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**Education**

- 1985                    **Weizmann Institute of Science, Israel.** Ph.D. in Physical Chemistry. Thesis Advisor: Prof. M.D. Cohen, Head of the Structural Chemistry Department.
- 1979                    **Weizmann Institute of Science, Israel.** M.Sc. in Physical Chemistry.
- 1973                    **Tel Aviv University, Tel Aviv, Israel.** B.Sc. in Chemistry.

**Previous Positions and Professional Experience**

- 1999- present            Professor of Medical Science and Engineering, Department of Molecular Pharmacology & Biotechnology, Director of Graduate Program, Artificial Organs, Biomaterials and Cellular Technology. Box B-G393, Providence, RI 02912. Tel (401) 863-1358. Fax (401) 863-1753.
- 2005                    Board member and consultant, Spherics
- 1999-2005              Chair woman and consultant, Spherics.
- 1997-1999              President of a start up company, Spherics.
- 1994-1999              Associate Professor of Medical Science and Engineering, Department of Molecular Pharmacology & Biotechnology, Director of Graduate Program, Artificial Organs, Biomaterials and Cellular Technology. Box B-G393, Providence, RI 02912. Tel (401) 863-1358. Fax (401) 863-1753.
- 1994-Present            Joint appointment: Associate Professor of Engineering.

- 1991-1994 Assistant Professor of Medical Science, Director of Graduate Students, Division of Biology and Medicine, Section of Artificial Organs, Biomaterials and Cellular Technology.
- 1989-1991 Senior Research Scientist in Drug Delivery. In charge of microencapsulation and new polymer development. Enzytech, Inc. 763 D Concord Avenue, Cambridge, MA 02138. Tel. (617) 252-0001/210. Fax: (617) 252-0915.
- 1987-1991 Visiting Scientist at the Department of Chemical Engineering, MIT. Department of Chemical Engineering, Massachusetts Institute of Technology Cambridge, MA 02139, Tel. (617) 253-3443
- 1987-1989 Research Associate at the Department of Surgery, Children's Hospital, Harvard Medical School.
- 1984-1986 Postdoctoral Fellow at the Department of Applied Biological Sciences, with Prof. R. Langer. Subject of research: "Development of erodible systems for drug delivery".
- 1985-1986 Lecturer, Pharmacological Engineering, course 20.S35, MIT
- 1979-1984 Research student at the Department of Structural Chemistry, Weizmann Institute of Science, with Prof. M.D. Cohen and the late Dr. A. Raziel. Subject: "Controlled photochemical rupture of microcapsules".
- 1975-1979 Research chemist at the Israel Institute of Biological Research, Nes Ziona, Israel, Polymer Department, in collaboration with the late Dr. A. Raziel, on applied polymer research.
- 1976-1979 M.Sc. degree as an external student at the Weizmann Institute of Science with Prof. M.D. Cohen and the late Dr. A. Raziel on "Release of the contents of microcapsules through controlled rupture by a photochemical method".
- 1973-1975 Army service in the Medical Corps (chemistry), as a lieutenant.
- 1973 Summer student at Prof. G. Navon's Laboratory, Tel Aviv University: "Energy transfer between rare earth metals and phenyl-alanine, in children with phenyl-ketonuria".

## List of Publications

### List of Publications

1. E. Mathiowitz, "Release of the contents of microcapsules through controlled rupture by a photochemical method," M.Sc. thesis, (1979), The Weizmann Institute of Science, Israel.
2. E. Mathiowitz, A. Raziel, M.D., Cohen, and E. Fischer, "Photochemical rupture of capsules, I. A model system," *Journal of Applied Polymer Science*, 26, 809-822 (1981).
3. E. Mathiowitz, "Controlled photochemical rupture of capsules," Ph.D. thesis, (1984), The Weizmann Institute of Science, Israel.
4. K. Leong, J. Kost, E. Mathiowitz, and R. Langer, "Polyanhydrides for controlled release of bioactive agents," *Biomaterials*, 7, 364-371 (1986).
5. E. Mathiowitz and R. Langer, "Polyanhydride microspheres as drug carriers. I. Hot melt microencapsulation," *Journal of Controlled Release*, 5, 13-22 (1987).
6. E. Mathiowitz, M.D. Cohen, and R. Langer, "Novel microcapsules for delivery systems," *Reactive Polymers*, 6, 275-283 (1987).
7. F.F. Ghodsian, L. Brown, E. Mathiowitz, D. Brandenburg, and R. Langer, "Enzymatically controlled drug delivery," *Proc. Nat. Acad. Sciences, USA*, 85, 2403-2406, (1988).
8. E. Mathiowitz, W.M. Saltzman, A. Domb, Ph. Dor, and R. Langer, "Polyanhydride microspheres as drug carriers. II. Microencapsulation by solvent removal," *Journal of Applied Polymer Science*, 35, 755-774 (1988).
9. E. Mathiowitz and M.D. Cohen, "Polyamide microcapsules for controlled release, I. Characterization of the membranes," *Journal of Membrane Science*, 40, 1-26 (1989).
10. E. Mathiowitz and M.D. Cohen, "Polyamide microcapsules for controlled release, II. Release characteristics of the microcapsules," *Journal of Membrane Science*, 40, 27-41 (1989).
11. E. Mathiowitz and M.D. Cohen, "Polyamide microcapsules for controlled release, III. Spontaneous release of azobenzene," *Journal of Membrane Science*, Vol. 40, 43-54. (1989).
12. E. Mathiowitz and M.D. Cohen, "Polyamide microcapsules for controlled release, IV. Effects of swelling," *Journal of Membrane Science*, 40, 55-65 (1989).

