

CURRICULUM VITAE

January 2019

Personal:

Name: Izhak Etsion I.D. 0670860

Place and Date of Birth: Israel, Aug. 13, 1942

Citizen of: Israel

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E-Mail: etsion@technion.ac.il

Academic Degrees:

1964: B.Sc., Technion, Israel Institute of Technology

1971: M.Sc., Technion, Israel Institute of Technology

1974: D.Sc., Technion, Israel Institute of Technology

Academic Appointments:

1971-1974: Instructor, Department of Aeronautical Engineering, Technion, Haifa, Israel.

1974-1975: Lecturer, Department of Mechanical Engineering, Technion, Haifa, Israel

1976-1983: Senior Lecturer, Department of Mechanical Engineering, Technion, Haifa, Israel.

1983-1996: Associate Professor, Department of Mechanical Engineering, Technion, Haifa, Israel.

1996-2010: Professor, Department of Mechanical Engineering, Technion, Haifa, Israel.

2004-2010: The Yeshayahu Winograd Chair

2010: Professor Emeritus, Department of Mechanical Engineering, Technion, Haifa, Israel.

Teaching Experience:

Technion:

Undergraduate courses: 1975-2010

Design projects
Compressible fluid flow
Statics
Dynamics
Mechanical Engineering Design
Introduction to computers
Strength of Materials

Graduate courses: 1975-2014

Hydrodynamic Lubrication
Theoretical Tribology

U.C. Berkeley:
Undergraduate
courses: 1986
Advanced Lab. in Mechanical Engineering

Professional and Research Experience:

1974 - present Department of Mechanical Engineering, Technion, Haifa, Israel
1975-1976: U.S. NRC Research Associate, NASA-Lewis Research Center, Cleveland, Ohio.
Summer 1978: Research Fellow, Department of Mechanical Engineering and Astronautical Sciences, Northwestern University, Evanston, Illinois.
1979-1980: U.S. NRC Senior Research Associate, NASA Lewis Research Center, Cleveland, Ohio.
Summer 1982: Visiting Scientist, Atomic Energy of Canada Ltd., Chalk River Nuclear Laboratories, Chalk River, Ontario.
1985-1986: Visiting Professor, Department of Mechanical Engineering, University of California, Berkeley, California.
Summer 1987: Department of Mechanical Engineering, University of California, Berkeley, California.
Summer 1988: Department of Mechanical Engineering, University of California, Berkeley, California
2006-2007: Dept. of Mechanical and Industrial Engineering Northeastern University, Boston, MA. (Aug.-Sept. 2006) and Dept. of Mechanical Engineering University of California, San Diego, CA (Oct. 2006-Feb. 2007).
2007-2008: Dept. of Engineering University of Cambridge, Cambridge UK, (Aug. 2007) and Dept. of Mechanical Engineering University of California, San Diego, (Aug. 2007-Feb. 2008).
2008-2009: State Key Lab. of Tribology, Tsinghua University, Beijing China (Aug-Sept. 2008). School of Mechanical Engineering University of Western Australia, Perth Australia (Oct.-Nov. 2008). Indian Institute of Science, Bangalore India (Dec. 2008-Jan. 2009), and Dept. of Mechanical Engineering University of California, San Diego, (Feb. 2009).
2009-2010 Dept. of Mechanical Engineering University of California, San Diego, (Oct.-Nov. 2009), Dept. of Mechanical Engineering University of Sao Paulo, Sao Paulo, Brazil (Jan.-Feb. 2010)

Industrial Experience:

1964-1966: Design engineer, Israel Air Force, design of aircraft components
1967-1970: Research engineer, Center of Aeronautical Research, Technion, I.I.T., in charge of the supersonic wind tunnels of the center. Research and development projects in wind tunnel testing.
1970-1971: Senior engineer, Vulcan Engineering Ltd., Haifa, Israel. Manager technical office, design and production of aeronautical engineering projects.
1974 - 2010: Consultant to various companies in Israel, the U.S. and W. Germany on bearings and sealing problems.
1992 – 1999: Scientific Manager (Founder), Tribology Ltd., a subsidiary of Technion Entrepreneurial Incubator Co.

1996 – 2005: Director (Founder) and Chief Scientist, Surface Technologies Ltd.

Administrative Posts

1991- 2010: Head, Shamban Tribology Laboratory, Dept. of Mechanical Engineering, Technion.
 2001-2007: Head, "Brakim" program, Dept. of Mechanical Engineering, Technion
 2006- 2007: Head, Danciger Laboratories, Technion.

