

**CURRICULUM VITAE**

(updated 2022)

**PERSONAL**Baruch Karp, married + 3, [bkarp@bgu.ac.il](mailto:bkarp@bgu.ac.il), [baruch@technion.ac.il](mailto:baruch@technion.ac.il)**ACADEMIC DEGREES**

1996 D.Sc. Aerospace Engineering, Technion, Haifa, Israel.  
 1989 M.Sc. Aerospace Engineering, Technion, Haifa, Israel.  
 1984 B.Sc. Aeronautical Engineering, Technion, Haifa, Israel.

**ACADEMIC APPOINTMENTS AS VISITING SCIENTIST**

2022 Adjunct Senior Researcher, Samuel Neaman Institute for National Policy Research, Technion City, Haifa, Israel.  
 2018 Adjunct Senior Lecturer, Faculty of Aerospace Engineering, Technion, Israel Institute of Technology, Haifa, Israel.  
 2013- 2014 Adjunct Senior Lecturer, Faculty of Aerospace Engineering, Technion, Israel Institute of Technology, Haifa, Israel.  
 2005-2006 Adjunct Senior Lecturer, Faculty of Aerospace Engineering, Technion, Israel Institute of Technology, Haifa, Israel.  
 1999-2000 Visiting Lecturer, Department of Mechanical Engineering, University of British Columbia, Vancouver, Canada.

**PROFESSIONAL EXPERIENCE****NRC, Negev****Israel**

2017- "Mechkar" A+ (Prof. equivalent).  
 System engineering, system reliability, structural health monitoring, reliability and measurement and experimentation design.  
 2004-2017 "Mechkar" A.  
 Experimental characterization of mechanical properties of materials, Saint-Venant's principle in elastodynamics, Systems aging and reliability, Structural health monitoring, fracture phenomena, System engineering.  
 1995-2003 "Mechkar" B.  
 Experimental investigation of mechanical properties of semi-brittle materials, Saint-Venant's principle in quasi-linear materials, systems reliability.  
 1989-1995 "Mechkar" C.  
 Development of NDT methods. Saint-Venant's principle.

**Israeli Air-force Headquarter****Israel**

1985-1989 Captain.  
 Design and project manager of aircraft retrofits.

**RESEARCH INTERESTS**

- Education (with emphasis on values), Engineering approach to education. Reliability of "soft data" and of perception.
- Wave phenomena in waveguides. Dynamic analogue of Saint-Venant's principle.
- Experimental characterization mechanical properties and fracture of metals, semi-brittle, and composite materials. Saint-Venant's principle in design methodology and in experimental methods.
- Structural health monitoring, Non-destructive inspection of materials and structures, Development Experimentation and Measurement, Accuracy philosophy.
- Structure and System reliability, Design management and System engineering, System approach to design and maintenance.

**TEACHING EXPERIENCE****Ben-Gurion University of the Negev, Department of Mechanical Eng. Beer-Sheva, Israel**

- Elasticity 2 graduate
- Strength of Materials 2 x 7 undergrad.
- Strength of Materials undergrad.
- Introduction to plates and shells undergrad.+graduate
- Advanced strength of materials x 3 undergrad.
- Structural health monitoring x 4 undergrad.+graduate

**Technion, Israel Institute of Technology, Faculty of Aerospace Eng. Haifa, Israel**

- Elastic waves and applications undergrad.+graduate
- Structural health monitoring x 10 undergrad.+graduate
- Strength of materials undergrad

**University of British Columbia, Department of Mechanical Eng. Vancouver, Canada**

- Vibrations and waves in elastic struct. graduate

**Negev Academic College of Engineering Beer-Sheva, Israel**

- Ordinary differential equations x 3 undergrad.

**SUMMER SCHOOL TEACHING****CISM: International Centre for Mechanical Sciences Udine, Italy**

- Dynamic Version of Saint-Venant Principle: in Dynamic Localization Phenomena in Elasticity, Acoustics and Electromagnetism. 11-15 June 2012.