13. E. Mathiowitz and M.D. Cohen, "Polyamide microcapsules for controlled release, V. Photochemical release," *Journal of Membrane Science*, 40, 67-86 (1989).
14. C. Bindschaedler, K. Leong, E. Mathiowitz, and R. Langer. "Polyanhydride microspheres formulation by solvent extraction," *J. Pharm. Sci.*, 77, No. 8, 696-698, (1989).
15. M. A. Howard III, A. Gross, M. S. Grady, R. Langer, E. Mathiowitz, H.R.Winn, M. R. Mayberg, "Intracerebral drug delivery in rats reverses lesion-induced memory deficits," *J. of Neurosurgery*, 71, 105-112, (1989).
16. E. Mathiowitz, Ph. Dor, C. Amato and R. Langer. "Polyanhydride microspheres as drug carriers. III Morphological characterization of microspheres by solvent removal," *Polymer*, 31, 547-555, 1990.
17. E. Mathiowitz, E. Ron, G. Mathiowitz and R. Langer, "Morphological characterization of bioerodible polymers. I. Crystallinity of polyanhydride copolymers." *Macromolecules*. 23, 3212-3218, 1990.
18. E. Mathiowitz, D Kline and R. Langer. "Morphology of polyanhydride microsphere delivery systems," *J. of Scanning Microscopy*, 4, 329-340, 1990.
19. M. Chaisin, E. Ron, E. Mathiowitz, K. Leong, C. Laurencin, H. Brem, B. Grossman and R. Langer. "Polyanhydrides as drug delivery systems," in Biodegradable Polymers as Drug Delivery Systems. Eds., R. Langer and M. Chasin, (Marcel Dekker Inc., NY), pp.43-70, 1990.
20. E. Ron, E. Mathiowitz, G. Mathiowitz and R. Langer," NMR characterization of erodible copolymers." *Macromolecules*, 24, 2278-2282, 1991.
21. E. Mathiowitz and R. Langer., "Polyanhydride microspheres as drug delivery systems," in Microcapsules in Medicine and Pharmacy, (M. Donbrow, ed), CRC, NY, p. 99-123, 1991.
22. Domb, E. Mathiowitz, E. Ron, S., Giannos and R. Langer, "Polyanhydrides IV. Unsaturated and crosslinked polyanhydrides," *Journal of Polymer Science*, 29, 571-579, 1991.
23. Staubli, E. Mathiowitz and R. Langer, "Characterization of hydrolytically degradable amino acid-containing poly(anhydride-co-imides)," *Macromolecules*, 24, 2283-2290, 1991.
24. Staubli, E. Mathiowitz and R. Langer, "Sequence distribution and its effect on glass transition temperatures of poly(anhydride-co-imides) containing asymmetric monomers," *Macromolecules*, 24, 2291-2298, 1991.

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26. E. Edelman, E. Mathiowitz, R. Langer and M. Klagsbrum, "Controlled and modulated release of fibroblast growth factor," *Biomaterials*, 12, 619-626, 1991.
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33. K. Pekarek, J. Jacob and E. Mathiowitz "One-step preparation of double-walled microspheres," *Advanced Materials*, 6, No. 9, 684-687, 1994.
34. D. Chickering, J. Jacob, and E. Mathiowitz. "Bioadhesive microspheres: II. Characterization and evaluation of bioadhesion involving hard, bioerodible polymers and soft tissue," *Reactive Polymers*, 25, 189-206, 1995.
35. D. Chickering, and E. Mathiowitz. "Bioadhesive microspheres: I. A Novel electrobalance-based method to study adhesive interactions between individual microspheres and intestinal mucosa," *J. Controlled Release*, 34, 251-261, 1995.