Research Interests:

Hydrodynamic and Hydrostatic Lubrication
 Fluid Film Bearings and Seals
 Contact mechanics
 Contact, Adhesion and Friction of Rough Surfaces
 Thin film coatings
 Micro/Nano Tribology
 Bio Tribology
 Laser Surface Texturing

Sponsored Research:

1971-1973: "Bearing-Pump", the Israel Government Defense, and Commerce and Industry Departments, (with O. Pinkus). (\$10,000)
 1973-1974: "Investigation of Hydrodynamic Bearings using Liquid and Gaseous Lubricants", (with O. Pinkus). (\$10,000)
 1974-1975: "Hydrodynamics of Bodies Moving within Tubes", Israel Government Defense Department and Sultam. (\$10,000)
 1975-1976: "Gas Thrust Bearings for Automotive Gas Turbines", U.S. National Research Council. NASA LeRC.(\$28,000)
 1976-1977: "Centering of Pistons" Israel Government Defense Department. (\$10,000)
 1976-1979: "Study of Radial Face Seal Mechanism of Operation", U.S.National Aeronautics and Space Administration. (\$65,000)
 1982-1983: "A Study of Bubbly Lubricating Films", U.S. National Aeronautics and Space Administration (with S. Haber). (\$30,000)
 1983-1985: "Mechanical Face Seal Dynamics", U.S. Air Force and the Israel Academy of Sciences and Humanities. (\$160,000)
 1985: "The Effect of Squeeze and Pressure on the Stiffness and Damping of Elastomer O-rings", RAFAEL-Armament Development Authority. (\$40,000)
 1987-1991: "Controlled Mechanical Seals", Israel Government, Industry and Commerce Department and various Technion Research Funds (with Z. Palmor). (\$35,000)
 1991: "Static Sealing Performance of End Face Seals", the Seals Technical Committee of the STLE. (\$50,000)

- 1993-1995: "A Method for Surface Engineering Based on Controlled Micro-Relief", Israel Government Science Department (\$95,000)
- 1993-1995: "Reducing Air Pollution via Tribo-Optimization of I.C.E. Piston-Cylinder System", Israel Government Science Department (\$106,000)
- 1993-1994: "Performance Analysis of Mechanical Seals with Structured Seal Faces", F. Burgmann, Germany (\$50,000).
- 1994: "Friction and Wear Reduction by Vibrogrooving", Pratt & Whitney, U.S.A. (\$100,000).
- 1995- 1998: "Diamond and Diamond-like Coatings for Tribological Applications", Israel Government Science Department (\$67,000).
- 1996-1997: "Modeling of Static C Seals", EG&G Sealol, U.S.A. (\$50,000).
- 1996- 1999: "Cladding of Aluminum-Alloys and Copper using High Power Laser" (with M. Bamberger) G.I.F. (DM 300,000).
- 1997- 1999: "A Model for Dynamic Friction Behavior" The Israel Science Foundation. (\$60,000).
- 1998- 2000: "Thematic Network on 2-Stroke Engine Wear Parts" the European Commission. (\$34,000).
- 1998- 2002: "Novel Tribological Strategies: From the Nano - to the Meso - Scales" D.I.P (DM 412,500).
- 1999-2002: "Development of New Nanocomposites for Advanced Tribological Applications" Israel Government Science Department (\$82,000).
- 2003-2005: "Nano-scale Fretting" The Israel Science Foundation. (\$100,000).
- 2004-2005: "The Effect of Various Surface Treatments on Piston Pin Performance" GM (\$110,000)
- 2004-2005: "Friction Reduction in Engines by LST" Israel Ministry of Infrastructures (\$37,500), and Argonne National Lab. (\$217,000)
- 2005-2007: "Friction Reduction in Engines by LST" Israel Ministry of Infrastructures (\$75,000)
- 2005-2008: "Developing nano-Structured Materials Stored in micro Surface Texturing for Friction and Wear Reduction" Israel Ministry of Science (\$96,000)
- 2005-2009: "Knowledge-based Radical Innovation Surfacing for Tribology and Advanced Lubrication" KRISTAL, the European Commission (\$400,000)
- 2006-2007: "Nano-Particle Additives Based Lubricants to Combat Osteoarthritis in Human Joints" RBNI Technion (\$40,000)
- 2010-2012: "Contact Mechanics of Coated Surfaces" Technion President Fund and Tribology Science Fund of the State Key Laboratory of Tribology Tsinghua University, China (\$14,000)

Professional Associations

1. Fellow, American Society of Mechanical Engineers.
2. Fellow (life), Society of Tribologists and Lubrication Engineers.
3. Member, Israel Society for Tribology.

Reviewer for

ACS Applied Materials & Interfaces
 Acta Materialia
 Applied Mechanics Reviews,
 Applied Physics A,
 ASME Jour. of Applied Mechanics,
 ASME Jour. of Tribology,
 ASME Jour. of Fluid Engineering,
 eXPRESS Polymer Letters,
 Friction,
 International Jour. of Impact Engineering,
 International Jour. of Modern Physics B,
 International Jour. of Precision Engineering and Manufacturing,
 International Jour. of Solids and Structures,
 Jour. of Adhesion Science and Technology,
 Jour. of Applied Physics,
 Jour. of Physics D: Applied Physics,
 Jour. of Materials Processing Technology,
 Jour. of Materials Research,
 Jour. of the Mechanics and Physics of Solids,
 Mechanics of Materials
 Meccanica
 Nanoscience and Nanotechnology Letters
 Proc. IMechE Jour. of Engineering Tribology,
 Surface and Coatings Technology
 Tribology Transactions,
 Tribology International,
 Tribology Letters,
 Wear,

