



Technion - Israel Institute of Technology

The S. Neaman Institute  
for Advanced Studies in Science and Technology

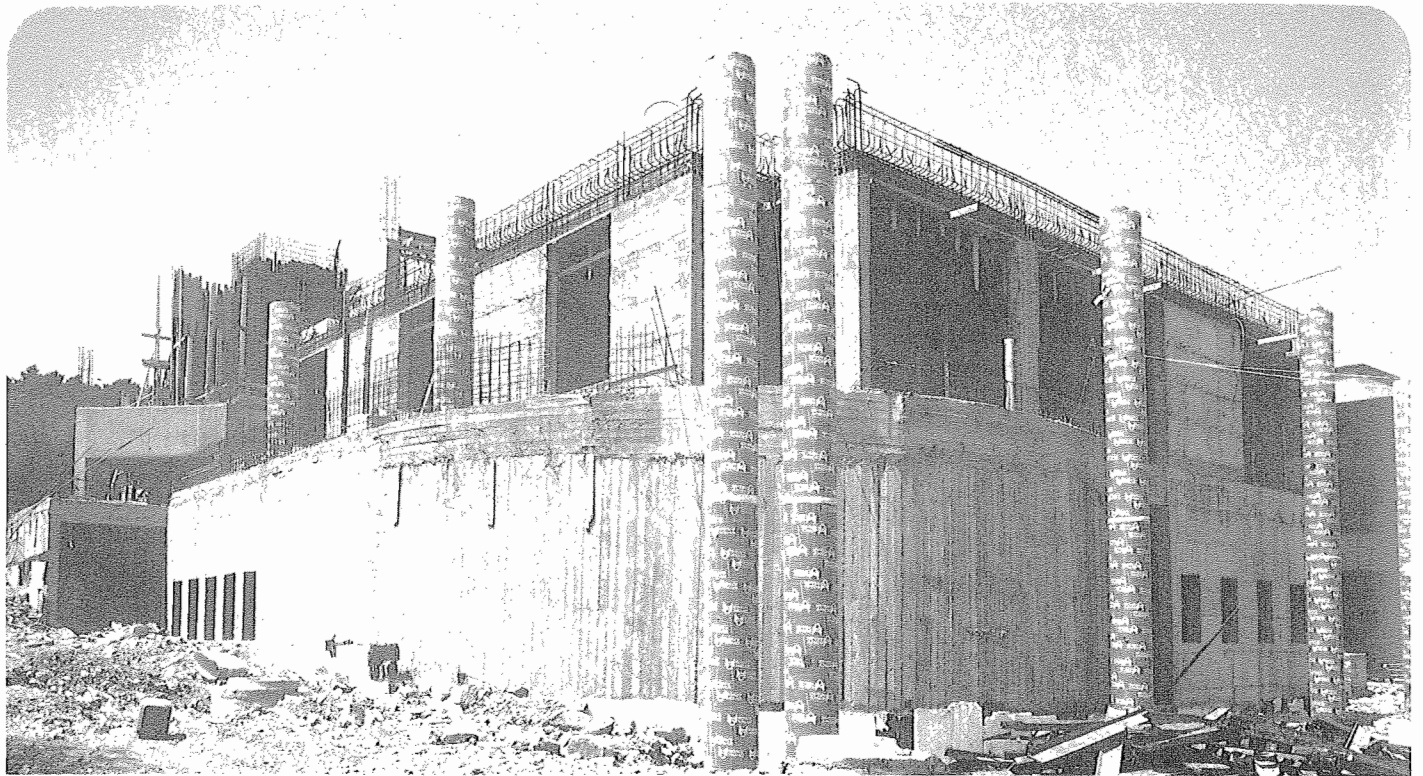


ANNUAL REPORT  
1994-1995

# Annual Report 1994-1995

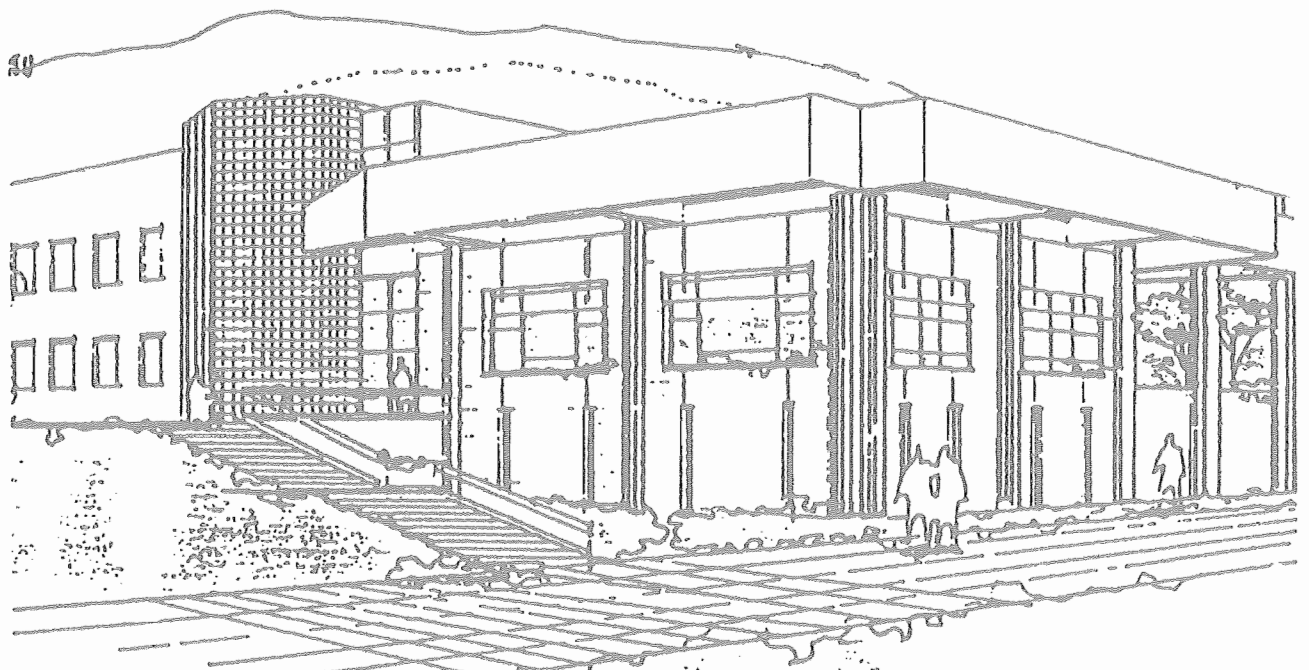
Technion - Israel Institute of Technology

The S. Neaman Institute  
For Advanced Studies in Science and Technology



## THE S. NEAMAN INSTITUTE BUILDING UNDER CONSTRUCTION

Located in Technion City, the new 16,000 sq.ft. building will house: office and seminar rooms for research, an administration wing, a library and a large auditorium

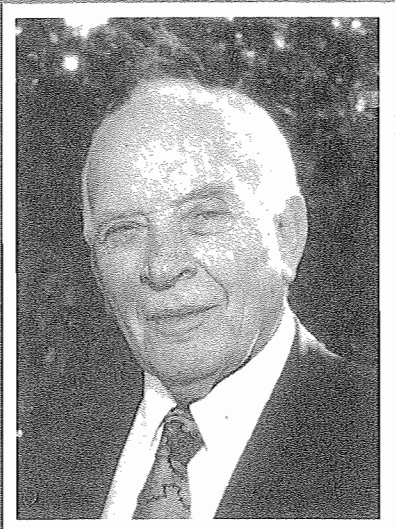


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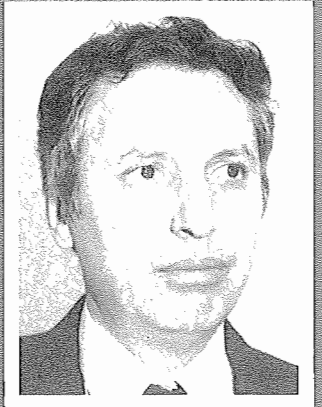
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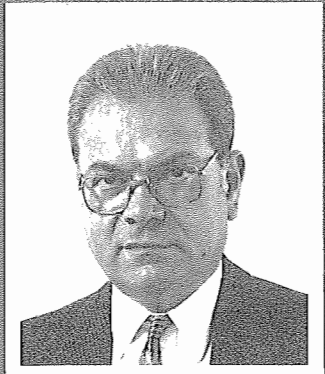
Prof. Zehev Tadmor  
Vice-Chairman



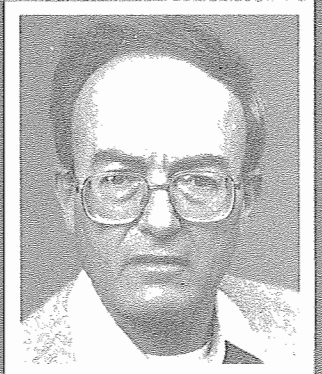
Samuel Neaman  
Chairman



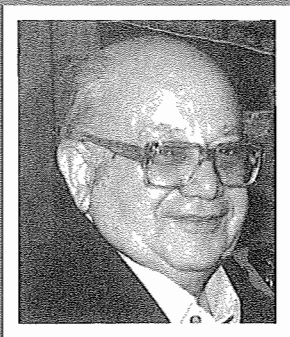
Prof. Daniel Welhs  
Director



Prof. Alexander Solan



Prof. Arnan Seglner



Ing. David Kohn



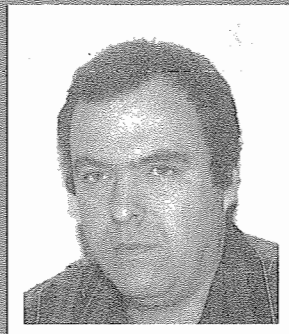
Ruth Rivkind, B.A.



Simi Nadler



Amnon Frenkel, M.Sc.



Dr. Eli Plotnik

THE SAMUEL NEAMAN INSTITUTE  
FOR ADVANCED STUDIES IN SCIENCE AND TECHNOLOGY

Samuel Neaman, Chairman, Oceanside, Ca., U.S.A.  
Zehev Tadmor, President, Technion  
Arnan Seginer, Professor of Aerospace Engineering,  
Vice-President, Technion  
Alexander Solan, Professor of Mechanical Engineering,  
Senior Vice-President, Technion

Director

Daniel Weihs, Professor of Aerospace Engineering, Technion

Advisory Council

Michael Fry, Professor of Medicine, Technion  
Gershon Grossman, Professor of Mechanical Engineering, Technion  
Itzhak Hoffi, General (Res.)  
Amos Horev, General (Res.), Former President of Technion  
Abraham Marmur, Professor of Chemical Engineering, Technion  
Bluma Peritz, Professor of Library and Information, Hebrew University  
Shalom Raz, Professor of Electrical Engineering, Technion  
Baruch Rosner, Professor of Physics, Technion  
Daniel Shefer, Professor of Architecture and Town Planning, Technion

Staff

Project and Workshop Coordinator: David Kohn, M.Sc., M.Phil.  
Administrative Assistant: Mrs. Ruth Rivkind, B.A..  
Book-keeping: Mrs. Sima Nadler  
Senior Researchers: Amnon Frenkel, M.Sc.  
Eli Plotnik, D.Sc.

