in the Government and to top leaders from the industry, with an invitation to participate in a closed workshop. In addition, personal presentations were made to the Minister of Trade and Industry, the Director General of the Ministry of Finance, the Chief Scientist of the Ministry of Trade and Industry and top leaders from the Manufacturers Association and Industry. The workshop took place on November 5th 2003. All the recommendations of the team were adopted and it was concluded that there is a need to complete the study and recommend action items for determining national policy. It was further agreed that the Ministry of Trade and Industry and the Manufacturers Association will join the Institute as sponsors of the research project.

The draft report can be downloaded from the S. Neaman Institute website, or a copy can be obtained from the Institute offices.

ENTREPRENEURSHIP LABORATORY

Project Leaders: Dr. Zipi Shperling, Prof. Mia Erez, Prof. Avi Fiegenbaum

The Entrepreneurship Laboratory was developed, modeled and given for the first time at the Technion in the 2003 academic year. This was an innovative and interactive course in which two interdisciplinary teams of Technion MBA students met with two selected inventors, each of whom had a patented innovation (Professor Yoram Reiter in Biotechnology and Professor Ron Kimmel in Computer Sciences). In addition, leading Israeli venture fund executives and experts joined the process in order to add their input on the creation of a business out of the presented ideas and innovations.

Both the inventors and the MBA students in this project could experience and actually run a “real” business process where a complex scientific idea or technology, embodied in a patent, became a viable business plan. Assignments ranged from conducting market studies for a pre-startup invention to business justification. Emphasis was placed on understanding the technology transfer mechanisms and accelerating the entrepreneurial and institutional processes of turning an academic invention into a commercial product. The final presentations generated out of this project included business based conclusions, particularly in regard to the commercial justification and any recommended future directions for the invention. A more general set of conclusions and recommendations was related to the technology transfer mechanisms being generated in the Technion.



DEVELOPING AN INDUSTRIAL AND BIOTECHNOLOGY CLUSTER IN HAIFA/N. ISRAEL

Project Leaders: Prof. D. Shefer, Dr. A. Rotem

The S. Neaman Institute has decided to lead an initiative aimed to establish a 'Cluster for Biotechnologies Industries' in Northern Israel and to call upon all those companies and academic researchers interested joining this initiative. The rationale for this initiative is due to the fact that biotechnology has become the fastest growing industrial sector worldwide, as well as in Israel, and is reshaping the life of science, especially in the fields of medicine, food and agriculture.

The decision to lead this initiative was taken after a survey conducted by the Neaman Institute, based on the fact that biotechnology industries usually develop as 'clusters' around the vicinity of academic institutes and successful biotechnology researchers. That survey led to the following additional findings:

- There has been a significant growth (around 650%) in the last 6 years in new biotechnological firms in the northern part of Israel.
- There has been a significant growth (around 500%) in the last 10 years in biotechnological inventions in the northern part of Israel as measured by the number of filed patents.

As of now, two different 'Biotechnology Industrial Clusters' have already been established in Israel: One in Jerusalem and the other in Rehovot. The survey has revealed that there is a justification for establishing an additional biotechnological cluster in Northern Israel:

- 20 biotechnological companies have been working in that field for over 10 years in the

northern part of Israel and about 50 new companies/start-ups have joined the field.

- The main academic biotechnological activity takes place in the Technion at the following faculties: Biotechnology and Food Engineering, Chemistry and Civil Engineering. Additional Bio-Medical activity takes place in Rambam Hospital, the Faculty of Medicine and the Rappaport Medical Institute (Bio-Rap).

In order to promote the initiative to establish the 'Northern Cluster for Biotechnologies', the S. Neaman Institute is planning to call a meeting of all leading scientists in this area from the Technion as well as representatives from the biotechnological companies located in the north part of Israel. The aim of the meeting is to assemble all the academic researchers as well as biotechnology industry forces, enabling them to create close professional relations, and to decide what the best organizational structure should be in order to promote the goal of establishing a Northern Cluster for Biotechnologies.

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