**RAFAEL Israel**

- Introduction to Elastodynamics. 14 Hrs. 23, 31, December 2013.
- Elastic and Dynamic response of structures 23 Hrs, March-April, 2018

**NRC Negev Israel**

- Overview of Project Phases in Design 12 Hrs. April 2012
- Introduction to Reliability in Design. 16 Hrs. April 2013
- Introduction to System Engineering 12 Hrs. July 2016

## GRADUATE STUDENTS

### M.Sc. and ME completed

**Alecs Tziperfel**, (2001), Laser induced cracks in Alumina for fracture toughness measurements, Department of Mechanical Engineering, BGU, with Prof. M. Perl.

**Michael Gecht**, (2014), Composite structures health monitoring by dynamic end effects, Faculty of Aerospace Engineering, Technion, Haifa. Jointly with Prof. D. Durban.

**Lior Shani**, (2014), Health monitoring of composite structures as a design tool. (M.E) Faculty of Aerospace Engineering, Technion, Haifa.

**Ido Bracha**, (2016), Health monitoring of aerospace joints by dynamic end effects, Faculty of Aerospace Engineering, Technion, Haifa. Jointly with Prof. D. Durban.

**Royi Robissa**, (2016), Decay of end effects in orthotropic strip with missalignment between material principal directions and longitudinal axis of the strip. (ME) School of Mechanical Engineering, Tel Aviv University, Ramat Aviv.

**Guy Shapira**, (2016) Stress triaxiality effect on plastic properties of ductile metals using shear compression disk specimen with controlled stress triaxiality under quasi-static and dynamic loadings, Faculty of Mechanical Engineering, Technion, Haifa. Jointly with Prof. D. Rittel.

**Neta Blum**, (2018) On Saint-Venant's Principle in Biological Tissues, Faculty of Aerospace Engineering, Technion, Haifa. Jointly with Prof. D. Durban.

**Itai Fargun**, (2020) Monitoring local damage in structure using Saint-Venant's Principle, Faculty of Aerospace Engineering, Technion, Haifa. Jointly with Prof. D. Durban.

## RESEARCH GRANTS

2009-2011 **Vatat**, Specimen development for characterization of metals under various stress triaxiality conditions, Jointly with Prof. D. Rittel (Technion).

2006 **Asher Space Research Fund at the Technion**, Structural health monitoring in space structures joints, Jointly with Prof. D. Durban (Technion) and Prof. D. Rittel (Technion).

1996-2001 **Vatat**, Fracture toughness of semi-brittle materials, Jointly with Prof. M. Perl (BGU).

## REVIEWING ACTIVITIES

1. Proceeding of the Royal Society of London, Ser. A
2. Journal of Sound and Vibration
3. International Journal of Impact Engineering
4. International Journal of Solids and Structures
5. Journal of Computational and Applied Mathematics
6. International Journal of Acoustics and Vibration
7. Experimental Mechanics
8. Mechanics of Materials

9. Latin American Journal of Solids and Structures
10. Mechanics Research Communications
11. Journal of Mechanical Engineering Science
12. Archive of Applied Mechanics
13. Mechanical Systems and Signal Processing
14. Applied Mathematical Modeling

## **PUBLICATIONS**

(updated 2022)

### **Theses**

- D.Sc. thesis      *Saint-Venant's principle in elastostatics and elastodynamics.* (1996).  
Supervisor: Prof. D. Durban.
- M.Sc. thesis      *Diffusion of end effects in compressible hyperelastic materials.* (1989)  
Supervisor: Prof. D. Durban.

### **Books**

- Karp B., (2006), Earthly Ecclesiastes (קהלת דרך ארץ) (English and Hebrew).
- Karp B., (2010), לצאת להפשי (in Hebrew).
- Karp B., Zonnenshain A., Bentur A., 2021/2021, World of Engineering: Historical development, challenges and strategies in modern society. Samuel Neaman Institute for National Policy Research, Technion City, Haifa (in Hebrew 2021, in English 2021).
- Karp B., Veracity of Perception: Introduction to the Theory of Measurement in: Science, Engineering, Education and in Society. (In Hebrew, To be published).

### **Book Chapter**

- Karp B., Durban D., 2013, Elastodynamic End Effects in Structural Mechanics, In CISM Courses and Lectures on *Dynamic Localization Phenomena in Elasticity, Acoustics and Electromagnetism*. Springer, 2013, pp. 115-179.

