DAVID SCHIEBER

CURRICULUM VITAE and LIST of PUBLICATIONS

I. Curriculum Vitae

Personal Data

Born:	May 30, 1938, Romania
Immigration to Israel:	September 25, 1951
Military Service:	1960–1962; Captain in the Reserve (Infantry; Signal Corps).

Degrees

July 1960	–	B.Sc.	Department of Electrical Engineering, Technion
July 1962	–	M.Sc.	Department of Electrical Engineering, Technion
March 1965	–	D.Sc.	Department of Electrical Engineering, Technion

Academic Positions at the Technion

March 1965	–	Lecturer	Department of Electrical Engineering
October 1966	–	Senior Lecturer	Department of Electrical Engineering
October 1970	–	Associate Professor	Department of Electrical Engineering
March 1976	–	Professor	Department of Electrical Engineering
December 1992	–	Endowed Chair	*American Technion Society Staff Chair in Electrical Engineering*
October 2006	–	Professor Emeritus	

Professional Experience Abroad

1965	–	Atkins, Robertson & Whiteford, Ltd., Glasgow: R&D – Current Regulators and Transformers.
1972-1973	–	Visiting Associate Professor – Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, MA.
1975	–	Department of Electrical Engineering, Polytechnic Institute of New York, Brooklyn, NY (Summer Term).
1979	–	Department of Electrical Engineering, University of Hawaii at Manoa (Summer Term).
1979-1980	–	Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, MA (Winter Term).
1982	–	School of Electrical Engineering, University of Sydney - recipient of the Norman I. Price Fellowship in Electrical Engineering,
1986	–	Department of Electrical Engineering, Polytechnic Institute of New York, Brooklyn, NY (Spring Term).
1986	–	High Frequency and Electromagnetics Institute, ETH, Zurich (Summer Term).
1987	–	Department of Electrical Engineering, Polytechnic University* of New York, Brooklyn, NY (February '87).

1988	–	Department of Electrical Engineering, Polytechnic University* of New York, Brooklyn, NY (February '88).
1989	–	Department of Electrical Engineering, Polytechnic University* of New York, Brooklyn, NY (February '89).
1990-1991	–	Department of Electrical Engineering, Polytechnic University* of New York, Brooklyn, NY (Spring and Summer Terms).
1991-2004	–	Short working visits to various Universities in Europe and in the US.
2004-2005	–	Department of Electrical Engineering, Polytechnic University* of New York, Brooklyn, NY (Fall Term).
2004-2005	–	Institut für Grundlagen und Theorie der Elektrotechnik, Vienna University of Technology (Winter Term).

Some Professional Activities (Abridged)

1962-1965 – Research on magnetic amplifiers, current regulators and transformers.

Invention of a new constant current transformer (patented and marketed through the Technion R&D Foundation in 1965). Research and development of airport-runway lighting facilities and of regulated welding supply units based on the above-mentioned transformer; these devices were adapted for industrial purposes and were *produced under license* in the U.K.

Research in power electronics; introduction of new magnetic amplifier circuits; these circuits were based upon judicious incorporation of (at that time) novel power electronics components into saturable reactor circuits.

Creating and teaching a novel course in Power Electronics (thyristors, power transistors, saturable reactors, rectifiers, and inverters). Teaching and performing extensive modernization of the course "Electrical Measurements" (Lectures and Lab).

Examination of the tender results concerning the automatized traffic lights installation in Tel-Aviv: the state comptroller's appointment through the Technion Research and Development Foundation; providing the relevant *expert opinion* (with Prof. M.S. Erlicki).

Development of electromechanical liquid metal (mercury) converters for industrial purposes (with Prof. Y. Naot).

1966-1968 – Organizer and Chairman: "Magnetic Amplifiers and Power Electronics Components", Electrical Engineering Conference (Haifa) sponsored by the Association of Engineers and Architects in Israel (AEAI). Presented the invited core lecture "Saturable Reactor Circuits Comprising Semiconductor Components".

Recipient of the Canadian National Research Council travel grant for "*noted speakers from overseas*". Presented the lecture "Thyristor Saturable Reactor System"; *the proposed system is now widely used in power engineering practice*.

Organizer and Chairman: "Magnetic Amplifiers and their Application in Industry", two day seminar (Tel-Aviv) sponsored by the Technion Research & Development Foundation; aimed at R&D electrical and electronics engineers.

*Formerly – Polytechnic Institute of New York.

Beginning of scientific collaboration (1966–1981) with Professor Franz Ollendorff; performing research and delivering lectures (1968–onwards) in the area of technical electrodynamics.

1967 – Creating the Direct Energy Conversion and Electromagnetics Laboratory in the Department of Electrical Engineering, Technion.

1969-1981 – Head, Direct Energy Conversion and Electromagnetics Laboratory; Department of Electrical Engineering, Technion.

1970-1971 – Associate Professor at the Technion (Department of Electrical Engineering) and in parallel Chairman of the Department of Electrical Engineering at the Ben-Gurion University by **Technion appointment**. *Creating, developing and consolidating* at the Ben-Gurion University what is now a smoothly running Department of Electrical Engineering and Computer Science; providing layout requirements and supervising construction of the first (temporary) building to house the Electrical Engineering Department at Ben-Gurion University; creating the basic Electrical Engineering laboratories, i.e.: General Electronics Laboratory;
Control Systems Laboratory; the Electronics Workshop and the Basic Electrical Engineering Laboratory; installing these laboratories as well as classrooms in the temporary building; creating the first electrical engineering library in this building.

Creating the first research program in Electrical Engineering at the Ben-Gurion University (solar energy conversion) and setting up the first relevant facilities.

Putting forward the layout requirements for the permanent Electrical Engineering building at the Ben-Gurion University; supervising and appraising relevant plans submitted by architects and engineers.

The above mentioned activity at the Ben-Gurion University was performed during the tenure of Professor Hannani as Rector and during the tenure of Professor Rosen as Dean of Engineering, while I was Head of the Department of Electrical Engineering.