36. D. Chickering, W. P. Harris and E. Mathiowitz, "A Micro-Tensiometer for the Analysis of Bioadhesive Microspheres," *Bioinstrumentation and Technology*, Nov/Dec 501-512, 1995. This paper was the winner of the 1995 Spacelabs Medical Inc./AAMI Annual Meeting Research Manuscript Award.
37. D. Chickering, J. Jacob and E. Mathiowitz, "Poly(Fumaric-co-Sebacic) Microspheres as Oral Drug Delivery Systems," *Biotechnology and Bioengineering*, 52, 96-101, 1996.
38. K. Pekarek, M. Dyrud, K. Ferrer, Y. Jong, E. Mathiowitz, "In Vitro and *In Vivo* Degradation of Double-Walled Polymer Microspheres," *J. Controlled Release*, 40, 169-178, 1996.
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53. M.Kuriakose, F-A.Chen, N.Egilmez, Y.Jong, E.Mathiowitz, M.Delacure, "W.Hicks, T.Loree, R.Bankert, Interleuckin-12 delivered by biodegradable microspheres promotes the antitumor activity of human peripheral blood lymphocytes in a human head and neck tumor xenograft/SCID mouse model", *Head and Neck*, accepted 1999
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55. E.Mathiowitz, D.Chickering, C-M Lehr, editors "Bioadhesive Drug Delivery Systems Fundamentals, Novel Approaches & Development" Marcel Dekker, Inc, 1999

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57. D.Chickering, C.Santos, E.Mathiowitz, "Adaption of a Microbalance to Measure Bioadhesive Properties of Microspheres", *Bioadhesive Drug Delivery Systems*, 131-146,1999.
58. D.Chickering, E.Mathiowitz, "Definitions, Mechanisms, and Theories of Bioadhesion", *Bioadhesive Drug Delivery Systems*, 1999 p 1-10.
59. B.Hertzog, E.Mathiowitz, "Novel Magnetic Technique to Measure Bioadhesion" *Bioadhesive Drug Delivery Systems*, 1999
60. G.Carino, J.Jacobs, C.J.Chen, C.Santos, B.Hertzog, E.Mathiowitz, "Bioadhesive, Bioerodible Polymers for Increased Intestinal Uptake" *Bioadhesive Drug Delivery Systems*, 1999
61. E.Mathiowitz, M.Kreitz, "Microencapsulatiion" *Encyclopedia of Controlled Drug Delivery*, 1999
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63. C.A.Santos, J.S.Jacob, B.A.Hertzog, B.D.Freedman, D.L.Press, P.Harnipicharnchai, E.Mathiowitz, "Correlation of two Bioadhesion assays: the everted sac technique and the CAHN Microbalance" *Journal of Controlled Release*, 1999
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65. B A Hertzog, CA Santos, P May, E Mathiowitz, "Tensile Testing of AxyaLoop™ Ultrasonically Welded Suture in Ligament Repair" *Axya Medical*, 1999
66. E. Mathiowitz, J. Jacob, Y. jong, T. M. Henkal, W. S. Spano, R. Guemonprez, A.M. Klibanov. R. Langer."Novel deciccants Based on Designed Polymeric Blends" *J. Applied Polymer Science*, 80,317-327,2001.
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70. E Mathiowitz, JS Jacob, YS Jong, TM Hekal, W Spano, R Guemonprez, AM Klibanov, R Langer, “Novel Desiccants Based on Designed Polymeric Blends”, *Journal of Applied Polymer Science*, 80, 317-327, 2001
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72. J Godbee, P Weston, E Mathiowitz, “The effects of infiltration on protein release from multi-phase microspheres fabricated via solvent removal” accepted by *Journal of Microencapsulation*, 19,783-796, 2002.
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74. M. Sandor, J Harris, E Mathiowitz, “A Novel Polyethylene Depot Device for the Study of PLGA Microspheres *in Vitro* and *in Vivo*” *Biomaterials*, 23,4413-4423, 2002.
75. M. Sandor, S Mehta, J Harris, C Thanos, J Marshall, P Weston “Transfection of HEK Cells via DNA-leaded PLGA and P(FASA)” *J Drug Targeting*, 10, 497-506, 2002.
76. CA Santos, BD Freedman, S Ghosn, JS Jacob, M Scarpulla, DJ Ensore, E Mathiowitz, “Effect of Polyanhydride Microsphere Composition on Bioadhesion. Evaluation of anhydride oligomers” *Biomaterials*, 24,3571-3583,2003
77. CG Thanos, Z Liu, J Reineke, E Edwards, E Mathiowitz, “Improving the Bioavailability of the Poorly-Soluble Drug Dicumarol by using Micronization and the Formation of a Solid Solution” In press *Pharm Res*, 2002
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79. CG Thanos, Z Liu, M Goddard, J Reineke, N Bailey, M Cross, R Burrill,, E Mathiowitz, “Enhancing the Oral Bioavailabliity of the Poorly Soluble Drug Dicumarol with a Bioadhesive Polymer” Accepted March 31, *J Pharm Sci*, 2002