## ABOUT THE INSTITUTE

The Samuel Neaman Institute for Advanced Studies in Science and Technology is an independent public-policy research institute, established in 1978 to assist in the search for solutions to national problems in science and technology, education, economy and industry, and social development. As an interdisciplinary think-tank, the Institute draws on the faculty and staff of Technion, other institutions and scientists in Israel, and specialists abroad. The Institute serves as a bridge between academia and decision makers through research, workshops and publications.

The Institute pursues a policy of inquiry and analysis designed to identify significant public policy problems, to determine possible courses of action to deal with the problems, and to evaluate the consequences of the identified courses of action.

As an independent not-for-profit research organization, the Institute does not advocate any specific policy or embrace any particular social philosophy. As befits a democratic society, the choices among policy alternatives are the prerogative and responsibility of the elected representatives of the citizenry. The Samuel Neaman Institute endeavors to contribute to a climate of informed choice.

The Institute undertakes sponsored research, organises invitational workshops, implements continuing education activities on topics of significance for the development of the State of Israel, and 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. Each research program undertaken by the Institute is designed to be a significant scholarly study worthy of publication and public attention.

## Origins

The initiative for establishing this Institute in Israel was undertaken by Mr. Samuel Neaman. He nurtured the concept to fruition with an agreement signed in 1975 between himself, the Noon Foundation, the American Society for Technion, and Technion. It was ratified in 1978 by the Senate of the Technion. 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, has since retirement devoted his time to the activities of the Institute.

## Organization

The Director of the Neaman Institute, appointed jointly by the President of the Technion and the Chairman of the Institute Board, is responsible for formulating and coordinating policies, recommending projects and selecting staff. The Institute Board is chaired by Mr. Samuel Neaman and includes ex-officio Technion's Vice-President for Development and Vice-President for Research. 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 the Technion Senate and distinguished public representatives reviews research proposals and consults on program development.

## Funding

The Institute's activities are partly financed by the fruits of the Samuel Neaman Research Fund, located at the American Society for the Technion. This ensures freedom and independence. At the same time, contract research is undertaken for government, public and private organizations, provided they are in accordance with Institute goals and objectives.



## DIRECTOR'S REPORT

The past year has been a year of further growth and development for the Neaman Institute both in breadth of subjects and in financial terms. For the first time in the Institute's history, the total annual income in 1994 was greater than one million dollars, with the Neaman Fund contribution less than one third, showing a measure of the maturity of the Institute.

The permanent home of the Institute is being constructed, at a central location on campus. This building will more than double the working space available, and allow having the researchers and equipment all under one roof. A library and conference facilities, with capacities ranging from 20 to over 200 will be also available. The Institute is scheduled to move to the new site during the winter of 1995.

Israeli public policy is undergoing rapid and dramatic changes due to the ongoing peace process, and international developments such as Israel's entry into agreements with the European community. There is thus a growing involvement of the Neaman Institute in projects of an area-wide and international nature. Our emphasis on interaction between the academic research community in science and technology and Israeli industry has started to bear fruit. Israeli industry will have a leading role in translating Israel's main resource, which is the quality of its technologists and scientists, into future competitiveness on the world marketplace. Environmental issues are also taking on a more central role in our work, as the population continues growing and the trend of dense urban development accelerates.

For the past several years we have concentrated on four main areas of activity:

- Industry and Technology
- Science and Research Policy
- Education and Culture
- Quality of Life and Natural Resources

In addition, we have set up a separate division dealing specifically with University-Industry Consortia, after a decision taken by Technion management last summer

that all future formation of such organizations would be the responsibility of the Neaman Institute. These consortia are based on a program initiated and supported by the Ministry of Industry and Trade, in which several industrial companies team up with an academic research institute (the SNI) for pre-competitive, generic research into specific areas of interest. Two consortia are already active, two more have been founded by a group of companies together with the Neaman Institute, and two more are in the planning stage. The two existing consortia are in the fields of:

i) Ground stations for satellite communication: in which four leading industrial groups and the Neaman Institute are starting the third year of a planned five-year program.

ii) Digital communication receivers: in which there are six companies involved. This consortium began activity in 1994, and is scheduled to last up to four years.

Two more, in the fields of testing and production equipment for semiconductor chips in the 0.25 micron range, with six companies and satellite technologies, with four companies, are in the process of establishment, with additional consortia in the environmental monitoring and water quality fields under advanced discussion.

These consortia are supported by the firms involved and the Ministry of Industry and Trade, as part of its Magnet program to enhance the competitiveness of Israeli industry by overcoming the limitations of Israel's size and small local market. We see this as a promising new way to increase interaction between the Technion and other university professors and local industry. It will benefit both the industrial partners and the quality and relevance of teaching at both undergraduate and graduate levels.

The Institute has continued its long range program of strategic studies of various industrial sectors, in cooperation and with joint support from the relevant government ministries and industrial associations. This year, we started the first of a planned series of follow-up

studies on sectors examined in the past, starting to reexamine predictions and decisions in the light of a 3-5 year time span. This year, the plastics industry, which was thoroughly studied in 1989-1992 is being looked at in this framework. We have completed the examination of the Chemical industry started last year, with recommendations for future investment and development.

Also completed recently was the pilot examination of the efficacy of the industrial research institutes belonging to the Ministry of Industry and Trade. We monitored the activities of the Ceramics Research Institute, and the results are now being studied, to see whether the methodology developed can be used for other institutes.

A new project, on recycling of electromechanical products is being considered, with a workshop as the preliminary phase.

A new 3-year project on the efforts of spreading high-tech industries into less-developed regions has been started, in collaboration with the ISI Fraunhofer Institute in Germany.

In the area of **Science Policy**, three symposia were held, including the second Whizin symposium on the ethical aspects of the information revolution, which was held in Los Angeles, jointly with the University of Judaism. The other symposia are within the framework of the Neaman Annual Conferences. A study on the advantages of joining the R&D efforts of the European Community was performed for the Ministry of Science and Arts.

As part of our work in **Education Policy**, we completed a survey of graduates of Technion's Medical School, to see how they rated their studies. A high level of satisfaction was found. A select committee was set up to monitor teaching at Technion, and suggest ways of improving the teaching process. The final report is now being discussed in Technion academic and administrative circles, and some of the recommendations have already been implemented. This year marked the start of several programs in

Medical Policy, as part of our **Quality of Life** area. Among the projects already activated we are surveying the national plan for early detection of breast cancer. A study of the effects of the Chernobyl accident on immigrants who came from the Ukraine is also in progress.

Environmental concerns have become increasingly important, and this is reflected in projects dealing with air pollution from particles, solid waste and wastewater recycling, utilization of coal ash from power stations.

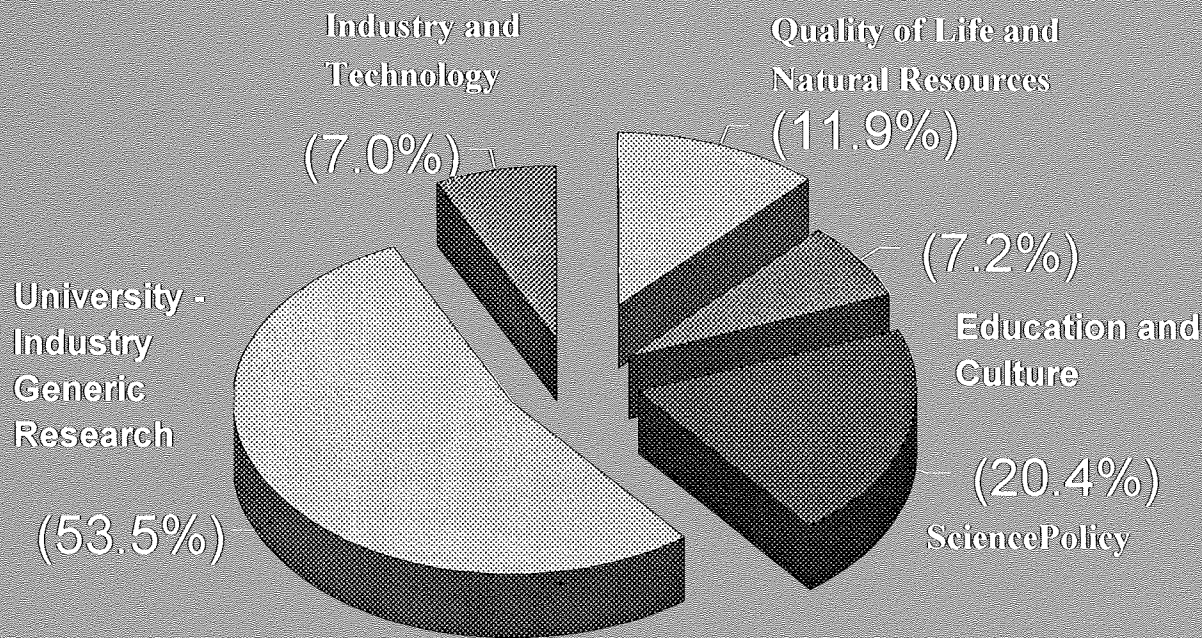
Other studies dealing with problems relating to quality of life include the future development of law-enforcement agencies, and amelioration of traffic congestion.

Over 30 books, reports and memoranda were published this year. The Institute organized and co-sponsored over a dozen conferences and symposia, with a total of over 2000 attendees.