Engaged at the Technion in research activities (military purposes) on solar cell arrays; in particular, development, design and construction of matched solar cell arrays including protective circuitry as well as tailor-made electronic inverters for a.c. output. Developing a computerized system for testing and classifying of solar cells; development of electrolytic-cell based storage for direct computer processing of array read-out. Performing research and delivering lectures in the area of theoretical electromagnetics and technical electrodynamics (1968 – onwards).

1972-1973 – Visiting Associate Professor; Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, MA.

Performing research in the area of electromagnetic field theory in cooperation with Institute Professor Hermann A. Haus and Institute Professor Lan Yen Chu; the research was supported in part by the Joint Services Electronics Program, U.S. Navy, U.S. Air Force, under Contract DAAB07-71-C-0300.

Conducting seminars in the area of electromagnetics.

1974-1975 – Chairman of the Steering and Development Committee of the Department of Electrical Engineering, Technion: construction of the new Building of Electrical Engineering (*the Meyer Center for Advanced Technology*).

1974-1976 – Member of the Technion Senate Committee for Sabbatical Leave and Leave of Absence.

1975 – The American Board of Transportation – Assessment of Research Proposals; New York, NY.

1976 – *Creating the first* undergraduate microwave laboratory in the Department of Electrical Engineering at the Technion as well as designing the relevant study topics and projects (microwave sources and oscillators, microwave components, HF and VHF lines and instrumentation). Introducing radiation safety measures.

Research on electromagnetic compatibility, field theory of electromagnetic devices and converters, and microcomputer instrumentation.

1977-1979 – Member of the Technion Senate Committee for Academic Accreditation of Medical Departments.

1978 – Creating the first undergraduate curriculum for the Technical College in Holon.

Examination of the request of the *Municipality of Sch'chem ("Nablus")* to expand the local power plant; appointment by the Ministry of Defence through the Technion Research and Development Foundation; providing the relevant expert opinion (with Prof. M.S. Erlicki).

1978-1980 – President, "EL-EN Energy Consultants", Israel (a privately owned company).

1980 – Organizer and Chairman of the IEEE sponsored International Electrical Engineering Conference – in honour of Prof. Ollendorff's 80^{th} birthday.

Beginning of scientific collaboration (1980–1995) with Institute Professor Nathan Rosen in the area of electrodynamics of moving media.

1981-1983 – In charge of the undergraduate program "Industrial Project", sponsored by the Department of Electrical Engineering, Technion, and by the Israeli Electronics Industry; heading the undergraduate program "Projects and Experiments" in the Department of Electrical Engineering; as such – responsible for *all* the projects submitted by the undergraduates in the Department of Electrical Engineering.

1983 – Chairman, Electromagnetic Waves Session, IEEE Conference, Israel.

1983–1999 – Member, editorial board, *Electrical Machines and Power Systems* (U.S.A.).

1985–1990 – Member, editorial board, *Journal of Electromagnetic Waves and Applications* (U.S.A.).

1989–1993 – Member, editorial board, book series: *Progress in Electromagnetics Research (PIER)*, Elsevier Science Publishing Company, Inc.

1991 – Session Chairman, the First Opto-Electronics Conference in Israel, Technion.

1992 – Chairman of the Professional Committee in the Area of Electrical Engineering, the Basic Research Foundation, administered by the Israel Academy of Sciences and Humanities.

1995–1996 – Engaged in creating the new graduate course "Impingement of Electromagnetic Waves on Moving Targets", and restructuring the two basic undergraduate courses "Electromagnetic Fields" and "Electromagnetic Energy Conversion", adapting them to the modern trend in Electrical Engineering. The two restructured courses had far-reaching consequences on the entire undergraduate curriculum in the Department of Electrical Engineering, Technion. Engaged in developing the new relevant undergraduate curriculum.

1996 – Setting up the Electromagnetic Waves Laboratory in the Department of Electrical Engineering, Technion.

1996–2000 – Head, the Electromagnetic Waves Laboratory, the Department of Electrical Engineering, Technion.

1996 – Chairman of the building effort of the new modern Electromechanical Workshop of the Electrical Engineering Department; engaged in the design and building supervision of the new Workshop.

1996–1997 – Chairman of the building effort of the new Center for Communication and Information Technologies *(approximately 1,800 m^2)*; as such engaged in the design and building supervision of the new, modern laboratories in the areas of electro-optics, opto-electronics, electromagnetic waves and of computer communication networks.

1997 – Engaged in creating the new infrastructure of the computer facilities of the Department of Electrical Engineering; responsible for the acquisition and installation of modern equipment *(approximately 2×10^6 \$)* aimed at bringing up-to-date the undergraduate and graduate students' computational facilities, the relevant computer communication network, the departmental servers and the back-up system.

1997 – Restructuring the undergraduate departmental computer workshops as well as setting up new undergraduate and graduate computer workshops (including the relevant building effort).

1997–1999 – Responsible for the continuous development of the departmental computerization project.

2000 – Member of the Technion Senate Committee for Honorary Degrees (International and Israeli).

Building and installing the new site of the modern undergraduate Electrical Engineering Laboratory; introducing novel equipment, restructuring the experiments and adapting the instruction manuals to the novel, computerized requirements. Paying special emphasis to safety; introducing mandatory safety lectures delivered by an external expert on safety. The laboratory provides access to about 500 students per term.

2001 – Head, departmental undergraduate teaching laboratories; engaged in establishing the new infrastructure for the basic electrical engineering laboratories; developing new laboratory courses; introducing novel computerized, remote controlled measurement procedures; *restructuring the whole concept of laboratory safety.*

2001 – Academic responsibility for undergraduate projects in the Electrical Engineering Department.

2001–2003 – Member of the Technion Senate Steering Committee for Computer and Computer Network Infrastructure and as such also Member of the Technion Computer Users Committee.

2002–2004 – Associate Dean for Infrastructure.

2004–2005 – The Polytechnic University, New York; Institut für Grundlagen und Theorie der Elektrotechnik, Vienna University of Technology: research on transient ground currents and on transient currents in metal screens. Investigations into the history of electrical engineering:

- The Development of Electrical Engineering Immediately after Maxwell (Research # 050–184);
- The History of Electromagnetic Radiation (Research # 050–066);
- Historical Roots of Modern Magnetic Concepts (Research # 050–023).