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81. E, Mathiowitz and J. Jacob. "a Novel Mechanism for spontaneous encapsulation of active agents: Phase Inversion Nanoencapsulation. Chapter in ACS book. In press.
82. J. Godbee, E. Scot, P. Pattamunuch, S. Chen AND E. Mathiowitz "The role of solvent/non-solvent ratio on microsphere formation using the solvent removal method" *Microencapsulation*, Vol. 21, p 151-160, 2004.
83. M. S. Sabel, J. Skitzki, L. Stoolman, N.K. Egilmez, E. Mathiowitz, N. Baily, W.J. Chang and A.E. Chang "Intratumoral IL-12 and TNF-a Loaded Microspheres leads To regression of Breast cancer and Systemic Anti -Tumor Immunity". *Annals of Surgical Oncology*, 11(2), 147 -156 2003
84. Claudia Carvalho-Queiroz<sup>1</sup>, Rosemary Cook<sup>1</sup>, Ching C. Wang<sup>2</sup>, Rodrigo Correa-Oliveira<sup>1</sup>, Nicola A. Bailey<sup>4</sup>, Nejat K. Egilmez<sup>1</sup>, Edith Mathiowitz<sup>4</sup> and Philip T. LoVerde<sup>1</sup>\* *Schistosoma mansoni* cytosolic superoxide dismutase, a vaccine candidate that targets adult worms: cross-reactivity with host superoxide dismutase and identification of parasite-specific B epitopes. *Infection and Immunity (IAI)*. In press.
85. J. Godbee, P. Pattamunuch, E. Scott, and E. Mathiowitz. Degradation of Multi-phase Microspheres Fabricated via Solvent Removal. *Journal of Microencapsulation*. 21(3) 2004: 331-352.
86. CG Thanos, K-P. Yip, and E. Mathiowitz Intestinal Uptake of Polymeric Microspheres In The Rabbit Studies With Confocal Microscopy. *Journal of Bioactive and Compatible Polymers*, Vol. 19, July 2004: 247-266.
87. N.A. Rahman, E. Mathiowitz. Localization of bovine serum albumin in double-walled microspheres. *Journal of controlled release*. 94,163-175,2004
88. DM Ciombor, Z Liu, C Thanos, N Rahman, P Weston, R Aaron, E Mathiowitz, "Investigation of Protein microencapsulation by PLGA using W/O/O Emulsion and Solvent Removal: The Effect of Fabrication Parameters on Size distribution, morphology, and release of bovine serum albumin"

## Books

1. E.Mathiowitz, D.Chickering, C-M Lehr, editors “Bioadhesive Drug Delivery Systems Fundamentals, Novel Approaches & Development” Marcel Dekker, Inc, 1999
2. E.Mathiowitz, editor “Encyclopedia of Controlled Drug Delivery” vol 1&11, John Wiley pub.1999

## Patents

1. United States Patent 6,824,791, *Mathiowitz*, et al., November 30, 2004, Methods for micronization of hydrophobic drugs; Inventors: Mathiowitz; Edith (Brookline, MA); Thanos; Christopher (Cumberland, RI); Liu; Zhi (West Roxbury, MA)
2. United States Patent 6,746,635 *Mathiowitz*, et al. June 8, 2004, Methods for micronization of hydrophobic drugs; Inventors: Mathiowitz; Edith (Brookline, MA); Thanos; Christopher (Providence, RI); Liu; Zhi (West Roxbury, MA)
3. United States Patent 6,696,075, *Mathiowitz*, et al., February 24, 2004. Liquid crystalline polymers; Inventors: Mathiowitz; Edith (Brookline, MA); Jacob; Jules S. (Taunton, MA); Jong; Yong S. (Providence, RI); Chickering; Donald E. (Framingham, MA); Edwards; Edwin E. (Providence, RI)
4. United States Patent 6,677,313, *Mathiowitz*, et al., January 13, 2004, Method for gene therapy using nucleic acid loaded polymeric microparticles; Inventors: Mathiowitz; Edith (Brookline, MA); Jong; Yong S. (Warwick, RI); Carino; Gerardo (Providence, RI); Jacob; Jules S. (Taunton, MA)
5. United States Patent 6,620,617, *Mathiowitz*, et al., September 16, 2003, Polymeric gene delivery system; Inventors: Mathiowitz; Edith (Brookline, MA); Jong; Yong Shik (Seoul, KR); Boekelheide; Kim (Wakefield, RI)
6. United States Patent 6,616,869, *Mathiowitz*, et al., September 9, 2003, Process for preparing microparticles through phase inversion phenomena; Inventors: Mathiowitz; Edith (Brookline, MA); Chickering, III; Donald (Pfulgerville, TX); Jong; Yong S. (Warwick, RI); Jacob; Jules S. (Taunton, MA)
7. United States Patent 6,531,154, *Mathiowitz*, et al., March 11, 2003, Modulated release from biocompatible polymers; Inventors: Mathiowitz; Edith (Brookline, MA); Webber; Wendy L. (Foxboro, MA); Thanos; Christopher G. (Providence, RI)
8. United States Patent 6,528,035, *Mathiowitz*, et al., March 4, 2003, Multiwall polymeric microcapsules from hydrophilic polymers; Inventors: Mathiowitz; Edith (Brookline, MA); Jacob; Jules S. (Taunton, MA); Chickering, III; Donald E. (Providence, RI); Leach; Kathleen Jo (Midland, MI)