German-Israel Foundation for Scientific R&D (GIF),
 Israel Ministry of Science,
 Israel-U.S. Binational Science Foundation (BSF),
 U.S. National Science Foundation (NSF),

Public Professional Activities:

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|------------|---|
| 1982: | Chairman, Organizing committee of the 16th Israel Conference on Mechanical Engineering. |
| 1983: | Member, Organizing committee of the 17th Israel Conference on Mechanical Engineering. |
| 1984-1985: | Secretary (1984) and Chairman (1985) of the Israel Society of Tribology. |
| 1987: | Organizer of the International Tribology Workshop held at the 21st Israel Conference on Mechanical Engineering. |

- 1990 -1996: Associate Editor, Trans. ASME Journal of Tribology.
- 1994 - 2000: Member (1994–1998), and Secretary (1999–2000), Executive Committee Tribology Division of the ASME.
- 1996 - 1998: Chairman of the ASME Tribology Division, International Coordination Committee.
- 1997- 1998: Member, Committee for Academic Development, Technion.
- 1997 - 2000: Member, MEMS committee, Israel National Academy of Sciences.
- 1998 – 1999: Chairman, ASME International Israel Section.
- 2000 – 2003: Member (2000-2002), and Chairman (2002-2003), Nomination and Oversight Committee Tribology Division of the ASME.
- 2001 – 2002: Member, Planning committee of the 2nd World Tribology Congress.
- 2001 – 2002: Member, Scientific Committee 3rd AIMETA International Tribology Conference
- 2001 – 2003: Member (2001-2002), and Chairman (2003), All Technion Joint Faculty Students Committee.
- 2002 – 2005: Member, Technion Senate committee for undergraduate and graduate studies.
- 2003 – 2004: Member, Technion Stipends Committee.
- 2003 – 2004: Member, Scientific Committee 4th AIMETA International Tribology Conference
- 2003 – 2005: Member, Technion Patents Committee.
- 2004-2005: Member, International Advisory Board of World Tribology Congress III.
- 2005 – 2006: Member, Scientific Committee 5th AIMETA International Tribology Conference
- 2005- 2010: Member, Managing Committee, Russell Berrie Nanotechnology Institute.
- 2005- 2011: Member and Chair (2010-2011), STLE Fellows Committee
- 2006 – 2008: Member, Editorial Board of Advances in Tribology.
- 2010: Co-Chair, Organizing committee China international workshop on surface texturing CIST 2010.
- 2012 -present: Member, Board of Editors, Friction.
- 2014 -present: International Member of the Advisory Committee of State Key Laboratory of Tribology, Tsinghua University, Beijing, China.

Prizes and Awards:

1. 1984 D.D. Ben-Aharon Research Prize (Technion)
2. 1989 H. Gutwirt Research Award (Technion)
3. 1991 STLE/STC Fluid Sealing Research Award
4. 1998 Academia Romana Traian Vuia Prize

5. 1999 The Hershel Rich Technion Innovation Award
6. 1999 ASME Fellow
7. 2001 STLE Fellow
8. 2004 Sanford Kaplan Prize in Creative management for 21st Century High Technology
9. 2005 STLE International Award
10. 2005 ASME Tribology Division RCT Innovative Research Award
11. 2008 ASME Tribology Division K.L. Johnson Best Paper Award
12. 2016 ASME Mayo D. Hersey Award

Participation in Congresses:

1. Joint ASME-ASLE Lubrication Conference, Miami Beach, Fla., Oct. 21-23, 1975
The Hydrodynamics of a Plug Bearing.
2. Joint ASME-ASLE Lubrication Conference, Boston, Mass., Oct. 5 - 7, 1976
 - a. An Accurate Solution of the Gas Lubricated Flat-Sector Thrust Bearing.
 - b. The Dual Action Gas Thrust Bearing - A New High Load Bearing Concept.
3. Joint ASME-ASLE Lubrication Conference, Kansas City, Mo., Oct. 3 - 5, 1977
 - a. Non-Axisymmetric Incompressible Hydrostatic Pressure Effects in Radial Face Seals.
 - b. Design Charts for Arbitrarily Pivoted, Liquid Lubricated, Flat Sector-Pad Thrust Bearing.
4. Joint ASME-ASLE Lubrication Conference, Minneapolis, Minn., Oct. 24-26, 1978
 - a. Radial Forces in a Misaligned Face Seal.
 - b. Hydrodynamic Effects in a Misaligned Radial Face Seal.
 - c. The Accuracy of the Narrow Seal Approximation in Analyzing Radial Face Seals.
5. ASLE Annual Meeting, St. Louis, Mo., Apr. 30 - May 3, 1979
Performance of End Face Seals with Diametral Tilt and Coning - Hydrostatic Effects.
6. Joint ASME-ASLE Lubrication Conference, Dayton, Oh., Oct. 16 - 17, 1979
 - a. Squeeze Effects in Radial Face Seals.
 - b. The Effect of Coning on Radial Forces in Misaligned Radial Face Seals.
 - c. Performance of End Face Seals with Diametral Tilt and Coning - Hydrodynamic Effects.
7. ASLE Annual Meeting, Anaheim, Ca., May 5 -8, 1980
On the Solution of Lubrication Problems Involving Narrow Configurations.
8. Joint ASME-ASLE Lubrication Conference, San Francisco, Ca., Aug. 18 - 21, 1980
 - a. Analysis of a Hydrodynamic Thrust Bearing with Incomplete Film.
 - b. Dynamic Analysis of a Cantilever - Mounted Gas-Lubricated Thrust Bearing.
 - c. An Analysis of Mechanical Face Seal Vibrations.
9. 9th BHRA International Conference on Fluid-Sealing, Netherlands, Apr. 1 - 3, 1981
The Simulation and Visualization of Face Seal Stability by Means of Computer Generated Movies.
10. Joint ASME-ASLE Lubrication Conference, New Orleans, La., Oct. 5 - 7, 1981
 - a. Observation of Pressure Variation in the Cavitation Region of Submerged Journal Bearings.
 - b. Dynamic Analysis of Non-Contacting Face Seals.
11. Joint ASME-ASLE Lubrication Conference, Washington D.C., Oct. 5 - 7, 1982
Fluid Film Dynamic Coefficients in Mechanical Face Seals.
12. Joint ASME-ASLE Lubrication Conference, Hartford, CT., Oct. 18 - 20, 1983
 - a. Experimental Observation of the Dynamic Behavior of Noncontacting Coned-Face Mechanical Seals.