Industrial and Practical Exposure (Abridged):
(Design; Consulting; Expert Opinions and Project Supervision)

The activities were carried out for the Israel Electric Co. Ltd., for the Israel Water Supply Authority, for the Board of Trade and Industry, for the Israeli Defence Forces, for the Armament Development Authority, for the Ministry of Defence (the Israeli Security and Defense Authorities), for the Technion and for Israeli as well as for foreign private enterprises. The areas covered:

- high current transformer design;
- automated traffic lights installation;
- high current starter design;
- optimization of solar cell arrays;
- power units; mil. spec. power units;
- special electrical machines;
- electromechanical devices;
- electrostatic discharges and their prevention in industrial processes;
- electromechanical and direct energy conversion;
- drive systems;
- engineering electromagnetics;
- electromagnetic compatibility, grounding (HF) and shielding;
- earthing, lightning protection and safety;
- industrial electronics;
- electronic and microcomputer instrumentation;
- magnetic levitation and propulsion;
- solar and terrestrial radiation;
- propagation of electromagnetic waves;
- underwater guiding;
- underwater signal propagation;
- impingement of electromagnetic waves on moving targets;
- installation of electrical drives;
- installation of transformer banks;

- installation of electromechanical workshops, including electrical as well as mechanical safety;
- installation of extended computer network systems for advanced computer laboratories;
- installation of computerized air-conditioning facilities in advanced research laboratories;
- installation of computerized, remote controlled gas ducts for advanced electro-optic and laser laboratories;
- installation of electro-optic and laser laboratories;
- safety in electrical laboratories and workshops;
- safety in laser laboratories;
- radiation hazards in microwave laboratories;
- radon hazards in ground-level and sub-ground level laboratories;
- expert investigation of electrocution in practice;
- installation of remote controlled, computerized measurement systems.

Subjects Taught

Undergraduate	*Graduate*
Basic Electrical Engineering	*Special Topics in Electrical Machinery* (created the course)
Basic Electrical Engineering – Extended Version	*Laboratory Course: Saturable Reactors and Silicon Controlled Rectifiers* (created the course)
Magnetic Amplifiers	*Direct Energy Conversion* (created the course)
Electrical Measurements	*Laboratory Course: Direct Energy Conversion* (created the course)
Control Systems	*Plasma Dynamics* (created the course)
Non-Linear Control Systems	*Advanced Technical Electrodynamics I* (created the course)
Control of Industrial Processes	*Advanced Technical Electrodynamics II* (created the course)
Industrial Electronics	*Electromechanics* (created the course)
Power Electronics	*Electromechanical Systems* (created the course)
Semiconductor Devices and Circuits	*Relativity in Electrical Engineering* (created the course)
Electromagnetic Field Theory	*Impingement of Electromagnetic Waves on Moving Targets* (created the course)
Electromagnetic Waves and Distributed Systems	*Laboratory Course: Electromagnetic Waves*
Microwaves	*Microwaves*

Some Departmental Activities (Abridged)

1. Tenure and Promotion Committee.
2. Chairman – Adjunct Appointment and Promotion Committee.
3. Ollendorff Research Center Committee.
4. Ad-hoc member of Undergraduate Curriculum Committee.
5. Graduate Studies Committee.
6. Chairman – Administrative and Technical Personnel Excellence Award Committee.
7. Chairman – Graduate Students Excellence Award Committee.
8. Chairman – Professors Excellence Award Committee.
9. Chairman of the Steering Committee and Project Leader – Building of the new Center for Communication and Information Technologies (CCIT).
10. Academic Development Committee.
11. Chairman – Screening Committee for Electrical Engineering Doctoral Candidates.
12. Chairman – Acceptance Committee for Graduate Students from other Universities.
13. Head – Electromagnetic Waves Laboratory.
14. Chairman – Committee for Area Allocation, Technical Manpower and Infrastructure.
15. Head – Computer Facilities and Layout Management (approximately 2×10^6\$).
16. Associate Dean.
17. Acting Dean: September 1996; February 1997; September 1997; October 1998; June 1999, October 1999, May 2002; September 2002; May 2003.
18. Chairman and project leader of the departmental building effort: the Electrical Engineering Technical Service Center; the students' P.C. workshops; the students' Unix workshop; the Center for Communication and Information Technologies, including the required relevant addenda. [Acoustics; gas supply and regulation; computer network communication (fiber; copper)]. The CCIT (Center for Communication and Information Technologies) comprises our modern electro-optics effort as well as our modern computer laboratories.

    Construction and installation of the Basic Electrical Engineering Laboratory housing (in shifts) about 500 students per term.
19. Head – Departmental Computerization Committee.
20. Departmental Fiscal Committee.
21. Academic Head – Departmental Undergraduate Laboratories and Projects:

    Electrical Engineering Laboratory; Extended Electrical Engineering Laboratory 1 – two versions: one for electrical engineering students and one for computer oriented electrical engineering students. (The laboratory provides access to about 500 students per term). Specialized Laboratories: Laboratory 2; Laboratory 3. Projects 1, 2; Special Project; Industrial Project.
22. Academic Head – Departmental Infrastructure (Associate Dean for Infrastructure).