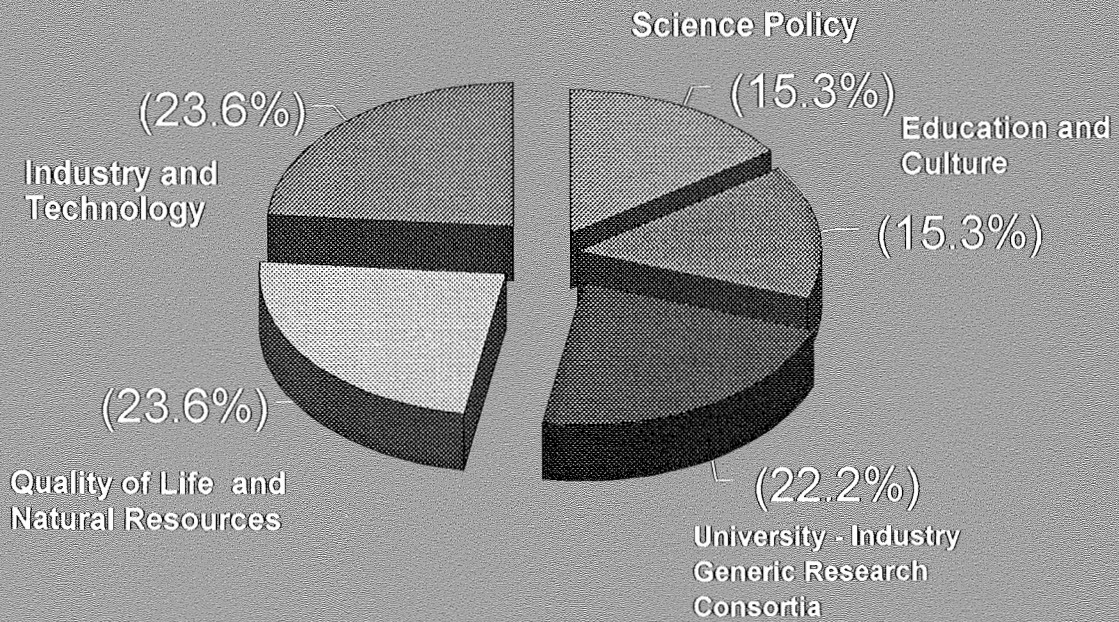
On the personal side, this will be the last time I write this Director's report, as my 5-year term approaching its close. I would like to thank all of the SNI family of employees and researchers, the directors and members of the advisory committee for 5 years of interesting and exciting activity, and especially Sam Neaman, who has been a constant source of sound advice and encouragement.

Daniel Weihs  
Director

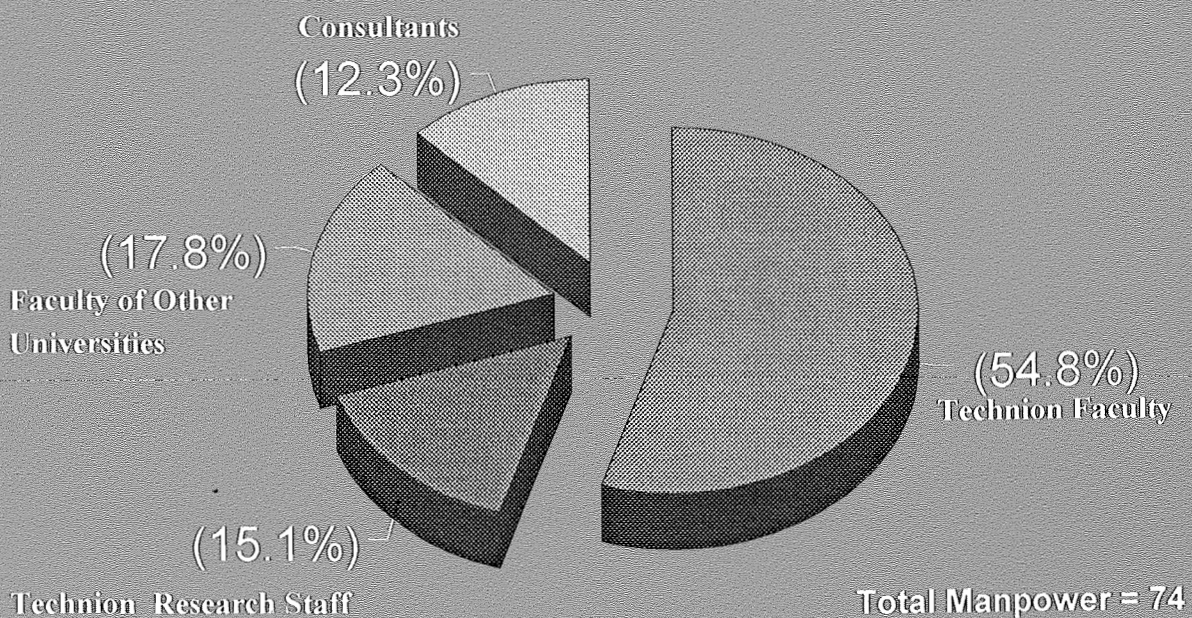
### BUDGET ACCORDING TO AREAS OF ACTIVITY

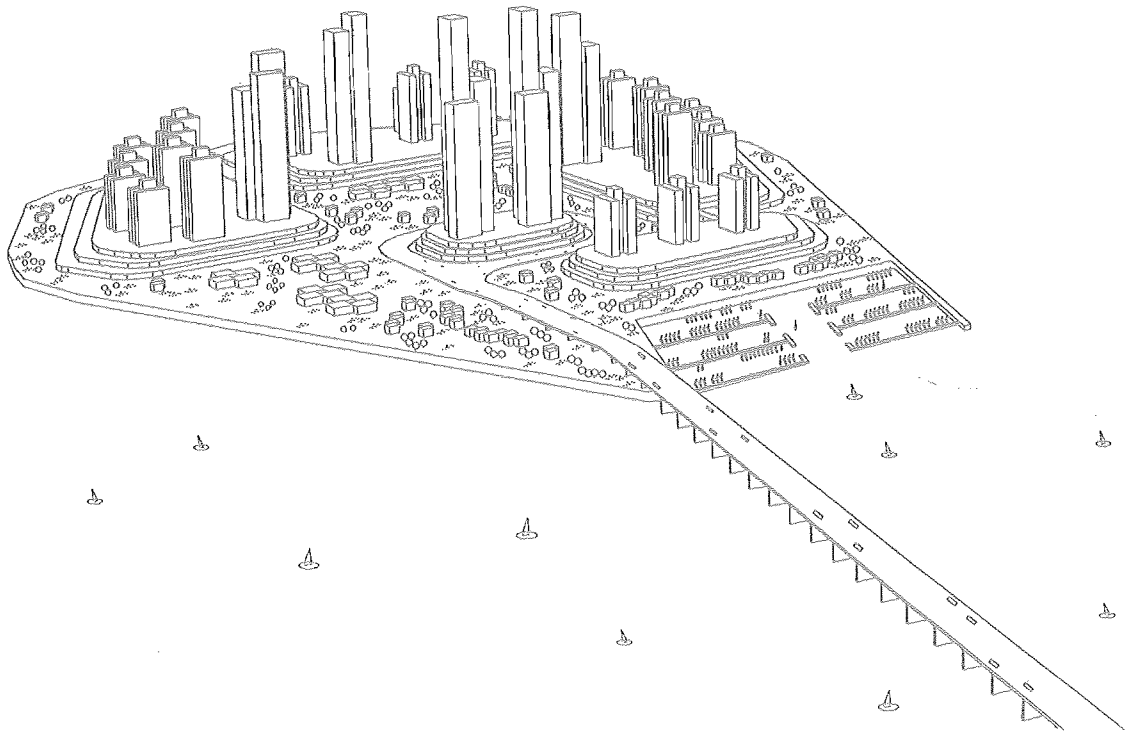


## MANPOWER DISTRIBUTION ACCORDING TO AREAS OF ACTIVITY



## MANPOWER DISTRIBUTION BY AFFILIATION





**ARTIST'S IMPRESSION OF THE OFFSHORE ISLAND (PAGE 42)**



## LIST OF ONGOING SNI PROJECTS

(Names of Researchers and Associates appear on page 46)

### I. INDUSTRY AND TECHNOLOGY

- 17 - Manpower Demand for the Software Industry (2610)
- 18 - Assessment of the Israel Ceramic and Silicate Institute (2590)
- 19 - Improving the Entrepreneur Support Infrastructure for New Immigrants (2560)
- 20 - Spatial Diffusion of Industrial Innovation and Regional Development (2510)
- 21 - The Chemical Industry 2000 (2380)
- 22 - Technological Aspects of Law Enforcement Systems (1561)

### II. UNIVERSITY-INDUSTRY GENERIC RESEARCH CONSORTIA

- 23 - Digital Receivers Consortium (2410)
- 24 - Earth Stations for Satellite Communication Consortium (2200)

### III. SCIENCE POLICY

- 25 - Israel's Integration in the 4th R&D Framework Program of the EU (2650)
- 26 - A National Space Program for Israel (2550)
  - The SNI Annual Scientific Conferences - Third year
- 27 1. Community Aspects of Hyperlipidemia and Atherosclerosis (2302a)
- 28 2. Next Generation Information Technology and Systems (2302b)
- 29 - The Second Whizin Symposium on Technology and Ethics (2221)