### **PATENT**

- Karp B., Rittel D., Durban D., "System and method for monitoring health of structural joints", US Patent No. 8,596,135 B2, Dec. 3, 2013. Patented by Technion.

### **Published papers (since 2004)**

1. Karp B., End effects in pre-stressed plates under compression, 2004, *ASME, J. Appl. Mech.*, 71, 816-824.
2. Karp B., Durban D., Evanescent and propagating waves in prestretched hyperelastic plates, *Int. J. Solids Struct.*, 42, 2005, 1613-1647.
3. Karp B., Dynamic version of Saint-Venant's principle - Historical account and recent results. *Nonlinear Analysis*, 63, 2005, e931-e942.
4. Karp B., Generation of symmetric Lamb waves by non-uniform excitations, *Journal of Sound and Vibration*, 312 (1-2), 2008, 195-209.

5. Karp B., Rittel D., Durban D., Health monitoring of joints using dynamic end effects, *Journal of Sound and Vibration*, 312 (1-2), 2008, 257-272.
6. Karp B., Dorogoy A., Wang Z., Non-Uniform Impact Excitation of a Cylindrical Bar, *Journal of Sound and Vibration*. 323, 2009, 757–771.
7. Karp B., Dynamic equivalence, self-equilibrated excitation and Saint-Venant's principle for an elastic strip. *Int. J. Solids Struct.* 46, 2009, 3068-3077.
8. Karp B., Study of dynamic end effects in an elastic strip with sliding boundary conditions. *Int. J. Solids Struct.* 48, 2011, 126-136.
9. Dorogoy A., Karp B., Rittel D., A shear compression disk specimen with controlled stress triaxiality under quasi-static loading, *Experimental Mechanics*, 51, 2011, 1545-1557.
10. Karp B., Durban D., Saint-Venant's Principle in dynamics of structures. *Applied Mechanics Reviews*. 64, 2011, 020801:1-20.
11. Karp B., Dorogoy A., Rittel D., A shear compression disk specimen with controlled stress triaxiality under dynamic loading, *Experimental Mechanics*, 53(2), 2013, 243-253.
12. He L., Ma G.W., Karp B., Li Q.M., Investigation of Dynamic Saint-Venant's Principle in a Cylindrical Waveguide – Analytical Results, *International Journal of Impact Engineering* 73, 2014, 135-144.
13. He L., Ma G.W., Karp B., Li Q.M., Investigation of Dynamic Saint-Venant's Principle in a Cylindrical Waveguide – Experimental and Numerical Results. *Experimental Mechanics* 55, 2015, 623–634.
14. Karp B., Dynamic End Effects in an Orthotropic Strip. *Int. J. Solids Struct.* 125, 2017 43–49.
15. Karp B., Shapira G., Rittel D., Experimental investigation of fracture under controlled stress triaxiality using shear-compression disk specimen. *International Journal of Fracture*. 209, 2018, 171–185.

#### **Manuscripts under review or to be submitted**

16. Karp B., Durban D., Universal Solutions for Decay of End Effects in an Orthotropic Strip. To be submitted.
17. Gecht M., Karp B., Durban D., Health Monitoring of Composite Structures Using Static and Dynamic End Effects. To be submitted.

#### **CONFERENCES**

##### **Invited Talks**

1. Karp B., 2004, “Dynamic version of Saint-Venant's principle – Historical account and recent results”, Fourth World Congress on Nonlinear Analysis (WCNA-2004), 30 June - 7 July, 2004, Orlando, USA.

2. Karp B., 2007, "Experimental and Analytical Aspects of End Excitation", Fourth International Conference of Applied Mathematics and Computing, August 12 - 18, 2007, Plovdiv, Bulgaria.