- b. A New Concept of Zero-Leakage Non-Contacting Mechanical Face Seal.
13. 10th BHRA International Conference on Fluid-Sealing, Austria, Apr. 3 - 5, 1984
Stiffness and Damping Characteristics of Elastomer O-rings Secondary Seals Subjected to Reciprocating Twist.
 14. ASLE Annual Meeting, Las Vegas, Nevada, May 6 - 9, 1985
Nonlinear Dynamic Analysis of Noncontacting Coned Face Mechanical Seals.
 15. Joint ASME-ASLE Tribology Conference, Atlanta, Ga., Oct. 8 - 10, 1985
 - a. A New Hybrid Magnetic Fluid Seal for Liquids.
 - b. Pressure and Squeeze Effects on the Dynamic Characteristics of Elastomer O-Rings Under Small Reciprocating Motion.
 16. Joint ASME-ASLE Tribology Conference, San Antonio, TX, Oct. 6 - 8, 1987
 - a. Adhesion Model for Metallic Rough Surfaces.
 - b. Static Friction Coefficient Model for Metallic Rough Surfaces.
 - c. Performance Analysis of A New Concept Viscous Pump.
 17. Joint ASME-STLE Tribology Conference, Baltimore, Md., Oct. 16 - 19, 1988
The Effect of Lubrication on the Static and Low-Speed Dynamic Friction in Thin Film Magnetic Disks.
 18. Joint STLE-ASME Tribology Conference, Ft. Lauderdale, Fla., Oct. 17 - 19, 1989
 - a. Adhesion of Contacting Rough Surfaces in the Presence of Sub-Boundary Lubrication.
 - b. The Effect of Curvature on the Load Carrying Capacity in Eccentric Gas Thrust Bearings.
 19. Joint ASME-STLE Tribology Conference, Toronto, Ontario, Oct. 7 - 10, 1990.
 - a. Feasibility Study of a Controlled Mechanical Seal.
 - b. Experimental Investigation of a New Concept Viscous Pump.
 20. Joint STLE-ASME Tribology Conference, St. Louis, Missouri, Oct. 13 - 16, 1991.
A Thermo-Hydrodynamic Analysis of a Mechanical Face Seal.
 21. STLE Annual Meeting, Philadelphia, PA, May 4 - 7, 1992,
A Thermohydrodynamic Analysis of a Misaligned Mechanical Face Seal.
 22. Joint ASME-STLE Tribology Conference, San Diego, CA, Oct. 18-21, 1992.
 - a. The Effect of Small Normal Loads on the Static Friction Coefficient in Very Smooth Surfaces.
 - b. Dynamic Analysis of Gas Lubricated Reciprocating Ringless Pistons - Basic Modeling.
 23. STLE Annual Meeting, Calgary, Canada, May 17 - 20, 1993.
A Model for Static Sealing Performance of End Face Seals.
 24. 6th International Congress on Tribology, EUROTRIB-93, Budapest, Hungary, Aug. 30 -Sept. 2, 1993.
Dynamic Analysis of Reciprocating Ringless Pistons.
 25. Joint STLE-ASME Tribology Conference, New Orleans, LA, Oct. 24 - 27, 1993.
 - a. Enhancing Sealing and Dynamic Performance with Partially Porous Mechanical Face Seals.
 - b. Parametric Study of the Dynamic Performance of Gas-Lubricated Ringless Pistons.
 26. Joint ASME-STLE International Tribology conference, Lahaina, Hawaii, Oct. 16 - 20, 1994.
Improved Design with Non-Cylindrical Profiles of Gas-Lubricated Ringless Pistons.
 27. Joint STLE-ASME Tribology Conference, Orlando, Florida, Oct. 8 - 11, 1995.