### IV. EDUCATION AND CULTURE

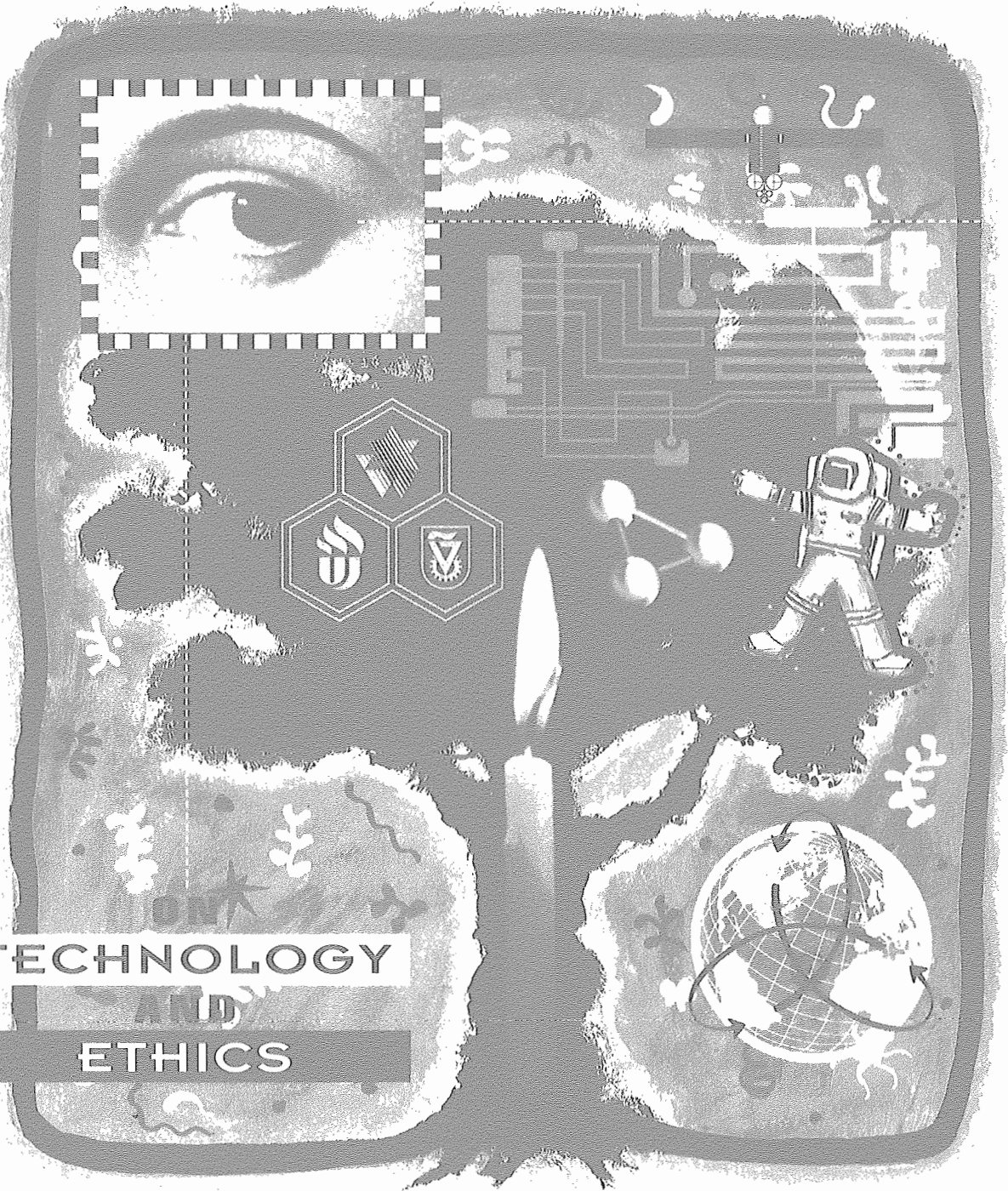
- 30 - Science Education and Career Selection (2870)
- 31 - Interactive Multimedia Services on Cable TV Channels (2880)
- 32 - Survey of Graduates from Technion's Faculty of Medicine (2600)
- 33 - Teaching at the Technion (2580)
- 34 - Teaching of Science and Mathematics by Video (1840)

### V. QUALITY OF LIFE AND NATURAL RESOURCES

- 35 - Recycling of Obsolete Electromechanical Products (2750)
- 36 - A Program for Early Detection of Breast Cancer (2710)
- 37 - Air Pollution from Particles (2700)
- 38 - Evaluation of Congestion and Parking Toll on Travel Demand (2620)
- 39 - Follow-up of the Immigrant population from the Chernobyl Area (2490)
- 40 - Reuse of Reclaimed Wastewater in the Urban Sector (2360)
- 41 - Collection and Recycling of Municipal Solid Waste (2190)
- 42 - Utilization of Coal Fly Ash for Construction of an Offshore Island in Israel (2140)
- 43 - Law Enforcement System in the 21st Century (1560)



# 1995 WHIZIN INTERNATIONAL SYMPOSIUM



TECHNOLOGY

AND  
ETHICS

THE MORAL TOLL OF THE INFORMATION SUPERHIGHWAY

## 2610 MANPOWER DEMAND FOR THE SOFTWARE INDUSTRY

Israel's software industry is diverse and dynamic. Today, more than 80 software houses have some 6,000 employees, the majority of whom are computer scientists, systems engineers, industrial engineers and programmers. International software and hardware manufacturers have established joint projects and R&D centers in Israel following growing international recognition of the talents of Israeli professionals.

The object of the study was twofold:

1. To present a projection on manpower demand for the software industry (qualitative and quantitative aspects).
2. To explore the possibility of integrating new immigrants from the former Soviet-Union into this field.

The respondents to the survey pointed out that there is an acute shortage of programmers mainly in Cobol, C, C++ programming languages, and experts in Novell networks, Windows, Unix and DOS operating systems.

During 1989-1993 software houses absorbed more than 700 new immigrants.

The project was conducted in conjunction with the Israeli Association of Software Houses, the Ministry of Immigrant Absorption and the Ministry of Labor.

2590

## ASSESSMENT OF THE ISRAEL CERAMIC AND SILICATE INSTITUTE

Located on Technion campus, the Ceramic and Silicate Institute is a company that conducts basic and applied research, laboratory tests and experiments, and technology consultancy in the branches of ceramic, silicate, cement, glass, stonewood, fire-proof products and more. It operates under the supervision of industry representatives, the Ministry of Industry and Commerce and the Technion.

The study was initiated and financed by the Chief Scientist of the Ministry of Industry & Trade, in order to provide and present an evaluation and judgement on the following issues :

- The effectiveness of Government support in the basic and applied research activities of the Institute.
- The Institute's contribution to Industry in various fields of activity.
- Potential effect of Government support policy reassessment on current and future research, and industrial projects.

The report had two main recommendations.

- i) The role of the Ceramic Institute is to perform technological transfer activities from the basic research that is done at the Academic Institutes to the applied activities within the industrial field, and to provide relevant laboratory services to the industry.
- ii) The research activity of the Institute should be concentrated in generic and applied technology with very close coordination with Industry.

2560

## IMPROVING THE ENTREPRENEUR SUPPORT INFRASTRUCTURE FOR NEW IMMIGRANTS

The study was aimed to evaluate the existing infrastructure for the promotion of entrepreneurship in Israel in order to determine the suitability of the services provided to the special needs of new immigrants, and to make recommendations for improvements in the existing infrastructure. Research results will facilitate a more efficient utilization of the resources allocated for the support of immigrant entrepreneurial initiative.

Main Activities:

### **a). Entrepreneurial Theory and Practice:**

A comprehensive review of the international literature concerning the theory and the policy supporting immigrant entrepreneurship was conducted. All over the world, many immigrants have turned to small business when faced by limited opportunities in the labor market. Differences in immigrant entrepreneurship are seen to result from pre-migration characteristics, circumstances of migration and post-migration characteristics.

### **b) An Evaluation of the Promotion of Immigrant Entrepreneurship in the Haifa Area:**

The support system for the promotion of immigrant entrepreneurship in the Haifa area was evaluated. Additional recommendations for improvements in the existing support infrastructure were made.

A pilot study was conducted to investigate the problems encountered by Israeli immigrant entrepreneurs.

The research was partially funded by:

The Program for the Support of Immigrant Entrepreneurship, Ministry of Immigrant Absorption;  
The Center for Urban and Regional Studies, Faculty of Architecture and Town Planning, Technion.

2510

## SPATIAL DIFFUSION OF INDUSTRIAL INNOVATION AND REGIONAL DEVELOPMENT

The objective of this three-year research project is to identify the spatial diffusion of industrial innovation and to examine their effect on regional development in Israel. This will enable us to identify the general and country-specific aspects of spatial diffusion processes.

The desire to develop peripheral regions exists in many countries throughout the world, particularly in these countries where a wide socio-economic gap exists between core and peripheral regions. These gaps often exacerbate spatial social and political unrest in the country. To foster the economic growth of peripheral regions it is necessary to create employment opportunities which will also attract the population to migrate and settle in these regions.

In Israel this desire has been translated into public policies aimed at developing the Northern Galilee and the southern Negev regions. In Germany, government programs in the form of investments allowance and development of industry-related infrastructure were designed in order to promote the economic growth of lagging regions.

This study represents a first attempt to carry out a cross-country study concerning the diffusion of innovation in space and their impact on regional growth and development. The findings will increase our understanding as to the most cost-effective policies aimed at promoting innovation-oriented policies, thus fostering investments in industrial development and creating employment opportunities in lagging regions.

This study is sponsored by the G.I.F - German-Israeli Foundation for Science Research and Development.

## 2380 THE CHEMICAL INDUSTRY 2000 Phase II: Potential for Growth

The objective of the study was to identify the potential for growth of the chemical industry in Israel, and to recommend policies that would result in such growth.

Phase II of the project was conducted this year. The main results were:

The chemical industry in developed countries is still in the throes of reorganizations and cutbacks in personnel.

Market segments that are growing faster than the average chemical markets, and market segments with future potential for growth were identified. These areas with potential for growth were collected in three groups:

1. Intermediates that are not currently manufactured in Israel.
2. Sophisticated products that require special know-how, as well as service to the clients.
3. New technologies that will be advantageous for innovators.

Among the recommendations made are:

- Stress professionalism and innovation.
- Build plants not only in Israel but also in other countries.
- Government support of research should share the risk, but not undertake all the risk.

The study is partially funded by the Ministry and Trade and the Manufacturers Association of Israel.

## 1561 THE TECHNOLOGICAL ASPECT OF THE LAW ENFORCEMENT SYSTEM

The purpose of this work was to assess future trends in science and technology, relevant to law enforcement, and to identify those among them that will significantly increase the efficiency of Israel police in the years to come. The present study is part of a larger on-going project (see page    ).

Presently unsolved technical problems and anticipated future needs were identified in collaboration with police personnel; a list of relevant existing and emerging technologies was compiled; and their impact on determining appropriate solution to the needs was analyzed. In doing so, a realistic approach was adopted: (a) future performance was estimated by cautious extrapolation and (b) inherent delays in the time-table of the acquisition and integration cycle of new and sophisticated systems (due to need for organizational changes, doctrine development, personnel training, etc.) were taken into account.

The main outcome of this study was the identification of 5 generic technology trends that are most likely to have a revolutionary effect on the efficiency of police work in the next 15 - 25 years : (1) Computerization; (2) Multi-media communication; (3) Advanced video technology; (4) Robotics; and (5) Miniaturization. The synergistic collaboration between police and other organizations involved in the law enforcement process, as well as much-needed educational programs for crime prevention, will also be boosted by the same technologies. The problem of defining priorities and choosing between alternatives, was also addressed.

## 2410 DIGITAL COMMUNICATION CONSORTIUM

This Industry-University consortium aims to develop pre-competitive generic technologies which will contribute to a variety of products in the rapidly increasing digital communications market and in particular in the personal communication market.

The S.Neaman Institute played a crucial role in the process which led to establishment of the consortium. The program was approved and first funded in 1994 by the Chief Scientist's Office in the Ministry of Industry and Trade. This funding covers 66% of the total funding, the rest is supplied by the member companies. The consortium includes six companies: Elta, Tadiran, Rafael/Galram, Gilat, Shiron and DSPT, in addition to the S.Neaman Institute.

The program includes five research projects which are performed in the laboratories of the members. Each project involves the cooperation of several companies working closely together. In addition there are some academic research topics in the Technion. In 1994, which was the first year of the consortium almost four million IS were spent on research.