9. United States Patent 6,511,749, Mathiowitz, et al., January 28, 2003, Preparation of multiwall polymeric microcapsules from hydrophilic polymers; Inventors: Mathiowitz; Edith (Brookline, MA); Jacob; Jules S. (Taunton, MA); Chickering, III; Donald E. (Providence, RI); Pekarek; Kathleen Jo (Midland, MI)
10. United States Patent 6,475,779, Mathiowitz, et al., November 5, 2002, Polymeric gene delivery; Inventors: Mathiowitz; Edith (Brookline, MA); Jong; Yong Shik (Seoul, KR); Boekelheide; Kim (Wakefield, RI)
11. United States Patent 6,465,002, Mathiowitz, et al., October 15, 2002, Liquid crystalline polymers; Inventors: Mathiowitz; Edith (Brookline, MA); Jacob; Jules S. (Taunton, MA); Jong; Yong S. (Providence, RI); Chickering, III; Donald E. (Framingham, MA); Edwards; Edwin E. (Providence, RI)
12. United States Patent 6,368,586, Jacob, et al., April 9, 2002, Methods and compositions for enhancing the bioadhesive properties of polymers; Inventors: Jacob; Jules S. (Taunton, MA); Mathiowitz; Edith (Brookline, MA)
13. United States Patent 6,365,187, Mathiowitz, et al., April 2, 2002, Bioadhesive microspheres and their use as drug delivery and imaging systems; Inventors: Mathiowitz; Edith (Brookline, MA); Chickering, III; Donald E. (Framingham, MA); Jacob; Jules Serge (Tauton, MA)
14. United States Patent 6,262,183, Domb, et al., July 17, 2001, Hydroxamic acid polymers formed from primary amide polymers; Inventors: Domb; Abraham J. (Brookline, MA); Langer; Robert S. (Somerville, MA); Cravalho; Ernest G. (Wellesley Hills, MA); Golomb; Gershon (Jerusalem, IL); Mathiowitz; Edith (Brookline, MA); Laurencin; Cato T. (Philadelphia, PA)
15. United States Patent 6,262,034, Mathiowitz, et al., July 17, 2001, Polymeric gene delivery system; Inventors: Mathiowitz; Edith (Brookline, MA); Jong; Yong Shik (Seoul, KR); Boekelheide; Kim (Wakefield, RI)
16. United States Patent 6,248,720, Mathiowitz, et al., June 19, 2001, Method for gene therapy using nucleic acid loaded polymeric microparticles; Inventors: Mathiowitz; Edith (Brookline, MA); Jong; Yong S. (Warwick, RI); Carino; Gerardo (Providence, RI); Jacob; Jules S. (Taunton, MA)
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91. Characterization of Heparin Loaded Composite Porous Polyurethane Vascular Grafts Michael Harrison, Ih-Ming Chan, Paul Yang, and Edith Mathiowitz. Controlled Release Society Miami, Florida, 2005.
92. Fabrication and Characterization of Heparin loaded Poly (D,L-lactide-co-glycolide) Microspheres via Modified Solvent Removal Method, Michael Harrison, Karen Wei., and Edith Mathiowitz. Controlled Release Society Miami, Florida, 2005.
93. Comparisons of two in vitro bioadhesion assays: Cahn and texture analyzer Peter M Cheifetz, Gail Chan, Camilla A Santos 1, Edith Mathiowitz. Controlled Release Society Miami, Florida, 2005.

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### **Invited lectures**

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2. "Polymeric drug composites: Structure-property relationships for novel delivery systems", Dept. of Material Sciences, MIT, March 1987.
3. "Photochemically controlled delivery systems", Du Pont & Co., R&D Division, Wilmington, Delaware, 1987.
4. "Structure property relationships for novel polymeric delivery systems". Department of Pharmaceutical Chemistry School of Pharmacy, University of California, San Francisco, April 8, 1988.
5. "Morphological characterization of microparticles". Presented in a course on microencapsulation. "Microencapsulation and Nanoencapsulation - process and Pharmaceutical Applications", Sponsored by the Controlled Release Society, Boston, May 14-15, 1990.
6. "Microencapsulation and drug delivery" Panel Chairman, annual Meeting of the society for Biomaterials, Scottsdale, Arizona, May 1991.
7. "Morphological characterization of biomaterials using X-Ray, DSC and SEM." Eastern Analytical Symposium, Inc., Somerset, NJ, November 1991.
8. "Evaluation and characterization of composite drug delivery systems." American Chemical Society (ACS) meeting, San Francisco, CA, April 1992.
9. "Bioadhesive microspheres as drug delivery systems" Invited lecture at the 38th Annual meeting of the American Society for Artificial Internal Organs (ASAIO), Nashville, TN, May 1992.
10. "Mechanism study on the interaction of bioadhesive microspheres with intestinal mucosa." Invited lecture at the Surface of Biomaterials Symposium, Minneapolis, MN, October 1992.