- a. Phase Change in a Misaligned Mechanical Face Seal
 - b. A Model for Mechanical Seals with Regular Microsurface Structure.
28. STLE Annual Meeting, Cincinnati, OH, May 20 - 23, 1996.
Hydrodynamic Effects on the Boiling Interface in a Misaligned Two-Phase Mechanical Seal - A Qualitative study.
 29. Joint ASME-STLE Tribology Conference, San Francisco, California, Oct. 13 - 17, 1996.
The Boiling Interface in a Misaligned Two-Phase Mechanical Seal.
 30. STLE Annual Meeting, Kansas City, MO, May 18 - 22, 1997.
Vaporization in Face Seals Operating with Liquid Mixtures.
 31. 1st World Tribology Congress, London, England, Sept. 8-12, 1997.
 - a. Static Friction of Contacting Real Surfaces in the Presence of Sub-Boundary Lubrication.
 - b. Comparison of the Static Friction Sub-Boundary Lubrication Model with Experimental Measurements on Thin Film Disks.
 32. 15th BHRG International Conference on Fluid Sealing, Maastricht, The Netherlands, Sept. 16-18, 1997.
Increasing Mechanical Seals Life with Laser-Textured Seal Faces.
 33. STLE Annual Meeting, Detroit, MI, May 18 - 21, 1998.
Static Sealing Performance of Gas Mechanical Seals Including Surface Roughness and Rarefaction Effects.
 34. Joint ASME-STLE Tribology Conference, Toronto, Canada, Oct. 26 - 28, 1998.
Analytical and Experimental Investigation of Laser-Textured Mechanical Face Seals.
 35. STLE Annual Meeting, Las Vegas, NV, May 24 - 27, 1999.
A Model for the Static Sealing Performance of Compliant Metallic Gas Seals Including Surface Roughness and Rarefaction Effects.
 36. 4th International Conference ICE99, Capri, Italy, Sept. 12 - 16, 1999.
Improving Tribological Properties of Automotive Mechanical Components by Laser Surface Texturing. Part 1: Theoretical Modeling.
 37. STLE Annual Meeting, Nashville TN, May 7-11, 2000.
The Contact of a Compliant Curved and a Nominally Flat Rough Surfaces
 38. 1st AIMETA International Tribology Conference, L'Aquila, Italy, Sept. 20 - 22, 2000
Improving Tribological Performance of Mechanical Components by Laser Surface Texturing
 39. Joint ASME-STLE Tribology Conference, Seattle WA, Oct. 2 - 4, 2000
 - a. Electrical Conductivity and Friction Force Estimation in Compliant Electrical Connectors.
 - b. The Effect of Shear Flow and Dissolved Gas Diffusion on the Cavitation in a Submerged Journal Bearing.
 40. STLE Annual Meeting, Orlando Florida, May 21 - 24, 2001.
 - a. Analysis of the Hydrodynamic Effects in a Surface Textured Circumferential Gas Seal.
 - b. Friction-Reducing Surface Texturing in Reciprocating Automotive Components.
 41. Joint ASME-STLE Tribology Conference, San Francisco CA, Oct. 21-24, 2001.

Reverse Flow as a possible Mechanism for Cavitation Pressure Build-up in a Submerged Journal Bearing

42. STLE Annual Meeting, Houston Texas, May 20 – 23, 2002
 - a. A Laser Surface Textured Hydrostatic Mechanical Seal.
 - b. Experimental Investigation of Laser Surface Texturing for Reciprocating Automotive Components.
 - c. Elastic Plastic Contact Analysis of a Sphere and a Rigid Flat.
43. 3rd AIMETA International Tribology Conference, Salerno, Italy, Sept. 18 – 20, 2002.
An Improved Elastic-Plastic Model for the Contact of Rough Surfaces.
44. Joint ASME-STLE Tribology Conference, Cancun, Mexico, Oct. 27-30, 2002.
A Semi-Analytical Solution for the Sliding Inception of a Spherical Contact.
45. STLE Annual Meeting, New York, NY, April 27 – May 1st, 2003
A Laser Surface Textured Parallel Thrust Bearing
46. TRIMIS 2003, Microtribology – Tribology in Microsystems, Neuchatel, Switzerland, June 1-3, 2003
Adhesion in Elastic-Plastic Spherical Micro-Contact
47. Smart Surfaces in Tribology, Zurich, Switzerland, September 10-12, 2003.
Improving Tribological Performance of Mechanical Seals by Laser Surface Texturing
48. International Joint Tribology Conference, Ponte Verda, Florida, Oct. 27-29, 2003.
 - a. An Experimental Investigation of Elastic Plastic Contact and Friction of a Sphere on a Flat.
 - b. State of the Art in Laser Surface Texturing.
49. 14th International Colloquium Tribology, Esslingen, Germany, January 13-15, 2004.
Laser Surface Texturing – Measure to Reduce Friction
50. STLE Annual Meeting, Toronto, Canada, May 17-20, 2004
Near-Contact Laser Surface Textured Dry Gas Seal
51. International Joint Tribology Conference, Long Beach, California, Oct. 24-27, 2004.
Unloading of an Elastic-Plastic Spherical Contact
52. STLE Annual Meeting, Las Vegas, NV, May 16-19, 2005
 - a. The Effect of Partial Laser Surface Texturing on Piston Rings Friction
 - b. A Hydrostatic Laser Surface Textured Gas Seal
53. 3rd World Tribology Congress, Washington DC, Sept. 12-16, 2005.
Multiple Loading-Unloading of an Elastic-Plastic Spherical Contact
54. 5th AIMETA International Tribology Conference, Parma, Italy, Sept. 20 – 22, 2006
A Rational Human Joint Friction Test using a Human Cartilage-on-Cartilage Arrangement
55. International Joint Tribology Conference, San Antonio, Texas, Oct. 23-25, 2006.
 - a. A Rational Human Joint Friction Test using a Human Cartilage-on-Cartilage Arrangement
 - b. A Test Rig for the Contact Area Evolution during Pre-Sliding
 - c. Elastic-Plastic Spherical Contact under Combined Normal and Tangential Loading
56. 1st European Conference on Tribology ECOTRIB 2007, Ljubljana, Slovenia, June 13-15, 2007.