The S.Neaman Institute role included responsibility for the academic research work, organization of workshops and creating the information bank which includes both relevant external information and all the knowledge generated by the consortium's research.



## 2200 EARTH STATIONS FOR SATELLITE COMMUNICATION CONSORTIUM

Communication via satellites has grown rapidly in recent years, as technological developments have broadened its accessibility. It is now also available to the "small business" sector (banks, offices, department stores), and the consumer market.

The consortium of Earth Stations for Satellite Communication was founded by Raphael, Israel Aircraft Industries, Elisra, Gilat and the S. Neaman Institute to establish a joint venture that will enable Israeli industry to compete in this market. The consortium is supported by the Chief Scientist of the Israeli Ministry for Industry and Trade and the companies involved.

The basic research activities of the consortium are the responsibility of the S. Neaman Institute. Subjects covered include:

1. Advanced modulation, coding and compression techniques for efficient utilization of the satellite channel.
2. New access and routing methods between earth stations and satellites
3. Image and data compression and image processing for satellite communications.
4. Antennas for low-cost front end units of earth stations.

In addition to this research, the Institute is responsible for building and handling the database in satellite communications for use by all consortium members.

Several workshops and technical meetings of consortium researchers were organized by the S. Neaman Institute in 1994/95.

2650

## ISRAEL'S INTEGRATION IN THE 4TH R&D FRAMEWORK PROGRAMME OF THE E.U.

This study was commissioned by the Ministry of Science and the Arts as part of the preparations for the negotiations with the EU on Israel's integration in the 4th R&D framework programme of the EU, which is to be initiated in the near future. The study analysed the pros and cons of Israel's integration in the programme and its impact on Israel's R&D.

The specific role the European Union wants to play in research and technology is to complement and add value to the efforts undertaken by the member states by providing a framework for collaboration between partners from various EU countries.

It also wants to play the role of a catalyst who combines the resources and talent dispersed throughout the member states.

One of the means to achieve these goals is by financially supporting cooperation and communication across the borders of the member states. This is done through various funding activities.

Compared to former programs an increasing attention will be given to environmental questions and to education and mobility of research personnel as well.

## 2550 A NATIONAL SPACE PROGRAM FOR ISRAEL

Space sciences and space technologies represent an important element of the technological strength of developed countries. Most high tech industries in those countries are involved in space development projects and have acquired their expertise and experience in the framework of a national space program.

This effort aims to formulate goals, scope and framework for a realistic national space program which could effectively strengthen the Israeli scientific and technological community and industry in the space field and in its ability to compete globally in space technologies, their applications, space utilization and the related markets.

A preliminary survey of Israel space industry and infrastructure was conducted. This infrastructure was laid down in the frame of the Ofeq program in the last decade, during which two experimental satellites were built and launched in Israel. It consists of a center of satellite integration and satellite development facilities and expertise at MBT in Israel Aircraft Industries, a relatively large number of Israeli high-tech companies which specialized in satellite subsystems and an academic center for space research at the Technion.

The need for an Israeli space agency and its scope of activity was investigated with the help of a national committee (the Uzia Galil Committee) formed for that purpose. The main conclusions were that due to the extent of the space infrastructure in Israel and its perceived potential, a national space agency is mandatory in order to formulate and update Israel space policy, coordinate government activities in the field, define and manage the recommended government support.

The project is funded by the Ministry of Science and Arts.

**2302a The SNI Annual Scientific Conferences - Third  
year:  
COMMUNITY ASPECTS OF HYPERLIPIDEMIA  
AND ATHEROSCLEROSIS**

The workshop on "Community Aspects of Hyperlipidemia and Atherosclerosis - The Family Physician's View", carried out at the Technion and attracted over 200 family practitioners and clinicians from throughout the country interested in the updated research results in this important field of atherosclerosis and related heart disease are the leading causes of mortality in the Western world. The workshop, held on May 10, 1995 at the Rappaport Family Institute for Research in the Medical Sciences, included lectures by internationally recognized experts in the fields of Epidemiology, Family Medicine and other clinical disciplines, and Economics, from Europe, the United States and Israel. The program also included discussion workshops on the subjects of Nutrition Education in Primary Care, Primary and Secondary Prevention and Medication and Economics. The workshop was organized in conjunction with the Bruce Rappaport Faculty of Medicine's Department of Family Health Care.

2302b **The SNI Annual Scientific Conferences- Third year:  
THE NEXT GENERATION INFORMATION TECHNOLOGIES AND SYSTEMS (NGITS)**

A current view in the research community is that next generation information and systems will be complex, intelligent, cooperative and will utilize various multi-media technologies.

The goal of this workshop is to provide a forum for discussing issues related to the realization of these next generation systems. Main topics included in the workshop:

- \* Architecture of NGITS systems
- \* Paradigms for the design and implementation of NGITS
- \* Knowledge and data management issues in NGITS
- \* Multi-media technologies
- \* Intelligent Information Systems
- \* Computer vision and its use in NGITS
- \* Industrial applications of NGITS
- \* Neural networks and their future impact on IT
- \* Intelligent tutoring systems
- \* Coordination between hardware and software research
- \* Telecommunication and its impact.

The workshop will be held in June 1995.

## 2221 THE SECOND WHIZIN SYMPOSIUM ON TECHNOLOGY AND ETHICS

The Whizin International Symposium in Technology and Ethics is a collaborative venture between the University of Judaism in Los Angeles, California, and the Samuel Neaman Institute at the Technion. The goal of the symposium is to provide a forum for reflection and discussion into the ethical considerations of the technological frontier.

Entitled "The Moral Toll of the Information Superhighway", the subject of this year's symposium held Feb. 5-7, 1995 at the University of Judaism campus in L.A. was communications technology exploring its social, ethical, legal and political implications.

The first day included a session on "The Promise of Communications Technology" with lectures on What can; and what should be done with emerging technologies. The second day was dedicated to case studies raising moral problems arising from the availability of communication technology.

The three cases discussed dealt with:

1. The needs of employers, insurance companies etc. vs the rights of individuals to privacy of personal medical records.
2. The rights to access vs. privacy of financial and business information, and the government's role in protecting public safety and welfare.
3. Literary and scientific intellectual rights.

The third day included plenary sessions. Over 100 people attended the discussions, which will appear in book form.

The third Whizin Symposium, which will deal with "Ethics and the Environment" will take place at Technion in 1997.

## 2870 SCIENCE EDUCATION AND CAREER SELECTION

The aim of the workshop was to provide a forum for discussion on science education and career selection.

In this framework three sessions were held dedicated to the following topics:

- a. Promoting excellence in Science Education.
- b. Professional training at the university level.
- c. Recruitment of professionals for the economy.

It was concluded to establish a permanent working group to improve communication between high-school educators, university staff and industrial employers with the hope that an ongoing dialogue will serve to improve both the level of scientific education and the relevant long-term needs of the Israeli economy.

**2880 INTERACTIVE MULTIMEDIA SERVICES ON  
CABLE TV CHANNELS**

This project is part of a study commissioned by the Ministry of Communication in order to advise the Ministry on problems posed by implementation of Multimedia services on the existing Cable TV Networks in Israel, and is done partly under the auspices of the S. Neaman Institute.

Main points covered in the present study

1. Multimedia application services and policies in selected countries.
2. Future market trends and demands.
3. Regulatory policies and competition considerations.
4. Technical aspects relating demand barriers and network architecture.

The study was funded by the Ministry of Communication.



## 2600 SURVEY OF GRADUATES FROM TECHNION'S FACULTY OF MEDICINE

Twenty years ago, the degree of Doctor of Medicine (M.D.) was first awarded to graduates of the Technion's Rappaport Faculty of Medicine.

The academic program of the faculty extends over a period of six years, plus one year of internship. The curriculum includes basic, preclinical and clinical sciences.

Since its establishment, more than 1000 students have graduated from the Faculty of Medicine. The aim of this survey was to study the background, the professional success and the attitudes of the graduates in order to enhance the attractiveness of the Faculty for potential candidates, and improve training. Detailed questionnaires were sent out to all graduates and answers were received from 35% .

The main findings: Countries of origin of the graduates: Israel - 53%, Western Europe - 27%, Eastern Europe - 14%, others 16%. Fields of specialization: Pediatrics 19%, Internal medicine - 13%, Gynecology - 13%, Family - 7%, Cardiology - 5%, Surgery - 5%, Ear, Nose and Throat diseases - 6%, ophtalmology - 4%. There are less than 2% in other fields of specialization.

Approximately 17% of the graduates are positioned in high ranking managerial positions as directors of hospitals, heads of medical institutions, hospital departments etc.

The study was conducted in conjunction with the Technion's Rappaport Faculty of Medicine.

## 2580 TEACHING AT THE TECHNION

The aim of the study, first recommended by the Technion Board of Governors, was to examine various aspects of teaching at leading universities in the world. Based on this examination, to evaluate the situation at the Technion and to recommend ways of maintaining high standards of teaching at the Technion.

A committee of five professors from different fields was convened for this study.

The committee performed an extensive literature survey and initiated direct contacts with leading universities. The committee also met faculty members, students representatives and other Technion employees. The committee concluded that although the Technion and its faculty members are devoting a significant effort to teaching, and the fruits of this effort are recognized by the students, the institute still suffers from problems that are similar to those of other leading research universities over the world.

These problems can be classified as follows:

- a. The "inferior" status of teaching as compared to research as criteria for advancement of faculty.
- b. Alienation between faculty members (including also administrative staff) and students, with regard to teaching
- c. The "first-year shock" that influences the students through the rest of their studies at the Technion
- d. Lack of tools that are required for the enhancement of teaching at the Technion.

The committee suggested both short and long-term solutions to these problems, in an extensive report presented to Technion's management and Board.

## 1840 TEACHING OF SCIENCE AND MATHEMATICS BY VIDEO

This project aims to improve the quality of science teaching in high schools. The concept is to have course material presented in the schools by the best teachers at university level. The most practical way to achieve this goal is to videotape entire courses in high-school physics, mathematics and chemistry, presented by the best teachers from Technion and other institutions. These videotaped lectures are then supplied for use in high-schools. The project began seven years ago, and in this academic year, the following activities were performed:

(1) Additional sets of physics and mathematics courses were distributed to high-schools and university preparatory units.

(2) A course in Calculus was prepared.

(3) A number of workshops for teachers, principals, supervisors and students were organized in which the program was presented in addition to lectures on advanced physics.

The program is partly funded by the Association for the Advancement of Education.