Research Projects* **(Partial List)**

1967	–	050-134	Utilization of Magnetic Constant Current Transformers in Starting and Regulation of Induction Motors.
1968	–	050-174	Investigation of Gas Discharges in Magnetic Fields.
1969	–	050-190	Behavior of Liquid Metal in Imposed Magnetic Fields.
1970	–	050-243	Investigation of Solar Radiation for Applications in Drive Systems and Telecommunication.
1970	–	050-276	Performance of Electric Arcs in Magnetic Fields.
1971	–	050-287	Utilization of Linear Motors in Industrial Drive Systems.
1971	–	050-295	Investigation of the Use of Fuel Cells in Autonomous Systems.
1972	–	050-306	Magnetic Propulsion and Levitation.
1973	–	050-331	Solar Cells for Domestic Applications.
1973	–	050-333	Use of Solar Cells for Hydrogen Production.
1974	–	050-338	Electrical Recording and Monitoring of Intra-Cranial Pressure after Severe Brain Injuries (*with Dr. J. Grushkievicz, M.D., Neurosurgeon.*).
1974	–	050-339	Investigation of Thermoelectric Units for Applications in Power Supplies and Refrigeration Installations.
1975	–	050-357	Electrodynamics of Distributed Parameter Induction Devices.
1975	–	050-359	Transient Fields in Saturable Iron.
1975	–	050-373	Computation of Electric Field Distribution around High-Voltage Equipment.
1976	–	050-376	Determination of Coil Inductance for Inductive Heating.
1976	–	050-377	Electromagnetic Screening of Technical Equipment.
1976	–	050-380	Electromagnetic Levitation.
1976	–	050-381	Accumulator Charge Measurement.
1977	–	050-398	Continuous Speed Regulation Using a Linear Motor Disk Drive Unit.
1977	–	050-400	Field Theory of Solid Rotor Machines.
1978	–	050-412	Permanent Magnets for DC Machines.
1979	–	050-421	The Linear Motor at High Frequencies.
1979	–	050-439	Solar Cells Power Supply.
1979	–	050-440	Electrical Energy Conversion in Industry.
1979	–	050-441	End Effects in Linear Induction Machines.

*Funds provided by the *Ministry of Defense*, the *Ministry of Industry and Trade*, the *Ministry of Development*, the *Israel Defense Forces*, the *Messing Foundation for Research and Development*, the *Fund for Promotion of Research at the Technion* and the *Commission of the European Community.*

1979	–	050-443	Radiation Pressure on Moving Resistive Sheets.
1980	–	050-456	Electrodynamics of Salient Pole Machines.
1980	–	050-457	Asynchronous Performance of Hysteresis Motors.
1980	–	050-466	Speed Regulation of a Disk Type Linear Motor by Means of a Microcomputer.
1981	–	050-467	Unipolar Induction Machines.
1981	–	050-468	Harmonics and Sub-Harmonics in Electromagnetic Circuits Comprising Saturable Reactors.
1982	–	050-472	Faraday's Law and its Application to Moving Media.
1983	–	050-490	Magnetic Levitation for Transportation Purposes.
1984	–	050-515	Surge Impedance of Extended Grounding Rods.
1985	–	052-528	Reaction in Unipolar Induction Systems, I.
1986	–	052-528	Reaction in Unipolar Induction Systems, II.
1987	–	050-0592	Electromagnetic Wave Scattering from Rotating Dielectric Cylinders.
1988	–	050-0630	Interaction between a Traveling Field and a Moving Conductor, I.
1989	–	050-0630	Interaction between a Traveling Field and a Moving Conductor, II.
1990	–	050-699	Electrostatic Influence Machines.
1991	–	050-735	Influence of Buried Pipes on Grounding Facilities.
1993	–	050-832	Collection of Fly Ash in Long Chimney Stacks, I.
1993	–	050-833	Longitudinal Oscillations with Inherent Time-Lag.
1994/5	–	050–832	Collection of Fly Ash in Long Chimney Stacks, II.
1995/6	–	050–909	Electromagnetic Radiation from Receding Radiation Sources, I.
1996/7	–	050–909	Electromagnetic Radiation from Receding Radiation Sources, II.
1997/8	–	050–909	Electromagnetic Radiation from Receding Radiation Sources, III.
1998	–	050–998	Solar and Terrestrial Radiation.
1998	–	050–999	Historical Perspectives in the Development of Modern Electrical Engineering.
1998	–	050–022	Electrification of Dielectric Rods by Imposed Fields, I.
1998	–	050–023	Historical Roots of Modern Magnetic Concepts.
1999	–	050–022	Electrification of Dielectric Rods by Imposed Fields, II.
1999	–	050–026	Wake Field in a Resonant Dielectric Medium (with Prof. L. Schächter).
2000	–	050–065	Electromagnetic Excitation of Capacitive Membranes, I.
2000	–	050–066	Research into the History of Electromagnetic Radiation.

2001	–	050–065	Electromagnetic Excitation of Capacitive Membranes, II.
2002	–	050–065	Electromagnetic Excitation of Capacitive Membranes, III.
2002	–	050–127	Screening of RF Waves.
2003	–	050–184	The Development of Electromagnetics Immediately after Maxwell, I.
2004	–	050–184	The Development of Electromagnetics Immediately after Maxwell, II.
2005	–	100–5184	Transient Return Currents in the Vicinity of Grounding Rods.
2005	–	100–5185	The Behavior of Plane Metal Screens under Transient Excitation.
2006	–	100–6269	Cable Shielding for Electromagnetic Compatibility.
2009	–	100–8463	Electromagnetic Wake Penetration into Metallic Medium.

Theses Supervision

Undergraduate Theses:

Supervised tens of undergraduate theses and projects.

Completed M.Sc. Theses:

1968	S. Gavril	"Working Conditions of Transformers Loaded by Rectifiers and Controlled Rectifiers".
1969	S. Axelrod	"High-Frequency Performance of Magnetic Amplifiers".
1969	H. Kamil	"Magnetic Guidance of a Conducting Jet".
1971	V. Brecher	"Electronic Measurement of Inversion Efficiency in Electric Discharges".
1972	H. Azria	"Development of an Electronic System for Testing and Classifying of Solar Cells".
1972	H. Landau	"Liquid Metal Pump for Low Capacities".
1979	A. Bianu	"Continuous Speed Control Using a Linear Stator".
1985	L. Schächter	"Electrodynamics of Solid-Rotor Induction Machines".
1985	S. Haklai	"Microprocessor Measurement of Resistance of Power Devices".
1985	M. Berman	"Programmable Controller in Process Supervision".
1986	M. Botton	"Dynamic Performance of Inductive Coils".
1990	Z. Raviv	"Production of Ceramic Permanent Magnets in the Presence of Magnetic Fields" (Joint supervision with M.S. Erlicki).
1994	S. Eyal	"Artificial Supplement of the Magnetizing Current of a Wye-Wye Connected Transformer". (Joint supervision with M.S. Erlicki).
2000	B. Mali	"Interaction between Free Electrons and Radiation in an Open Resonator" (Joint supervision with L. Schächter).
2000	S. Banna	"Interaction of Symmetric and Asymmetric Modes with Free Electrons" (Joint supervision with L. Schächter).
2008	V. Karagodsky	"X-Ray Source based on Free Electron Beams" (Joint supervision with L. Schächter).