Improving Fuel Efficiency with Laser Surface Textured Piston Rings

57. International Joint Tribology Conference, San Diego, CA, Oct. 22-25, 2007.
 - a. A Model for Junction Growth of a Spherical Contact
 - b. In Situ and Real Time Optical Investigation of Junction Growth in Spherical Elastic-Plastic Contact
58. 2nd European Conference on Tribology ECOTRIB 2009, Pisa, Italy, June 7-10, 2009.
 - a. Techniques for Assessment of Wear between Human Cartilage Surfaces
 - b. The Effect of Surface Roughness on Static Friction and Junction Growth of an Elastic-Plastic Spherical Contact
59. 4th World Tribology Congress, Kyoto, Japan, Sept. 2009.

The Effect of Surface Roughness on Static Friction and Junction Growth of an Elastic-Plastic Spherical Contact
60. International Joint Tribology Conference, Memphis, Tennessee, Oct. 19-21, 2009.

Revisiting the Cattaneo-Mindlin Concept of Interfacial Slip in Tangentially Loaded Compliant Bodies
61. 3rd International Conference on Mechanics of Biomaterials & Tissues, Clearwater, Florida, Dec. 13-17, 2009.

Liposomes as Potential Biolubricant Additives for Combating Osteoarthritis in Human Synovial Joints
62. 11th Pan-American Congress of Applied Mechanics, Foz do Iguacu, Brazil, Jan. 4-8, 2010.

Revisiting the Cattaneo-Mindlin Concept of Interfacial Slip in Tangentially Loaded Compliant Bodies
63. STLE Annual Meeting, Las Vegas, NV, May 16-19, 2010

The Effect of Dwell Time on the Static Friction in Creeping Elastic-Plastic Polymer Spherical Contact
64. International Joint Tribology Conference, San Francisco, CA, Oct. 17-20, 2010

Multiple Normal Loading-Unloading Cycles of a Spherical Contact under Stick Contact Condition
65. ICMCTF, San Diego, CA May 2-6, 2011

The Onset of Plastic Yielding in a Coated Sphere Compressed by a Rigid Flat
66. STLE Annual Meeting, Atlanta, GA, May 15-19, 2011

The Onset of Plastic Yielding in a Coated Sphere Compressed by a Rigid Flat
67. STLE Annual Meeting, St. Louis, MO, May 6-10, 2012

Extending the Classical Hertz Solution by an Equivalent Young's Modulus for a Coated Spherical Contact
68. International Joint Tribology Conference, Denver, CO, Oct. 7-10, 2012

A Potential Weakening Effect of Very Thin Hard Coatings
69. STLE Annual Meeting, Detroit, MI, May 5-9, 2013

A New Approach to the Equivalent Young's Modulus of a Coated Spherical Contact
70. 5th World Tribology Congress, Turin, Italy, Sept. 8-13, 2013.

A Model for the Weakening Effect of Very Thin Hard Coatings.

71. ICMCTF, San Diego, CA April 20-24, 2015
A Universal Model for the Load-Displacement Relation in an Elastic Coated Spherical Contact.
72. NORTRIB, Hämeenlinna, Finland, June 14-17, 2016
 - a. Contact Area and Maximum Equivalent Stress in Elastic Spherical Contact with Thin Hard Coating.
 - b. A Universal Model for an Elastic-plastic Coated Sphere Contact with Moderate to Large Coating Thickness
73. STLE TFC, Chicago, IL Nov. 11-15, 2016
Experimental Study of the Effect of Coating Thickness and Substrate Roughness on Tool Wear during Turning
74. 15th Global Conference on Sustainable Manufacturing, Haifa, Israel Sept. 25-27, 2017
The Effect of Coating Thickness and Substrate Roughness on Tool Wear during Turning