## 2750 RECYCLING OF OBSOLETE ELECTRO-MECHANICAL PRODUCTS

A joint German-Israeli seminar dealing with recycling household appliances was held by the Institute. The aim of the seminar was to survey the current available eco-friendly technologies for reducing harmful effects of such waste, and on the other hand, to find an efficient, clean and economical technology to dispose of the hazardous waste, and at the same time to regain as much as possible useful materials for future use. Guest experts from Europe, both from industry and the academy, reported on their experience in the recycling processes of obsolete electro-mechanical products and explored the challenges confronting the recycling industry.

Until now, a vast amount of obsolete household appliances have been dumped as a part of the overall municipal waste. At best, part of it has been shredded, allowing to regain most of the ferrous and some of the non-ferrous materials, whereas the rest required disposal in special dumping sites.

Currently, manufacturers as well as municipal and governmental authorities, regard this environmental problem most seriously: They have to comply with environmental regulations which demand a change of attitude and a search for new ways to reduce waste, improve waste treatment efficiency and cut costs. They cannot rely anymore on the wasteful technologies of the past. Consequently, industry has been pushed to devote itself to look for new, environmentally-sound recycling methods of obsolete appliances.

**2710 A PROGRAM FOR EARLY DETECTION OF BREAST CANCER**

The aim of the study was to enhance the use of mammography by the female population in Israel and to promote high quality in the medical and human aspects of the diagnostic process.

The National Israeli Early Breast Cancer Detection Program has been operating for 3 years. During this period 22 mammography units were recruited to participate in the program and are providing diagnostic work-up under strict quality criteria. Close to 100,000 women were examined in the National program sites in 1994; of them, some 60,000 were referred for screening. The program also involves reporting and quality evaluation of all the pathology and cytology institutes in Israel.

The study is funded by the Israel Cancer Association and the Ministry of Health.

## 2700 AIR POLLUTION FROM PARTICLES

The health effects of man made, and natural particles in the aerial environment are not sufficiently understood, with the result that the experts are not agreed about the efficacy of existing pollution standards. As a start of research into the information required for public policy decisions, a workshop was organised in January 1995. Two lecture sessions, and a panel debate were held. The lectures dealt with excess mortality due to particulates, a status report on the particulate pollution in the Haifa region, industrial sources of pollution and means of detection, natural particulates and their dependence on wind regimes, technological means of reducing particle emissions, and particulate air standards in various countries. The talks and panel included speakers from universities government and local authorities, industry and environmental protection societies, with an audience of about 120 attendees. A lively debate arose, with the conclusion that much further investigation is needed, especially into the effects of submicron particles, and that existing standards are not updated enough.

## 2620 EVALUATION OF CONGESTION AND PARKING TOLLS ON TRAVEL DEMAND

Congestion toll is a payment that is imposed on drivers traveling at peak hours in congested roads. Congestion and parking tolls are expected to achieve a new equilibrium between the demand and supply of freeway use at peak hours by reducing use of private cars. The smaller number of trips with higher prices is justified, since drivers do not currently pay the full cost of their journey, particularly for the delays they cause to other drivers. This research was undertaken to evaluate the impact of congestion and parking fees at destinations on traffic volume. The Technion campus was selected as a case study. The sample comprised 133 workers travelling currently to the Technion by car. These were asked whether and how they would change their travelling habit if such tolls were imposed. The tolls are assumed to prevent:

1. Congestion on entering the Technion in the morning.
2. Lack of parking space on campus.

The questionnaire was based on the methodology of Stated Preference (SP). In the SP, a series of hypothetical alternatives are presented, and the individuals are asked to indicate how they would respond if these situations faced them in reality. The travel demand curve and its elasticity, and the willingness to pay were estimated, based on the sample response. A logit model was calibrated from the data yielded. The model coefficients were estimated, and also the probability of choosing each alternative in the choice set.

## FOLLOW-UP OF THE IMMIGRANT POPULATION FROM THE CHERNOBYL AREA

The aim of the study is to evaluate the magnitude of health effects possibly related to radiation exposure from the Chernobyl nuclear reactor.

Immigrants to Israel from areas in the former USSR where increased Cesium<sup>137</sup> levels were measured following the 1986 accident in the Chernobyl nuclear reactor, were asked to participate in this study. The number of participants accrued thus far is close to 8,000. All participants provided self-reported information on their exposure and on their health status before, and after the accident. The major steps taken in the present year were:

1. Increasing the number of participants.
2. Partial validation of the medical data provided by the immigrants.
3. Evaluation of the subgroup of liquidators who were part of the rescue teams and the cleaning-up teams after the accident.
4. Establishment of two control groups. One of the control groups includes immigrants from non-radiation-inflicted areas such as Moscow and St. Petersburg to serve as baseline data. The second is of immigrants from the radiation inflicted areas who did not register with the study center. This latter group will control for possible selection bias into the study group.

Thus far the major preliminary findings are a very high rate of self-reported diseases among the study group. This mainly includes various thyroid problems but also benign and malignant tumors. These data need to be referred to with caution due to possible over-reporting. Among the liquidators no excess morbidity or mortality has yet been detected.

The study is partially funded by Kupat-Holim Health Fund Insurance Foundation.



## 2360 REUSE OF RECLAIMED WASTEWATER IN THE URBAN SECTOR IN ISRAEL

Reuse of reclaimed wastewater for various urban purposes, such as gardens and landscape irrigation, industry and recreation, can be the most easily available and the less expensive method to augment water supply to towns located in water deprived regions. The aim of the research was to evaluate the technical feasibility, to examine its public acceptance and to estimate the cost-effectiveness of urban reuse of properly treated wastewater. The comprehensive study of the subject will enhance the implementation of urban reuse projects in Israel.

A comprehensive research and planning report was been prepared. It comprises the following sections:

- a. Defining the potential urban application of the reclaimed wastewater: irrigation of public gardens & parks, private gardens, industry, out-door cleaning and dust spraying, in-house cleaning and toilet flushing, recreational ponds & lakes, groundwater recharge.
- b. Literature review of effluent quality requirements, imposed by health authorities in other countries & states, for various reuse applications. Proposing a tentative effluent quality criteria to be used in urban reclamation project in Israel.
- c. Description and analysis of several urban reclamation projects successfully operated in U.S.A, South Africa and other countries.
- d. A public attitude poll had been carried out. It was found that 90% of the participants will accept reuse application not involved with direct contact with the effluent. Factors which influence citizens' attitude, such as education and consciousness to water problems were analysed.
- e. The engineering feasibility evaluation and the cost-effectiveness study were made by general planning of reuse projects for two actual towns.

The research is co-sponsored by the Water Commissioner's office.

## 2190 COLLECTION AND RECYCLING OF MUNICIPAL SOLID WASTE IN ISRAEL

The disposal of municipal solid waste causes economic and environmental burdens in Israel. The different aspects of recycling, including technological aspects of the recyclable materials and economical aspects of waste management were studied.

The main objectives of the study were:

- \* To study the different alternatives, including technological and economical aspects, of waste management: separation, processing and recycling.
- \* To develop an economic model for minimum waste management costs.
- \* To study economic incentives for waste management.

A computer model was developed, using data obtained from recycling companies in Israel and the Municipal Authorities Organization. The model enables each municipality use its data in order to evaluate anticipated costs of different waste management alternatives. The data include collection costs, transportation costs, processing costs and landfill tipping fees.

Presently, there is no direct nor indirect incentive for the individual household, to reduce, reuse or recycle its waste. Economic incentives in solid waste management policies in several western countries were studied. Some of these incentives can be implemented in Israel as a part of a national integrated waste management policy.

The study was partially funded by the Ministry of the Environment.

2140

## UTILIZATION OF COAL FLY ASH FOR CONSTRUCTION OF AN OFFSHORE ISLAND IN ISRAEL

The construction of artificial islands off the shore of Israel has the potential of developing into one of the largest national projects in the future. The purpose of this project is to reclaim land from the sea in a region where the land is scarce, expensive and highly in demand.

The effect of the proposed island on the balance of sand sedimentation and the existing shore line was studied using a computer simulation program. Using this program the effect of different shapes of a 1-square KM base area island on the shore was tested.

The limited availability of coal fly ash, motivated the search for the most efficient uses of this ash, as fill and building material, and to this end different options to utilize it as top and bottom covers and as part of construction elements were illustrated. In this context the rate of supply of ash and methods to store it on the sea bottom were considered. Solidified ash that included hazardous metals was tested for their leachability. The results indicate that even at high concentration of these metals, their leachability is small. Different aspects of the economics of the project were studied using a computer program developed for this purpose.

The project was co-funded by the Israel Electric Corporation and by the Dutch Government.

1560

## LAW ENFORCEMENT SYSTEM IN THE 21ST CENTURY

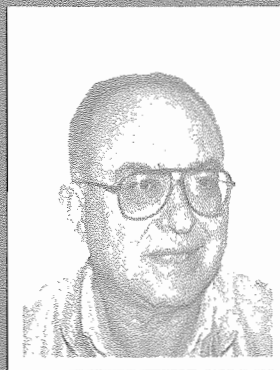
This project, jointly sponsored by the Ministry of Police, the S. Neaman Institute, and the Jerusalem Center for Public Affairs, seeks to define the future objectives of the Israeli law enforcement system and to specify the tools required to achieve those objectives. The first stage of this project has involved the exploration of developmental trends within Israeli society by teams of experts in various fields. In the second stage, now to begin, criminologists and experts from the major law enforcement agencies will consider the implications of the possible scenarios which have been given for each relevant field on the Israeli law enforcement system.

During the past year, the first stage of the project was essentially completed. Comprehensive reports were written on the societal issues facing Israel; on the science and technology relevant to Israel's law enforcement agencies; and an assessment of the future of Israeli politics and government; law enforcement. In addition, two workshops, attended by academics and professionals, were sponsored - one on the report of the Israeli legal system and the other on the reports dealing with societal issues facing Israel. In December, Prof. Herman Goldstein, a leading law enforcement expert from the University of Wisconsin law school, visited Israel and assessed the relevance of the information gathered for Israel's police force and the implications it may have for the future of law enforcement in Israel.