Completed D.Sc. Theses:

1971	S. Gavril	"Electric Current Flow in Gases".
1974	H. Kamil	"Direction Control of an Electric Arc and its Use in Industrial Processes".
1979	Y. Yaniv	"Modern Principles of Separation of Particles in Magnetic and Electric Fields". (Co-supervisor).
1982	A. Mor	"Electrodynamics of Linear Induction Motor of Finite Dimensions".

1988 L. Schächter	"Generators of Radiation Based on an Electron Beam Moving in a Periodic Structure". (Co-supervisor)
1989 M. Botton	"Radiation Emission by Ballistic Electrons in Semiconducting Superlattices". (Co-supervisor)
1990 A. Bianu	"Disk Type Linear Motor".
2004 S. Banna	"Scaling Laws for Wake-Fields in Optical Structures".
2006 A. Lahav	"Interaction of Electron Beams Generated by Ferroelectric Cathodes and Electromagnetic Waves in Periodic Structures". (Co-supervisor).

II. List of Publications

A. Theses

"Radial Oil Flow and Pressure Differences in High Voltage and Very High Voltage Cable Insulations"; M.Sc. Thesis, Department of Electrical Engineering, Technion, June 1962.

"Magnetic Amplifiers and Their Application in Regulating Systems and Drives";
D.Sc. Thesis, Department of Electrical Engineering, Technion, March 1965.

B. Journal Articles

1. "Radial Oil Flow in Cable Insulations", AIEE Trans. on Power Apparatus and Systems, No. 59, pp. 72-81, 1962 (with N. Klein).
2. "Fluted Sheath for Oil-Filled Pressure Cables", IEEE Trans. on Power Apparatus and Systems, No. 66, pp. 335-343, 1963 (with N. Klein).
3. "Durch Magnetische Verstärker Gespeister Reihenschlussmotor für Konstante Drehzahl", Elektrotechnik und Maschinenbau, Issue 6, pp. 137-139, 1964 (with J. Ben Uri and Y. Wallach).
4. "Magnetic Amplifier with Positive and Negative Control", Israel Journal of Technology, Vol. 2, pp. 218-226, 1964 (with J. Ben Uri and M.S. Erlicki).
5. "Series Magnetic Amplifier", Israel Journal of Technology, Vol. 3, pp. 133–137, 1965 (with M.S. Erlicki and J. Ben Uri.)
6. "Static Magnetic Constant Current Transformer", IEEE Trans. on Power Apparatus and Systems, Vol. PAS-84, No. 8, pp. 691-700, 1965 (with J. Ben Uri and M.S. Erlicki.)
7. "Transient of D.C. Generator with Highly Saturated Field", Wissenschaftliche Zeitung der Elektrotechnik, Band 5, Heft 4, pp. 215-230, 1965 (with J. Ben Uri.)
8. "Transistor Saturable-Reactor System", IEEE Trans. on Ind. Electr. and Control Inst., Vol. IECI-12, pp. 62-66, 1965.
9. "Transients in Saturable Reactors", Electronics Letters, Vol. 1, p. 240, 1965.
10. "A Simplified Approach to Instruction in Saturable Reactors", IEEE Trans. on Education, Vol. E-8, No. 4, pp. 91-93, 1965 (with J. Ben Uri and M.S. Erlicki.)
11. "Magnetic Amplifiers with Free Harmonic Flow in Control Circuit", Int. J. Electr. Engrg. Ed., Vol. 3, pp. 577-582, 1965.
12. "Instability of Magnetic Amplifier under Inductive Load", Wissenschaftliche Zeitung der Elektrotechnik, Band 6, Heft 4, pp. 203-213, 1966 (with M.S. Erlicki and J. Ben Uri.)
13. "Power Measurement Errors in Controlled Rectifier Circuits", IEEE Trans. on Ind. and Gen. Appl., Vol. IGA-2, pp. 309-311, 1966.
14. "Solution of a Non-Linear Problem", Int. J. Electr. Engrg. Ed., Vol. 4, pp. 513-521, 1966.
15. "Study of Saturable Reactor Performance by Means of Analog Computer", Int. J. Electr. Engrg. Ed., Vol. 5, pp. 481-496, 1967 (with A. Alexandrovitz.)

16. "Effect of Magnetic Field on a Layer of Free Surface Mercury", Israel Journal of Technology, Vol. 5, pp. 261-266, 1967 (with N. Geffen.)

17. "Use of Root Trajectories in Control Systems", Wissenschaftliche Zeitung der Elektrotechnik, Band 10,. Heft 1, pp. 17-18, 1967 (with J. Ben Uri.)

18. "Power Dissipation in Rectifiers", Instrument Review, Vol. 14, pp. 497-500, 1967 (with Y. Wallach.)

19. "Negative Impedance Transformer", IEEE Trans. on Ind. Electr. and Control Inst., Vol. IECI-14, No, 2, pp. 77-80, 1967 (with M.S. Erlicki.)

20. "Working Range and Design of a Static Constant-Current Transformer", IEEE Trans. on Power Apparatus and Systems, Vol. PAS-27, pp. 1259-1262, 1968 (with M.S. Erlicki.)

21. "The Polarized and Non-Polarized Saturable Reactor", Archiv für Elektrotechnik, Vol. 51, pp. 281-288, 1968.

22. "A Simple Low Pass Filter", Israel Journal of Technology, Vol. 6, No. 4, pp. 265-268, 1968 (with M.S. Erlicki.)

23. "Use of Magnetic Tape in the Investigation of Electrical Machinery", Israel Journal of Technology, Vol. 6, No. 4, p. 273, 1968 (with Distinguished Professor Franz Ollendorff.)