Invited Lectures

1. International Sealing Conference, Wolfratshausen, Germany 1986.
Ideas and Tendencies of Future Mechanical Seal Development.
2. STLE Annual Meeting, Calgary, Canada, 1993.
Static Friction Coefficient - Some Recent Theoretical and Experimental Observations.
3. EG&G Sealol, Providence, Rhode Island, 1995.
The Effect of Surface Roughness on Static Sealing Performance of Mechanical Seals.
4. U.S. Army TACOM, Detroit, Michigan, 1996.
Improving Tribological Properties of Mechanical Components by Regular Microsurface Structure.
5. Ohio Aerospace Institute, Cleveland, Ohio, 1996.
Tribology at Technion.
6. Tel Aviv University, Sackler School of Medicine, 1996.
Tribology in Orthopedics.
7. Weizmann Institute of Science, Faculty of Chemistry, 1997.
Tribology from BC to PC.
8. Israel Science Foundation Workshop, Ein Gedi, 1997.
The Effect of Sub-Boundary Lubrication on Adhesion and Friction at Interfaces.
9. Tel-Aviv University, Gordon Center for Energy Studies, May - June, 1998.
Reducing Energy Consumption Through Tribology.
10. International Conference COST 532 Porto, Portugal, 2005.
Laser surface texturing (LST) of engine components
11. Nanotribology meeting Univ. of Modena, Italy 3-4 Nov. 2006
State of the Art in Laser Surface Texturing

12. I-SUP 2008, Bruges, Belgium, April, 2008
Laser Surface Texturing
13. STLE Annual Meeting, Cleveland, OH, May 19-22, 2008
Laser Surface Texturing (panel discussion)
14. CIST 2008, Beijing, China, Sept. 2008
State of the Art in Laser Surface Texturing
15. Batsheva de Rothschild seminar on: Shear Physics at the Meso-Scale in Earthquake and Landslide Mechanics, Ein Gedi, Israel, Jan. 2009.
On the Mechanism of Junction Growth in Pre-Sliding
16. University of Sao Paulo, Sao Paulo, Brazil, Feb. 2010.
Laser Surface Texturing
17. Gordon Conference on Tribology, Waterville, Mein, June 27-July 2, 2010.
The Impact of Surface Texturing on Tribology
18. TriboBR, Rio de Janeiro, Brazil, Nov. 24-26, 2010
A Review of Laser Surface Texturing and Applications
19. CIWST 2011, Lanzhou, China, Aug. 2011.
The Impact of Laser Surface Texturing on Tribology
20. The University of Modena, Italy, Sept. 16, 2013.
Optimizing Thickness of Hard Coatings

Keynote Lectures

1. 7th Biennial ASME Conference on Engineering Systems Design and Analysis, Manchester, UK, July 2004.
The State of the Art in Laser Surface Texturing
2. 3rd World Tribology Congress, Washington DC, Aug. 2005
Nanoscale Fretting Study by Scanning Probe Microscopy
3. 6th EDF–LMS Poitiers Workshop, Futuroscope, France, Sept. 2007
Laser Surface Texturing in Dynamic Sealing
4. 12th International Conference on Metrology & Properties of Engineering Surfaces, Rzeszow, Poland, July 2009.
State of the Art in Laser Surface Texturing
5. 4th World Tribology Congress, Kyoto. Japan, Sept. 2009.
State of the Art in Laser Surface Texturing and Applications
6. CIWST 2010, Beijing, China, Sept. 2010.
The Impact of Laser Surface Texturing on Tribology
7. 6th World Tribology Congress, Beijing, China, Sept. 2017.
Contact Mechanics of Coated Surfaces

Post-Docs.

1. A.A. Polycarpou, 1996-1997, "Static Friction Sub-Boundary Lubrication Model"
2. Y. Kligerman, 1998-1999, "Modeling of Dynamic Friction".
3. H. Kasem, 2011-2012, "Contact Mechanics"
4. P. Kurien, 2018- present, "Bilayer Coatings"

Graduate Students:**D.Sc./Ph.D.**

1. I. Green, 1984, "Dynamics of Noncontacting Mechanical Face Seal".
2. W.R. Chang, 1986 (U.C. Berkeley with D.B. Bogy, primary supervisor) "Contact, Adhesion and Static Friction of Metallic Rough Surfaces".
3. K. Gomed, 1991, "Flow and Stability Analysis of Free Piston in Periodic Motion".
4. M. Groper, 1999, "New Aspects of the Cavitation Phenomenon in a Submerged Journal Bearing".
5. L. Kogut, 2002, "An Elastic-Plastic Model for the Contact and Friction of Rough Surfaces".
6. M. Varenberg, 2004, "Tribological Aspects of Nanoscale Fretting".
7. V. Brizmer, 2007, "Elastic-Plastic Contact of a Sphere and a Flat under Combined Normal and Tangential Loading".
8. A. Ovcharenko, 2008, "Experimental Investigation of Junction Growth in Spherical Contact"
9. Y. Kadin, 2009, "Cyclic Loading of Elastic-Plastic Spherical Contacts".
10. A. Shinkarenko, 2009, "Soft Elastohydrodynamic Lubrication"
11. R. Goltsberg, 2015, "Contact Mechanics of Thin Film Coatings"
- 12.