#### **Refereed papers in Conference proceedings**

1. Karp B., Durban D., 1997, "Towards a dynamic version of Saint-Venant's principle", The 3<sup>rd</sup> international conference on modern practice in stress and vibration analysis, 3-5 September, 1997, Dublin, Ireland.
2. Karp B., 2003, "Constitutive sensitivity of end effects in plates under compression", Third European conference on constitutive models for rubber, 15-17 September, 2003, Queen Mary University of London, London, United Kingdom.
3. Karp B., 2005, "End effects and dynamic equivalence in elastic waveguides", Proceedings of IDETC/CIE 2005, ASME 2005 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, September 24-28, 2005, Long Beach, California, USA.
4. Karp B., Rittel D., Durban D., 2006, "Health Monitoring of Structural Joints", 47<sup>th</sup> Israel Annual Conference on Aerospace Sciences, Tel-Aviv – Haifa, 21-22 February, 2006, Israel.
5. Karp B., 2007, "Non-uniform, harmonic, edge excitation of a waveguide", 14<sup>th</sup> International Congress on Sound and Vibration, ICSV14, 9-12 July 2007, Cairns, Australia.
6. Karp B., 2012, "Dynamic End-Effects in Composites and Health Monitoring ", 52<sup>nd</sup> Israel Annual Conference on Aerospace Sciences, Tel-Aviv – Haifa, 29 February-1 March, 2012, Israel.
7. Gecht M., Karp B., Durban D., 2014, "Health Monitoring of Composite Structures Using Static and Dynamic End Effects", 54<sup>th</sup> Israel Annual Conference on Aerospace Sciences, Tel-Aviv – Haifa, 19-20 February, 2014, Israel.
8. Bracha I., Karp B., Durban D., 2016, "Health Monitoring of Aerospace Structural Joints by Local Dynamic Effects", 56<sup>th</sup> Israel Annual Conference on Aerospace Sciences, Tel-Aviv – Haifa, 9-10 March, 2016, Israel.

#### **Presentations in Conference/Symposia**

1. Karp B., Durban D., 1997, Elastic waves in prestretched plates, McNU '97 conference, 29 June – 2 July, 1997, Norris center, Northwestern University, Evanston, Chicago, USA.
2. Karp B., Durban D., 1997, Axial decay of quasi-static disturbances in a prestretched semi-infinite plate, 3<sup>rd</sup> EUROMECH Solid Mechanics Conference, 18-22 August, KTH, Royal Institute of Technology, Stockholm, Sweden.
3. Tziperfel A., Perl M., Karp B., Haruch S., 2001, Laser induced pre-cracking of Alumina fracture toughness specimens, First Israel-Japan bi-national workshop on dynamic response of brittle solids, 28-30 January, Neve-Ilan, Israel.

4. Karp B., 2001, On stability and Saint-Venant's principle in hyperelastic materials", MMC 2001, 26-30 June, San-Diego, USA.
5. Karp B., 2002, Bifurcation and Saint-Venant's principle in nonlinear elasticity, SECTAM XXI, 21<sup>st</sup> Southeastern conference on theoretical and applied mechanics, 19-21 May, Orlando, Florida, USA.
6. Karp B., 2003, Buckling, Barreling, and End effects in compressed plates, 5<sup>th</sup> EUROMECH Solid Mechanics conference, 17-22 August, Thessaloniki, Greece.
7. Karp B., 2004, A dynamic version of Saint-Venant's principle, 5<sup>th</sup> International Symposium on Impact Engineering (ISIE 5), 11-15 July, Cambridge, UK.
8. Karp B., Durban D., 2004, Axial decay of time harmonic end perturbations in prestretched hyperelastic plates, 21<sup>st</sup> International Congress of Theoretical and Applied Mechanics, 15-21 August, Warsaw, Poland.
9. Karp B., 2006, Dynamic response of a plate subjected to various edge excitations, 4<sup>th</sup> Joint Meeting of the Acoustical Society of America and the Acoustical Society of Japan, 28 November - 2 December, Sheraton Waikiki Hotel, Honolulu, Hawaii, USA.
10. Karp B., Rittel D., Durban D., 2007, End Effects as Structural Marker for Damaged Joints. SEM Annual Meeting, Springfield, USA, June 2007.
11. Karp B., Dorogoy A., Wang Z., 2009, Non-uniform impact excitation of a bar in SHPB system, *Society for Experimental Mechanics - SEM Annual Conference and Exposition on Experimental and Applied Mechanics 2009* 3, pp. 1693-1702.
12. Karp B., 2012, Mathematical and Engineering Aspects of Dynamic Saint-Venant's Principle, Mechanics – New Challenges, The 2012 ISIMM – STAMM XVIII Symposium, 3-6 September, 2012, Technion, Haifa, Israel.