24. "The Transductor and the Auto-Self Excited Transductor", Wissenschaftliche Zeitung der Elektrotechnik, No. 11/3, pp. 149-166, 1968.

25. "A Non-Conventional Amplistat Configuration", IEEE Trans. on Ind. Electr. and Control Inst., Vol. IECI-15, No. 1, pp. 12-16, 1968.

26. "Practical Application of a New Constant Current Transformer", Measurement and Instrument Review, March Issue, 1969 (with J. Ben Uri and M.S. Erlicki.)

27. "Transformer Performance Under Rectified Load", Int. J. Electr. Engrg. Ed., Vol. 7, pp. 153-163, 1969 (with S. Gavril and M.S. Erlicki.)

28. "Nonlinearity of Hall Voltage", Electronics Letters, Vol. 5, pp. 78-79, 1969 (with M.S. Erlicki.)

29. "Switching off of Magnetic Fields", IEEE Trans. on Education, Vol. E-13, No. 1, p. 59, 1970.

30. "Electron Temperature Determination in a Low Density Helium Plasma", Plasma Physics, Vol. 12, p. 897, 1970 (with S. Gavril and M.S. Erlicki).

31. "Correlation of Electrical Power and Optical Oscillations in Low-Density Helium Plasma", Electronics Letters, Vol. 6, No. 9, April 1970.

32. "Magnetic Control of a Conducting Jet", Journal of Physics - Applied Physics, Vol. 3, pp. 1981-1984, 1970 (with M.S. Erlicki and H. Kamil.)

33. "Phase Sensitive Detection of Nonperiodic Signals", Trans. IEEE on Instr. and Meas., Vol. IM-21, No. 1, pp. 84-85, 1972 (with S. Gavril.)

34. "Unipolar Induction Braking of Thin Metal Sheets", Proc. IEE, Vol. 119, No. 10, pp. 1499-1503, 1972.

35. "Transient Eddy Currents in Thin Metal Sheets", Trans. IEEE on Magnetics, Vol. MAG-8, pp. 775-779, 1972.

36. "Shielding Performance of Metallic Cylinders", Trans. IEEE on Electromagnetic Compatibility, Vol. EMC-15, No. 2, pp. 12-16, 1973.

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51. "Wave Propagation in a Lossy-Plane Waveguide", Archiv für Elektrotechnik, Vol. 61, pp. 209-213, 1979 (with Distinguished Professor Franz Ollendorff.)

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94. "Dielectric Rod in the Field of Two Parallel Plates", Journal of Electrostatics, Vol. 48, pp. 65–75, 1999.

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96. "Some Remarks on the Heat Content Transformation in a Cartesian Induction System", Electrical Engineering/Archiv für Elektrotechnik, Vol. 82, pp. 225–229, 2000.

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98. "Decelerating Field on a Bunch Moving in a Periodic Symmetric Structure", Physics Letters A, Vol. 293, pp. 17–22, 2002 (with L. Schächter).

99. "Wake-Field Generated by a Line-Charge Moving in the Vicinity of a Dielectric Cylinder", Nuclear Instruments & Methods in Physics Research A, Vol. 489, pp. 18–31, 2002 (with S. Banna and L. Schächter).

100. "Wall Roughness Effects on an Electron Bunch", Applied Physics Letters, Vol. 84, No. 5, pp. 723–725, 2004 (with S. Banna and L. Schächter).

101. "Electromagnetic Wake-Field due to Surface Roughness in an Optical Structure", Journal of Applied Physics, Vol. 95, No. 8, pp. 4415–4426, 2004 (with S. Banna and L. Schächter).

102. "Suppression of Synchrotron Radiation", Physics Letters A, Vol. 344, pp. 324–330, 2005 (with L. Schächter).

C. Research Reports, Internal Publications and Various Presentations (Partial List)

1. "Radial Oil Flow and Pressure Differences in Cable Insulations", AIEE Winter General Meeting, New York; Paper No. 62-9, January/February 1962 (with N. Klein).

2. "Fluted Sheath for Oil-Filled Pressure Cables", IEEE Winter General Meeting, New York; Paper No. 63-11, January/February 1963 (with N. Klein).

3. "Operation Principles of a New Constant Current Transformer"; lecture delivered at the memorial symposium on the second anniversary of the passing away of Prof. C.A. Stoerk, October 1964 *(Invited Lecture.)*

4. "A New Static Magnetic Constant-Current Transformer", IEEE Winter General Meeting, New York; Paper No. 31, TP65-178, January/February 1965 (with J. Ben Uri and M.S. Erlicki).

5. "Solution of Non-Linear Problems with the Root Locus Method", I.F.A.C. Symposium, Tokyo, August 1965 (with J. Ben Uri).

6. "Power Measurement Errors in Controlled Rectifier Circuits", IEEE International Convention, New York, March 1966 (with M.S. Erlicki and J. Ben Uri).

7. "Parameters and Design Relations of a New Static Magnetic Constant Current Transformer", IEEE Power Meeting, New Orleans; Trans. Paper No. 31PP66–427, July 1966 (with M.S. Erlicki).

8. "Additional Remarks on a New Static Magnetic Constant Current Transformer", IEEE Power Meeting, New York; Trans. Paper No. 31PP67–131, January/February 1967 (with M.S. Erlicki).

9. "Saturable Reactor Circuits Comprising Semiconductor Components", Association of Engineers and Architects in Israel (AEAI) Symposium on Magnetic Amplifiers and Power Electronics, Haifa, April 1967 (*Invited Lecture*).

10. "Novel Direct Energy Conversion Sources", Association of Engineers and Architects in Israel (AEAI), Haifa, May 1967 (*Invited Lecture*).

11. "A New D.C. Transformer for Measurement Purposes", Fourth International Measurement Congress, IMEKO IV, Warsaw, Poland; Paper No. IS-115, July 1967 (with J. Ben Uri and M.S. Erlicki).

12. "Thyristor Saturable Reactor System", IEEE International Electronics Conf., Toronto, Canada; Paper No. 67084, September 1967 (*Invited Paper*).