11. "Drug delivery systems" Panel Chairman, Annual Meeting at the 39th Annual meeting of the American Society of Artificial Internal Organs (ASAIO), New Orleans, LA, May 1993.
12. "Microspheres as drug delivery systems." Invited lecture at the Surgical Research Seminar, The Miriam Hospital, Department of Surgery, Providence, RI, September, 1992.
13. "The mechanism of bioadhesion between hydrogels, thermoplastics and intestinal mucosa." Invited lecture at the PPST Research Seminar, Departments of Chemical Engineering and of Material Science at the Massachusetts Institute of Technology, Cambridge, MA, October 1992.
14. "Controlled and Sustained Release Formulations Designed for Protein Drugs Pt. I & II. Speaker in short course "Formulation Development of Therapeutic Proteins and Drug Delivery Systems for Peptide and Protein Drugs," American Chemical Society Short Course, Chicago, IL, 1992-present.
15. "Drug delivery systems." Invited lecture at Morehouse College, Atlanta, Georgia, February 25, 1993.
16. "Mucus Epithelia." Invited lecture at the Keystone Symposia Conference, Hilton Head Island, South Carolina, January 7-13, 1994.
17. "Novel Double-Walled Microspheres For Oral Or Parental Administration." Invited lecture at XI Congress of the International Society For Artificial Cells, Blood Substitutes, and Immobilization Biotechnology, Boston, Massachusetts, July 24-27, 1994.
18. "Bioadhesive microspheres as drug delivery systems." Invited lecture at Alza, Palo Alto, California, September 8, 1994.
19. "Bioadhesive microspheres as drug delivery systems." Invited lecture at Cygnus Therapeutics Systems, Redwood City, California, September 9, 1994.
20. "The Proprietary Dilemma - Bridging the Information Gap Between Academia and Practice," Annual Congress of the Association of Faculties of Pharmacy of Canada, Montreal, Canada, May 11, 1995.
21. "Bioadhesive Drug Delivery Systems". Invited lecture at Engineering Foundation Conference, BIOCHEMICAL ENGINEERING IX: Interdisciplinary Foundations for Creating New Biotechnology, in Davos, Switzerland, May 21-26, 1995.
22. "Hydrophobic Polymer Microspheres for Oral Delivery of DNA, Proteins, Peptides, and Small Molecules in the Small Intestine." Invited lecture at VRI Virus Research Institute, 61 Moulton Street, Cambridge, MA 02138 April 1997.

23. "Hydrophobic Polymer Microspheres for Oral Delivery of DNA, Proteins, Peptides, and Small Molecules in the Small Intestine." Invited lecture at Eli Lilly and Co., Indianapolis, IN, May 8, 1997.
24. "Hydrophobic Polymer Microspheres for Oral Delivery of DNA, Proteins Peptides", Ares Services, 15 bis, Ch. des Mines, CH-1202 Geneva, Switzerland, June 1997.
25. "Hydrophobic Polymer Microspheres for Oral Delivery of DNA, Proteins Peptides" Amgen Corporation, 1900 Oak Terrace Lane, Thousand Oaks, CA 91320, July 1997.
26. "Bioadhesive Polymers as Oral delivery Systems", Affymax Research Institute, 3410 Central Expressway, Santa Clara, California 95051, July, 1997.
27. "Hydrophobic Polymer Microspheres for Oral Delivery of DNA, Proteins Peptides", Bristol-Myers Squibb, Pharmaceutical Research Institute, P.O.Box 191, New Brunswick, NJ 08903-0191, July 1997.
28. "New Opportunities in Drug Delivery Systems", Corporate Research and Technology, Hoechst Celanese Corporation, R.L. Mitchell Technical Center, 86 Morris Avenue, Summit, NJ 07901 July 1997.
29. "Bioadhesive Microspheres as Oral Delivery Systems for Proteins and Genes" Enzon, Inc. Piscutway, NJ, August 1997.
30. "Bioadhesive Microspheres as Oral Delivery Systems for Proteins and Genes", the 4th US-Japan Symposium on Drug Delivery Systems, Kauai, Hawaii, December, 1997.
31. "Characterization of Drug Delivery Polymers using DSC and FT-IR" Thermal Analysis Fall Seminar Series, Westborough Marriottt, 5400 Computer Drive, Westborough, MA, November, 1997.
32. "Bioadhesive Polymers for Oral DNA Delivery", Keystone Symposia, Silverthorne, CO, January 1998.
33. "Bioadhesive Polymers for Oral DNA Delivery", Roswell Park Cancer Cancer Center, Buffalo, NY, Jan.27, 1998.
34. "Drug Carriers in Biology and Medicine", Gordon Research Conference, Ventura, CA. February, 1998.
35. "Bioadhesive Microspheres as Oral Delivery Systems for Proteins and Genes", Micrologix Biotech, Inc. Vancouver, B.C. February, 1998