RESEARCHERS  
AND ASSOCIATES



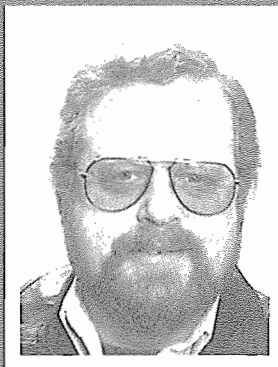
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Prof. Y. Avnimelech



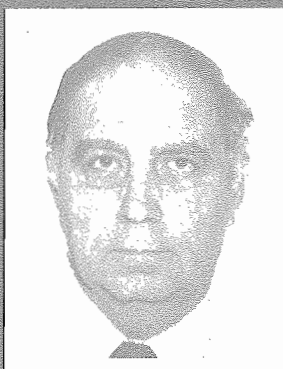
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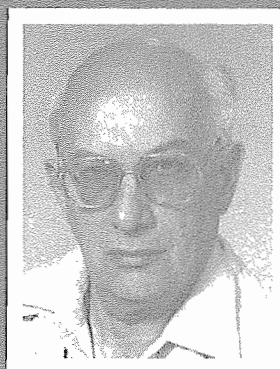
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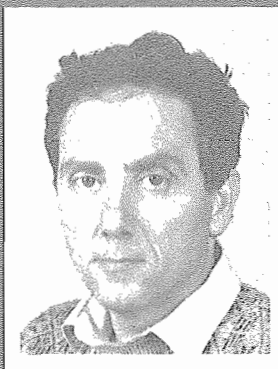
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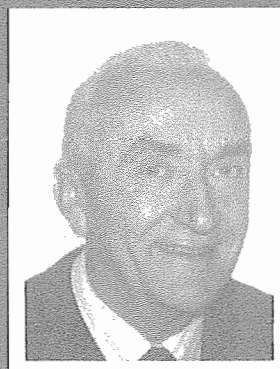
Prof. E. Kehat



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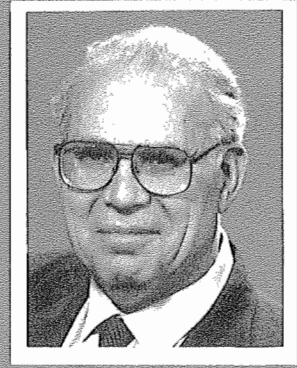
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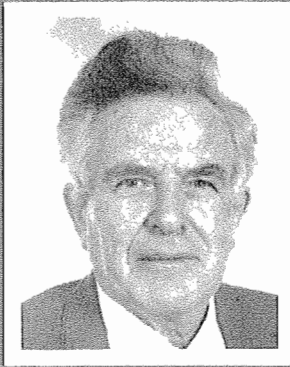
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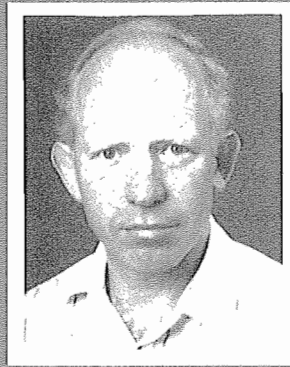
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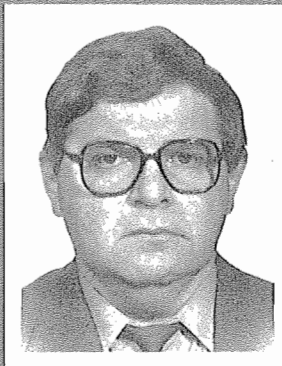
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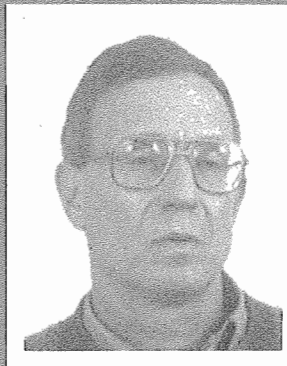
Prof. Aviv Rosen



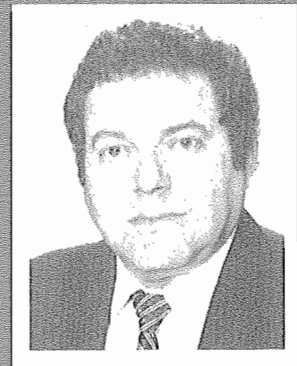
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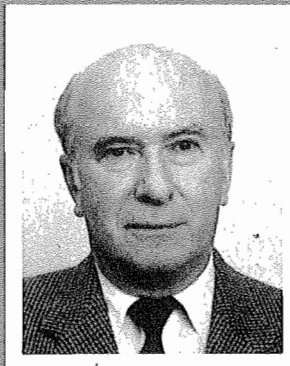
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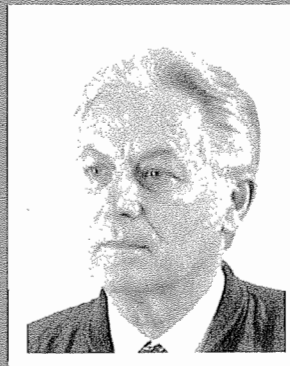
Prof. M. Shechter



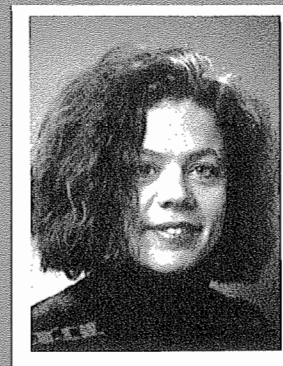
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- Yoram Shiftan*, Ph.D., Transportation Research Institute, Technion
- Reuel Shinnar*, Professor Emeritus of Chemical Engineering, CCNY

- Abraham Shitzer*, Professor of Mechanical Engineering, Technion  
*Aner Shoham*, The S. Neaman Institute
- \* *Dan Shklarsky*, Ph.D. , Consultant (2880)
  - Samuel Sideman*, Professor of Bio-Medical and Chemical Engineering, Technion
  - \* *Moshe Sidi*, Assoc. Professor of Electrical Engineering, Technion (2200)
  - Michael Silberman*, Professor of Medicine, Technion
  - \* *D. Simmons-Cohen*, Department of Architecture and Town Planning, Technion (2560)
  - Paul Singer*, Professor of Physics, Technion
  - \* *Tomas Spenser*, Ph.D., Department of Medicine, Technion (2302)
  - \* *Eli Spiegler*, Ph.D., Consultant (1561)
  - Ciporah S. Tadmor*, Ph.D., Rambam Medical Center, Haifa
  - Zehev Tadmor*, Distinguished Professor of Chemical Engineering, Technion.
  - Tsila Tuviana*, Department of General Studies, Technion
  - \* *Motti Vaknin*, The S. Neaman Institute (2410)
  - David Vofsi*, Professor Emeritus of Chemistry, Weizmann Institute of Science
  - \* *Yochanan Vozner*, Professor of Social Work, Tel Aviv University (1560)
  - \* *Reuven Wachs*, Consultant (2380)
  - Shlomo Waks*, Assoc. Professor of Teaching in Science and Technology, Technion
  - \* *Daniel Weiss*, Professor of Aerospace Engineering, Technion
  - \* *Ami Wolanski*, Ph.D. Ministry of Education (1560)
  - Micha Wolfshstein*, Professor of Aerospace Engineering, Technion
  - Michael Yoeli*, Professor of Computer Sciences, Technion
  - Abraham Zaks*, Professor of Mathematics, Technion
  - Shmuel Zaks*, Assoc. Professor of Computer Sciences, Technion
  - Moshe Zakai*, Distinguished Professor of Electrical Engineering, Technion
  - \* *Yoel Zaphir*, Ph.D. Consultant, (1561)
  - Yehoshua Zeevi*, Professor of Electrical Engineering, Technion
  - Zvi Ziegler*, Professor of Mathematics, Technion
  - \* *Yoram Zimmels*, Assoc. Professor of Civil Engineering (2140)
  - \* *Yaakov Ziv*, Distinguished Professor of Electrical Engineering, Technion (2302, 2670)

## WORKSHOPS and SEMINARS 1992 - 1995

Recycling of Glass, February 6, 1992.

2nd International Workshop on Civilian Space Applications,  
February 19, 1992.

The Domination of the Car: The End of the Road, Dr. Meyer  
Hillman, Policy Studies Institute, London, April 13, 1992.

The Incompatibility of Economic Growth and Preservation of the  
Environment, Dr. Meyer Hillman, Policy Studies Institute, London,  
April 14, 1992.

Measurement of R&D Quality and Productivity, May 5, 1992

Info 92 - Evaluation of Scientific Activity: Methods and Tools, May  
19, 1992.

Seminar on Measurement of Performance Parameters for the  
Israeli Industry, June 9, 1992.

Consortium on Earth Stations for Satellite Communication:

- I. R&D plans within the Consortium framework, June 11, 1992.
- II. Technical Workshops for Professional Groups, June 25, 1992.
- III. INMARSAT mobile satellite system, September 9, 1992.
- IV. Communication Networks, February 2, 1993.
- V. Annual General Meeting, October 27, 1993.
- VI. Seminar on Communication Techniques for Satellites,  
Professor Joachim Hagenauer, LNT, TU Muenchen, January 5-  
6, 1994.
- VII. Technical Workshops for Professional Groups, January 6, 1994.
- VIII. Antennas and microwave Technical Meeting, July 6, 1994.
- IX. Annual General Meeting, November 6, 1994.

Electronics 2000, June 25, 1992.

Whizin International Symposium on Technology and Ethics, June  
17-19, 1992.

WDAG International Workshop on Distributed Algorithms,  
November 2-4, 1992.

Economic and Social Aspects of Manpower Layoffs, January 21, 1993.

Physics - Laboratory Demonstrations, February 1, 1993.

International Amendments on the Environment and Their Effect on Israel's Energy Sector, April 29, 1993.

Immigrant Absorption: The Interface between Research and Policy, May 30-June 2, 1993.

Physics - Laboratory Demonstrations, February 3, 1994.

The Economics of Peace, Professor Gad Gilbar, February 16, 1994.

The Chemical Industry 2000, Prof. E. Kehat, February 24, 1994.

Consortium for Digital Communications:

1. Technical Workshop for Professional Groups, April 21, 1994.
2. Technical Workshop for Professional Groups, April 2, 1995.

Signal and Image Representation in Combined Spaces, May 8-10, 1994.

Conference on Shore Extensions and Artificial Islands off the Coast of Israel, June 16-17, 1994.

1995 Whizin International Symposium: The Moral Toll of the Information Superhighway, February 5-7, 1995.

Physics - Laboratory Demonstrations, February 6, 1995.

Seminar for Physics Teachers in Colleges - February 23-24, 1995.

Science Education and Career Selection, April 30, 1995.

Recycling of Obsolete Electro-Mechanical Products, April 3, 1995.

Community Aspects of Hyperlipidemia and Atherosclerosis, May 10, 1995.

## SNI - LIST OF PUBLICATIONS\* - 1992-1995

### English Publications

Peritz, B.C., *Science Indicators and the Evaluation of Scientific Activity*, March 1992.

S. Sideman (Ed.) Proceedings of the International Workshop on *The Interaction between Medicine and Engineering*, March 1992.