M.Sc.

1. A. Sharoni, 1978, "An Investigation of the Operational Mechanism of Dynamic Face Seals".
2. M. Magen, 1979, "Dynamic Analysis of Piston Motion within a Tube".
3. Y. Dan, 1979, "Dynamic Investigation of Mechanical Face Seals".
4. I. Green, 1979, "Dynamic Analysis of Flexibly Mounted Gas Thrust Bearing.

5. I. Barkon, 1980, "A Theoretical Analysis of a Hydrodynamic Thrust Bearing with Incomplete Film".
6. R. Yaier, 1985, "Performance Analysis of A New Concept Viscous Pump".
7. C.R. Hale, 1986 (U.C. Berkeley), "Experimental Fluid Journal Bearing Study".
8. B.M. May, 1986 (U.C. Berkeley with D.B. Bogy, primary supervisor), "Wear Protection of Carbon Overcoats on Thin Film Magnetic Media".
9. Y. Shaked, M.Sc. 1989, "The Effect of Curvature on the Load Capacity in Gas Thrust Bearings".
10. N. Harary, 1990 (with Z. Palmor, primary supervisor), "Feasibility Study of a Controlled Mechanical Seal".
11. I. Front, 1990, "The Effects of Closing Force and Surface Roughness on Leakage in Radial Face Seal".
12. N. Galperin, 1991 (with Z. Palmor, primary supervisor), "A Test Rig for the Development of a Closed Loop Digital Control for Mechanical Seals".
13. M. Amit, 1992, "Investigation of the Static Friction Coefficient of Highly Smooth Surfaces".
14. D. Zlatnik, 1992 (with Z. Palmor, primary supervisor), "Development of a Control System for an Active Magnetic Bearing".
15. O. Michael, 1992, "Investigation of Porous Mechanical Seals".
16. M. Groper, 1995, "A Comparison of Approximating Methods for the Evaluation of the Temperature Distribution in a Mechanical Face Seal".
17. L. Kogut, 1998, "The Effect of Mechanical Properties and Surface Roughness on the Electrical Conductivity and Friction in Compliant Electrical Contacts".
18. M. Varenberg, 2000, "A Study of the Fretting Wear Mechanism".
19. V. Brizmer, 2001, "Analysis of a Hydrodynamic Bearing with Laser Textured Surface".
20. A. Wolchuk, 2001, "A Study of the effect of Surface Micro-Topography on Fretting Fatigue".
21. A. Ronen, 2002, "Improving Tribological Properties of Automotive Mechanical Components by Laser Surface Treatment".
22. R. Greenberg, 2002, "Nano Composites for Tribological Applications".
23. L. Kreines, 2003, "Fretting Wear of Thin Film Diamond Coatings".
24. A. Shinkarenko, 2004, "Improving Tribological Performance of Piston Rings by Partial Surface Texturing".
25. O. Levinson, 2004, "Experimental Investigation of Static Friction".
26. Y. Feldman, 2006, "Analysis of Gas Lubrication with Textured Surfaces".
27. Y. Mercher, 2006, "The Effect of New Lubricants on the Friction of Human Cartilage".
28. Y. Morag, 2007, "A Fractal Model for the Contact of Rough Surfaces".

29. C. Brot, 2008, "Contact Mechanics in Bio Tribology".
30. J. Salib, 2008, "Elastic Plastic Contact under Normal and Tangential Loading".
31. G. Verberne, 2008, "Tribology of Biological Tissues".
32. D. Cohen, 2009, "A Model for Contact and Static Friction of Nominally Flat and Spherical Rough Surfaces in Full Stick"
33. S. Malamut, 2010, "Creep of Spherical Contact under Combined Normal and Tangential Loading"
34. Y. Zait, 2010, "The Effect of Contact Conditions and Material Properties on the Unloading and Cyclic Loading of a Spherical Contact"
35. V. Zolotravskiy, 2012, "The Effect of Tangential Loading on Tribological Phenomena in Spherical Contact"
36. M. Levi, 2016, "Contact Mechanics of Elastomeric O-Rings with Time"
37. M. Bar-Chen, 2016, "Experimental Study of the Effect of Coating Thickness and Substrate Roughness on Cutting Tool's Wear"
38. S. Ronen, 2017, "Elastic-Plastic Model For a Coated Sphere Compressed by a Rigid Flat under Full Stick Contact Condition"
39. O. Korchevnik, 2017, "Electrical Resistance Model of a bi-Layer Coated Spherical Contact"
40. S. Levi, 2017, "Plastic yield inception of a soft coated sphere compressed by a rigid flat"
41. O. Stav, 2018 (with H Kasem primary supervisor), "Simultaneous shot-peening of hard and soft particles for friction reduction"

In Progress

1. Z. Chen, Ph.D
2. A. Perl, M.Sc.
3. E. Fortinsky, M.Sc.