36. "Drug Carriers in Biology and Medicine", UCSF, Dept.of Pharmaceutical Chemistry, San Francisco, CA. March 1998.
37. "Development of Oral Delivery of Proteins and Genes", 9<sup>th</sup> Int'l Symposium on Recent Advances in Drug Delivery Systems, Feb.22-25, 1999.
38. "Oral Delivery of Protein and Genes:Realty or Myth?", CRS Annual Meeting, Boston, MA, June 24, 1999.
39. "Bioavailability Testing of Insulin-Loaded Microspheres", "The Effect of Protein Molecular Weight on Release from PLGA Nanospheres", "Solvent Removal for Protein Encapsulation", "Biodegradable Nanosphere Uptake in the Rabbit Jejunum", New England Pharmacy Conference, Providence, RI, Feb, 2000.
96. "Enhanced Oral Delivery of Macromolecules using Bioadhesive Microspheres". AAPS Pharmaceutics and Drug Delivery Conference. April 22-24, 2002, Arlington, VA, USA, 2002.
40. Mechanism for Spontaneous Encapsulation of Active Agents: Phase Inversion NanoencapsulationThe ACS Division of Colloid and Surface Science,Colloidal Drug Delivery,Co-sponsored by American Association of Pharmaceutical svience (APPS). Orlando, FL, April 7-11, 2002

### **Professional Organizations**

Controlled Release Society

American Chemical Society (Polymer Division)

American Association for the Advancement of Science

Material Research Society

Biomaterials Society

American Society for Artificial Internal Organs (ASAIIO)

### **Chair Positions**

1. Session Chair, Annual Meeting of the Society for Biomaterials, May, 1991, Scottsdale, Arizona.
2. Session Chair, 38th Annual Meeting of the American Society for Artificial Internal Organs (ASAIO), May 1992, Nashville, Tennessee.
3. Session Chair, 19th International Symposium on the Controlled Release of Bioactive Materials, Controlled Release Society, July 1992, Orlando, Florida.
4. Session Chair, XI Congress of the International Society for Artificial Cells, Blood Substitutes, and Immobilization Biotechnology, July 24-27, 1994, Boston, Massachusetts.
5. Session Chair, 22nd International Symposium on the Controlled Release of Bioactive Materials, Controlled Release Society, July 31-August 2, 1995, Seattle, Washington.
6. Session Chair. "The 24th International Symposium on Controlled Release of Bioactive Materials, Stockholm, Sweden, June 15-19, 1997.
7. Session Chair, "The second Annual Meeting of the Israeli Chapter of th Controlled Release Society", Oral Protein and Gene Delivery, September 18-19, 1997
8. Session Chair, "25th Int'l Symposium on Controlled Release of Bioactive Materials", Microparticles Session, June 20-26, 1998.
9. Session Chair, "45<sup>th</sup> Anniversary Conference of ASAIO" Trends/Developments in Drug Delivery, June 3-5, 1999, San Diego, CA.
10. Session Chair, CRS 2000, July 7-15, 2000, Paris, France.
11. Session Chair, MRS, Nov.27-29, 2000, Boston, MA.
12. Science chair persons (with two other members) for the Bioactive Sessions for the 32nd Annual Conference of the Controlled Release Society to be held in Miami from June 12 -18, 2005
13. Scientific organizer of the Controlled release society that will take place in Miami Florida 2005

### University Services

2002-2004	<u>Awards@Benefits</u> committee
1995-present	Biophysics Concentrator
2000-2002	Brown's Goldwater Scholarship Screening Committee
1991-present	Director of Graduate Students, ABC Section
1993	Member of Search Committee for new professor in Pharmacology
1994	Advisor for Sophomore Undergraduates
1995	Member of Search Committee for new professor in Pharmacology
1995	Member of the Materials Research Council
1995 - present	Biophysics Concentrator
1996 - present	Hillel Advisor