13. "Magnetic Amplifiers and their Applications in Industry", EE Symposium, sponsored by the Technion R&D Foundation, December 1967, ZOA House, Tel-Aviv.

14. "Influence of a Magnetic Field on a Glow Discharge", Ninth Symposium on Engineering Aspects of Magnetohydrodynamics (AIAA, ASME, IEEE, VTSI), Tullahoma; April 1968 (with M.S. Erlicki and S. Gavril).

15. "Influence of Magnetic Fields on Gaseous Conductors", lecture delivered at the General Electric Co., Valley Forge, Pennsylvania, February 1968 (*Invited Lecture*).

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17. "Dominant Factors in Charged Particle Distribution", Technion, Research Report, September 1968 (with M.S. Erlicki).

18. "Particle Distribution in a Cross-Magnetized Plasma Strip", The Annual Meeting of the Division of Plasma Physics (The American Physical Society), Miami Beach; 1968 (with M.S. Erlicki).

19. "Liquid Metal Inverter for Low Voltage Power Sources", IEEE Summer Power Meeting, Dallas; Trans. Paper No., 69, CP730-PWR, June 1969 (with Y. Naot).

20. "Particle Distribution in Ionized Gases", Ninth International Conference on Phenomena in Ionized Gases, Bucharest; September 1969 (with M.S. Erlicki) *(Invited Lecture.)*

21. "Characteristics of a Low-Density Helium Plasma in a Magnetic Field", 22nd Gaseous Electronics and High-Pressure Arc Symposium (APS), Gatlinburg; October 1969 (with M.S. Erlicki and S. Gavril).

22. "Shock Induced Surface Motion in Liquid Metal", Oklahoma, Am. Phys. Soc. Meeting, Oklahoma, November 1969.

23. "Characteristics of a Low-Density Helium Plasma in a Magnetic Field", Technion, Research Report, March 1969 (with S. Gavril).

24. "Optical Investigation of a Low Density Plasma", U.S. Department of Commerce, Research Report PB187716, Clearinghouse, September 1969 (with M.S. Erlicki and S. Gavril).

25. "Reference Data for Optical Investigation of a Low Density Plasma", U.S. Department of Commerce, Research Report PB187717, Clearinghouse, October 1969 (with S. Gavril).

26. "Magnetic Control of a Conducting Jet", Technion Research Report, November 1969 (with M.S. Erlicki and H. Kamil).

27. "Experimental Investigation of Fluorescent Light Sources under Constant Current Supply, Technion Research Report, January 1970 (with S. Gavril).

28. "Radial Distribution of Kinetic Temperature", Technion, Research Report, January 1970 (with S. Gavril).

29. "Determination of Electron Temperature from Spectral Measurements", Technion, Research Report, January 1970 (with S. Gavril).

30. "On the Propagation of Striations in Gaseous Discharges", Technion, Research Report, February 1970.

31. "Construction of Electric Probes", Technion, Research Report, March 1970 (with S. Gavril).

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37. "Stabilization of Arc Discharges in Magnetic Fields", Technion, Research Report, January 1971 (with M.S. Erlicki and H. Kamil).

38. "Development of an MHD Generator Prototype", Technion, Research Report, April 1971 (with S. Gavril and U. Graiver).

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40. "Determination of Electric Field from Measured Kinetic Temperature in a Uniform Gas Discharge", Technion, Research Report, April 1971 (with S. Gavril).

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42. "Investigation of Energy Conversion Efficiency in a Glow Discharge", Technion, Research Report, May 1971 (with M.S. Erlicki and S. Gavril).

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45. "Electromagnetic Induction in Transformer Laminations"; the Open Seminar of the Department of Electrical Engineering, Technion, Haifa, June 1972.

46. "Investigation of Solar Radiation for Drive Systems and Telecommunication", Technion, Research Report IV (Research Reports I,II,III see #36, #39, #44 above), February 1972 (with S. Gavril and U. Graiver).

47. "Investigation of Solar Radiation for Drive Systems and Telecommunication", An assessment of the global solar radiation in Israel (Eilat, Beit-Dagan, Beer-Sheva, Genin, Mt. Carmel, Hulata, Tirat Zvi, Jericho), Technion, July 1972 (with M.S. Erlicki, S. Gavril and U. Graiver).

48. "Operation Principles of Induction Devices", Area IV Electrodynamics Seminar, Department of Electrical Engineering, M.I.T., Cambridge, MA, U.S.A., November 1972 (*Invited Lecture*).

49. "Rectification and Inversion with Ionized Gas", Technion, Research Report I, March 1973 (with H. Kamil).

50. "Linear Propulsion Devices", Department of Electrical Engineering, University of Toronto, Toronto, Canada, April 1973 (*Invited Lecture*).

51. "On Formulations of Macroscopic Electrodynamics", Electrodynamics Memo No. 34, Department of Electrical Engineering and Electronics Research Laboratory, M.I.T., June 1973 (with Institute Professor Hermann Anton Haus).

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54. "Direct Energy Conversion by Means of Solar Cells", International Conference: 'The Sun in the Service of Mankind', Paris; 1973 (with M.S. Erlicki and S. Gavril).

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56. "Solar Energy Research – Assessment of the 'State of Art', Report on a visit to the U.S. and Japan", Technion, Research Report, July 1974 (with M.S. Erlicki).

57. "Use of the Solar Radiation Energy for Terrestrial Applications", Technion, Research Report, December 1974 (with M.S. Erlicki).

58. "Determination of Magnetic Flux Density in a Three Phase Linear Stator", Technion, Research Report, September 1975 (with S. Gavril).

59. "Construction of a Three Phase Linear Machine", Technion, Research Report, September 1975 (with S. Gavril).

60. "The Thermoelectric Cell as a Heat Pump", Technion, Research Report, September 1975 (with S. Gavril).

61. "Intracranial Pressure Fiber Optic Sensors – An Assessment", Technion, Research Report, September 1975 (*with J. Grushkievicz, M.D., neurosurgeon*).

62. "Transient Fields in Saturable Iron", EE Publication #256, March 1975.