D. Weihs (Ed.) Proceedings of the Second International Workshop on *Civilian Space Applications*, April 1992.

E. Kehat, Y. Aharoni, D. Kohn, G. Czapski, E. Nissim, U. Rappaport, *Evaluation Methodology for Research Productivity of Universities*, August 1992.

G. Fortuna, R. Shinnar, *Measurement of Performance parameters for the Israeli Industry*, August 1992.

A. Segal, S. Zaks (Eds.) *Distributed Algorithms, W DAG '92*, Springer Verlag, Lecture Notes in Computer Science Series, No. 647, November 1992.

Frenkel, A., Maital, S., Koschatzky, K., Grupp, H., *Estimating and Partitioning Sources of Value in Technologically-Sophisticated Products*, Working Paper, SNI, 1993.

S. Maital, A. Frenkel, H. Grupp, K. Koschatzky, *Toward a Dynamic Technometric Benchmarking Model for Strategic Innovation and Second-Generation R&D Investment*, Working Paper, The S. Neaman Institute, Jan. 1993.

E.A. Halevi, D. Kohn, *Technology and Ethics*, Proceedings of the Whizin International Symposium, Haifa, June 17-19, 1992. March 1993.

Peritz, B.C., *Further Investigation in the Evaluation of Scientific Activity*, May 1993.

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S. Maital, H. Grupp, A. Frenkel, K. Koschatzky, *A Technometric Analysis of Comparative Advantage in Selected High-Technology Industries in Israel*, Final Report, Vol. I - II, October, 1993.

N. Carmon, (Ed.), *Immigrants - Liability or Asset? Innovative Research and Policy Implications*, May, 1993.

E. Kehat, R. Wachs *The Chemical Industry 2000*, Phase A, December, 1993.

D. Shimshoni, *Human Resources Policy in an Age of Change*, 1994 (Internal Report).

Workshop on *Signal and Image Representation in Combined Spaces* (Abstracts), May 1994.

D. Chillag, S. Gepstein, N. Movshovitz-Hadar, M. Perl, A. Rosen, *Report of the S. Neaman Institute Committee on the Advancement of Teaching at Technion*, June 1994.

E. Kehat, R. Wachs, *The Chemical Industry 2000*, Phase B, November 1994.

N. Gomelski, D. Simmons-Cohen, *An Evaluation of the Promotion of Immigrant Entrepreneurship in the Haifa Area*, December 1994.

N. Gomelski, D. Simmons-Cohen, *Entrepreneurial Theory and Practice: Immigrant Opportunities*, December 1994.

E. Kehat, R. Wachs, *The Chemical Industry 2000 Potential for Future Growth*, March 1995.

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Czapski, G., Frenkel, A., Kohn, D., Shoham, A., "Cooperation between Israeli and Foreign Researchers", *Scientometrics*, Vol. 25, No. 3, pp. 381-400, 1992.

Carmon, N. "Housing Renovation of Moderately Deteriorated Neighborhoods: Public-individual Partnership in Israel and its Lessons", *Housing Studies*, Vol. 7, No. 1, 1992, pp. 56-73.



Carmon, N. "Affordable Decent Housing: Expanding the Stock Through Assisted Upgrading by Incumbent Residents", in: Kilmartin, L. and H. Singh (eds). *Housing in the Third World: Analysis and Solutions*, New Delhi: Concept Publishing Company, 1992, pp. 291-316.

Grupp, H., Maital, S., Frenkel, A., Koschatzky, A., "The Relation between Scientific and Technological Excellence and Export Sales: A Data Envelopment Model and Case Study of Israel and European Countries", Working Paper. *Review of World Economy*, 1992.

Adler, I. Kohn, D., *Teaching Sciences by Video*, Hypermedia in Vaasa, '93, May 24-26, 1993.

Frenkel, A. Reiss, T., Koschatzky, K., Maital, S. "Technometric Evaluation and Technology Policy: The Case of Biodiagnostic Kits in Israel. *Research Policy*, 23, 281-292, 1994.

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S. Maital, A. Frenkel, H. Grupp, K. Koschatzky, "The Relation between the Level of Technological Complexity and Its Dispersion across Firms: An Empirical Study of High-Tech Products in the United States and Japan", *J. of Evolutionary Econ.*, 4: 273-288, 1994.

H. Grupp, S. Maital, A. Frenkel, and K. Koschatzky, "A Data Envelopment Model to Compare Technological Excellence and Export Sales in Israel and European Community Countries", *Research Evaluation*, Vol. 2, No. 2, 87-101, 1994.

S. Maital, A. Frenkel, H. Grupp, K. Koschatzky, "The Relation between Scientific and Technological Excellence and Export Performance: Theory and Empirical Results for 7 E.C. Countries", *Science and Public Policy*, Vol. 21, No. 3, 138-146, 1994.

A. Frenkel, H. Grupp, K. Koschatzky, S. Maital, "Technometric Approach to Technology Assessment", *International Journal of the Management of Technology*, special issue on *Technology Assessment*, (accepted for publication).

C. Tadmor, J. Brandes, Biopsychological Profiles of Pregnant Women at High or Low Risk to Encounter Preterm Birth, *Journal of Community Psychology*, Vol. 22, July 1994.

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K. Koschatzky, A. Frenkel, H. Grupp, S. Maital, "A Technometric Assessment of Sensor Technology in Israel vs. Europe, the United States & Japan", forthcoming, 1995. *International Journal of the Management of Technology*, special issue on *Technology Assessment*.

#### **Papers Presented at Scientific Conferences**

G. Rennert, S. Shapiro, H.S. Rennert, *The Israeli Chernobyl Health Effects Study (ICHES)* presented at the 19th Annual Meeting of the American Society of Preventive Oncology, Houston, Texas, March 8-11, 1995.

#### **Educational Video Tapes**

1. High-School Physics: Mechanics - Prof. Mario Livio
2. High-School Physics: Electricity - Prof. Mario Livio
3. High-School Algebra - Giora Harubi, M.Sc.
4. Vectors - Prof. David Chillag
5. Calculus - Prof. Ron Aharoni
6. Trigonometry - Giora Harubi, M.Sc.
7. Chemistry - Dr. Riva Bar-Shai
8. Intermediate Calculus - Lea Inger, M.A.

## פרסומים בעברית Hebrew Publications

- ה. פלטיאלי, צ. בן-חורין, עברית לטכנולוגיה ולמדעים (לרמה הבינונית),  
ינואר 1992.
- נ. בן-בסט, צ. טביאנה, עברית לטכנולוגיה ולמדעים (לרמה המתקדמת),  
ינואר 1992.
- ז. בונן, א. פרנקל, אלקטרוניקה 2000: איתור תחומים ונושאים בעלי ענין.  
אפריל 1992.
- ט. אלפנדר, ד. שפר, הגירה אל ומערי פיתוח בישראל, יוני 1992.
- א. דראל, ז. בונן, ד. מאירסדורף, הגברת הפיריון במו"פ, מאי 1992.
- ש. וקס, אלקטרוניקה 2000 - התפתחויות בחינוך ההנדסי הגבוה בתחום  
האלקטרוניקה, יוני 1992.
- מ. פוטרמן, "חומרים פלסטיים בבניה - מגמות והתפתחויות", בשדה הבניה,  
בולטין 92/7, סדרה 12.
- ע. שביב, י. קפלוט, קיום מנחים לתכנון אקלימי אנרגטי של מבני מגורים,  
אוגוסט 1992.
- ג. שלף, י. צימלס, הקמת איים מלאכותיים בחופי ישראל תוך שימוש באפר  
פחם, פברואר 1993.
- א. וידר, ד. שפר, מרכזי ידע ומיקום תעשיות עתירות ידע, מרץ 1993.
- ג. גילבר, התפתחות מערכות ההשכלה הגבוהה בשבע מדינות ערביות  
1965-1988, מאי 1993.
- ד. כהן, א. הראל, מגמות ביקוש למהנדסי אלקטרוניקה ובוגרי מדעי  
המחשב, יולי 1993.
- ב. מנהיים, ד. כהן, היבטים חברתיים וכלכליים בצמצום כח-אדם, יולי 1993.
- א. דראל, ז. בונן, ד. מאירסדורף, איכות ופיריון במחקר ופיתוח, יולי 1993.

ה. גרופ, א. פרנקל, ש. מיטל, תהליך החדשנות הטכנולוגית: האם לישראל יש יתרון יחסי במוצרים עתירי ידע? אפריל 1993.

י. אראל, הערכות משק האנרגיה לשיפור איכות הסביבה, אוקטובר 1993.

א. ישראלי, ניתוח השוואתי של המבנה האקדמי במוסדות האוניברסיטאיים להשכלה גבוהה בישראל, דצמבר 1993.

כ. אורן, פוטנציאל לימודי גבוה וממושך: פרופיל השגי, סביבתי ואישיותי של מחוננים שאותרו בשנות ה-20 לחייהם, דצמבר 1993.

א. אילון, מ. שכטר, י. אבנימלך, ניתוח חלופות לאיסוף ומיחזור פסולת עירונית מוצקה, פברואר 1994.

א. אילון, מ. שכטר, י. אבנימלך, מדיניות מיחזור פסולת מוצקה בישראל - ניתוח חלופות, דו"ח מסכם לשנת 1993, פברואר 1994.

מ. ארו, ה. הרמתי, דפוס קריירה ותעסוקה של מסיימי תואר שלישי בהנדסה ובמדעים באוניברסיטאות בישראל, מאי 1994.

ג. פורטונה, ר. שנער, מדדים להערכת אפקטיביות ההשקעה בתעשייה הישראלית יוני 1994.

ג. שלף, י. צימלס (עורכים) הכנס לשלוחות ים ואיים מלאכותיים נוכח חופי ישראל (תקצירי הרצאות) יוני 1994.

ד. ויס (עורך), התעשייה האווירונוטית בישראל - הווה ועתיד, יולי 1994.

ד. כהן, מגמות ביקוש לכח אדם מקצועי בחברות המאוגדות בארגון בתי התכנה בישראל, יוני 1994.

ח. קוסטינר, א. פרנקל, תפקידו של מכון הקרמיקה והסיליקטים ותיפקודו, יוני 1994.

פ. זיאקוב, עורך מדעי - א. כץ, הלוגיקה של החי, הוצאת כתר ומוסד ש. נאמן, יולי 1994.

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א. רוזן, ש. גפשטיין, נ. מובשוביץ-הדר, מ. פרל, ד. צילג, קידום ההוראה  
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א. אילון, מ. שכטר, א. כספר, ניתוח כלכלי של חלופות לטיפול בפסולת  
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