### Editorial Activities

- Member of the Controlled Release Society 1996 Kyoto Scientific Programming and Abstract Review Committee
- Member of the Editorial Board of the *Journal of Biomaterials* 1996-2003
- Member of the Editorial Board of the *Journal of Controlled Release* 1999-2003
- Member of the Editorial Board of the *Journal of microencapsulation*-2000-2003
- Guest Editor for special issue on Drug Delivery Systems for *Journal of Reactive Polymers*
- Editing a book on bioadhesion 1999
- Editing the Encyclopedia of Controlled Drug Delivery Systems 1999
- Scientific Program and Abstract Review Committee Member for the Controlled Release Society, Inc.
- Member of the Editorial Board of *Microencapsulation*, 1998
- Review papers and books for the following Journals:
  1. *Journal of Controlled Release*
  2. *Biomaterials*
  3. *Journal of Polymers Science, Polymer Chemistry*
  4. *Pharmaceutical Research*
  5. *Biotechnology and Bioengineering*
  6. *American Institute of Chemical Engineering*
  7. *Journal of Physical Chemistry*
  8. *Journal of Pharmaceutics and Biopharmaceutics*
  9. *Nature Biotechnology*
  10. *Macromolecules*
  11. *Nature Medicine*
  12. *ASME Journal*

**Other Activities:**

Elected for the Board of Governors of the Controlled Release Society 1997-2001.

National Institute of Health

1. Consultant to NIH Study Section on “Angiogenesis and Breast Cancer”, 1994.
2. Peer review of grant application for the National Heart, Lung and Blood Institute, 1995.
3. Special Study Sections of the National Institute of Diabetes and Digestive and Kidney Diseases: SBIR, March 1995.
4. Special Study Section Meeting: Scientific Review, SBIR, Diabetes and Digestive and Kidney Diseases, July 1995.
5. Special Study Section Meeting: Review of grant applications, Nov. 18-19, 1997
6. Panel of chemistry & related sciences, March 11-12, 1998
7. Special Study Section Meeting: Review of small business applications for drug Development and delivery, March 10-11, 1999
8. SB Study Section-Review of applications, June 13-15, 1999.
9. Biodefense, partnerships: vaccines, adjuvants, therapeutics, diagnostics, and resources. 2003/05 council ZA/1 HSD-M M3, 04/28/2003.

**Awards**

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|-----------|---|
| 2000      | <b>The Eurand Award for Excellence in Research in the Area of Oral Drug Delivery Systems.</b>   |
| 1994      | <b>Recognition Award for Excellence in Guiding Graduate Student Research.</b> Controlled Release Society - Procter & Gamble. Awarded in Nice, France. |
| 1991-1993 | <b>Whitaker Foundation Award.</b>   |
| 1985-1987 | <b>Bantrell Postdoctoral Fellowship (MIT).</b><br>A competitive award at MIT in the field of surface science.   |
| 1979-1984 | <b>Feinberg Fellowship, Weizmann Institute of Science, Israel.</b> A competitive award conferred for graduate research students.                      |
| 1982      | <b>Delek Prize</b> for distinctive research work (Weizmann Institute of Science, Israel).   |
| 1973      | <b>Distinction Prize for B.Sc. students</b> (Tel Aviv University, Israel).  |

## Teaching Experience

1992-present	Annual speaker in a short course entitled “Formulation Development of Therapeutic Proteins and Drug Delivery Systems For Peptides and Protein Drugs. Controlled Release Systems for Proteins.” organized by the American Chemical Society. Chicago, Illinois.
1992-present	Teaching Bio 211, “Biomaterials,” graduate level course. Biomaterials course is an overview of materials considered biocompatible.
1991-present	Teaching Bio 109, “Polymers for Artificial Organs” an undergraduate/graduate level course serving as an introduction to polymer science.
1990	Lecturer in course on microencapsulation. “Microencapsulation and Nanoencapsulation - Process and Pharmaceutical Applications”, Sponsored by the Controlled Release Society, Boston, May 14-15, 1990.
1979-1981	Lecturer of chemistry at the “Reali” Gymnasium, Rishon Le Zion, Israel.
1974-1975	Physics and chemistry lecturer in an adult education program at Israel Institute of Biological Research, Nes Ziona, Israel.

### Committees (Name, role):

Departmental:	Director of Graduate Students, ABC Section
University:	Biophysics Concentrator 1995-present Benefit Committee 2003

## II. Teaching

Course name, # Semester	Role	Enrollment	Total #sessions	Total # taught by faculty member	Student evaluations available?
BIO109 Polymers For artificial organs	PI	17		40	Yes
BIO223 Seminar	PI	15			No
BIO211 Drug & Gene Delivery	PI	15		30	
BIO224 Seminar	PI	15			

**Current research**

- i. Developments and characterization of novel bioadhesive delivery systems.
- ii. Oral delivery of proteins such as Insulin.
- iii. Development of nanotechnology for therapeutic applications
- iv. Development of novel bone repair delivery systems
- v. Development of drug eluting vascular grafts
- vi. The use of progenitor cell to redirect healing of vascular grafts
- vii. Development of novel liquid crystals.
- viii. Gene delivery.