63. "Speed Regulation of Linear Motor with Disk-Rotor by Radial Displacement of Stator", International Conference on "Special Purpose Electrical Machines", Bydgoszcz, Poland, 1979 (with A. Bianu and S. Gavril).

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75. "Electromagnetic Transients Associated with the Motion of a Point-Charge above Dielectric or Metallic Half-Planes", International Symposium on Electromagnetic Fields in Electrical Engineering, Gdansk, Poland, September, 1997 (with L. Schächter).

76. "The Interaction of Symmetric and Asymmetric Modes with Free Electrons", Euro-Electromagnetics, Edinburgh, Scotland, May/June 2000 (with S. Banna and L. Schächter).

77. "Enhanced Absorption of Electromagnetic Radiation by Resonant Sites in Biologic Tissue", CCIT Technical Report # 362, November 2001 (with L. Schächter).

78. "Electromagnetic Fields and the Human Body", EE Publication #1312, March 2002 (with L. Schächter, in Hebrew).

79. "Wake-Fields and Optical Acceleration Structures", the Tenth Advanced Accelerator Concepts Workshop (sponsored by the U.S. Department of Energy), Mandalay Beach, California, June 22–28, 2002 (with S. Banna and L. Schächter); published under the heading "Analytic and Quasi-Analytic Solutions of Wake-Fields" in the Conference Proceedings, Vol. 647, pp. 516–526, American Inst. of Phys., Melville, NY, 2002.

80. "Electromagnetic Field Vectors, Potentials and Superpotential Vectors: Basic Three Dimensional and Four Dimensional Considerations", EE Publication #1394, November 2003 (with L. Schächter).

81. "On the Electrical Excitation of Extremely Narrow Capacitive Structures", EE Publication #1398, December 2003.

82. "Scaling Laws of Wake-Fields in Optical Structures", The 3rd Asian Particle Accelerator Conference (APAC 2004), Gyeongju, Korea, March 22–26, 2004 (with S. Banna and L. Schächter).

83. "Electromagnetic Wake-Field due to Wall Roughness in an Optical Structures", the Eleventh Advanced Accelerator Concepts Workshop (sponsored by the Brookhaven National Laboratory, the U.S. Department of Energy, the Stony Brook University and by Advanced Energy

Systems); Stony Brook, N.Y., June 21–26, 2004 (with S. Banna and L. Schächter); published in the Conference Proceedings, Vol. 737, pp. 743–749, American Inst. of Phys., Melville, N.Y., 2004.

84. "Some Remarks on the Faraday Cage", EE Publication #1446, August 2004 (with P. Einziger and S. Banna).

85. "Remarks on Nonlinear Optics and Optical Accelerators", the 23rd IEEE Convention of Electrical and Electronics Engineers in Israel, Herzlia, September 6–7, 2004 (with S. Banna and L. Schächter).

86. "Bremsstrahlung Suppression by Image-Charges", EE Publication #1466, February 2005 (with L. Schächter).

In addition – many classified reports for the Israel Defense Forces, for the Armament Development Authority (Israel) and for the Ministry of Defence (Israel); many technical reports for the private sector within the framework of consulting and many "on-site" expert opinions on industrial or building projects being either set up or in progress.

D. Patents

1. "Static Constant Current Regulator" (with J. Ben Uri and M.S. Erlicki), 1965.

French Patent	No.	1,420,117
U.K. Patent	No.	1,108,301
U.S. Patent	No.	3,397,301
Israeli Patent	No.	20,574

   Produced and marketed by "Atkins, Robertson & Whiteford, Ltd.", Thornliebank - Glasgow, as well as by "Savage Transformers Ltd.", Wiltshire.

2. "Saturable Reactor Driven into Negative Saturation" (with M. S. Erlicki), 1967.

   British Provisional Patent No. 31359/67.
   Adapted to industrial use and applied in power-engineering practice.

E. Book

1. "Electromagnetic Induction Phenomena", (Editing and publication supervision – Institute Professor Theodor Tamir, Polytechnic University of New York) *Springer-Verlag – Berlin, New York, November 1986.*

F. Manuals

1. "Military Specification Power Units".

Classified, Israel Defense Forces, the General Staff; in Hebrew, Mandatory Field Manual under General Staff Decree 1.0105, June 1967. Continuously revised and used for many years by the Israel Defence Forces.

G. Lecture Notes in Book Form

1. "Electromagnetic Field Theory", Undergraduate Lectures (Editing and publication supervision – Dr. S. Gavril); Technion, Department of Electrical Engineering, March 1976 (in Hebrew).

Widely used as a text-book by Electrical Engineering students in Israel.

2. "Waves and Distributed Systems", Undergraduate Lectures (Editing and publication supervision – Dr. S. Gavril); Technion, Department of Electrical Engineering, June 1977 (in Hebrew).

3. "Advanced Technical Electrodynamics", Graduate Lectures; Technion, Department of Electrical Engineering, January 1983.

4. "Electromagnetic Fields", Undergraduate Lectures; Technion, Department of Electrical Engineering, February 2002; *revised* version – October 2003 (with L. Schächter).

5. "Electromagnetic Field Theory", *new* versions of the volume **G.**1. above; (Editing and publication supervision – Dr. S. Banna); Technion, Department of Electrical Engineering, October 2001, October 2002. *New, rewritten, revised and extended* versions – October 2003, March 2004, October 2004.

Widely used as a text-book by Electrical Engineering students in Israel.

6. "Electromagnetic Fields", *new, revised, rewritten and extended* version of the volume **G.**4. above; Technion, Department of Electrical Engineering, March 2004 (with L. Schächter).

Widely used as a text-book by Electrical Engineering students at the Technion.

H. Laboratory Manuals

Instruction manuals for students of the Department of Electrical Engineering, Technion, in the areas of *Electrical Measurements, Basic Electrical Engineering, Magnetic Amplifiers, Special Electrical Machines, Electromechanical Energy Conversion, Direct Energy Conversion (Solar Cells; Solar Cell Arrays; Fuel Cells; Thermoelectric Cells), Microwave Measurements, Microcomputers*, as well as *Computed, Remote Controlled Electrical Measurements.*