

## Leon MISHNAEVSKY

Dr. Eng., Heisenberg Fellow (German Scientific Council)

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**PERSONAL DATA:** Date of birth: May 14, 1964.  
Nationality: German.

### EMPLOYMENT:

since 03/2003 Darmstadt Univ of Technology, Heisenberg Fellow (post-habilitation fellowship of DFG)  
since 1/1996 University of Stuttgart (Germany), Materials Testing Institute (MPA)  
- since 03/2003 - Heisenberg Fellow,  
- 1998-2002 - Research Associate, 1996-98 - Visiting Scientist  
12/1996 - 12/1997 Max-Planck Institute for Metal Research (Germany), Research Scientist  
04/1994 - 05/1995 Technical University of Vienna (Austria), Institute of Mechanics, Research Scientist  
09/1981-08/1994 Inst. Superhard Materials (Ukrainian Acad. Sci, Kiev). 1990-94 – Research Scientist  
(Dept. of New Tool Materials), 1987-90 – Engineer, 1981-87- Technician (Dept. of  
Surface Quality).

### VISITING APPOINTMENTS:

2-3/2004 Massachusetts Institute of Technology, Dept. Materials Science & Engrng, Visiting Scholar  
1-3, 7/2003 Ecole Nationale Supérieure d'Arts et Métiers (ENSAM, Paris, France). Invited Professor  
5-6/2002 Rutgers, The State University of New Jersey, Dept. Mechanical & Aerospace Engrng  
(USA). Visiting Research Professor  
3-4/2001 Science University of Tokyo, Computational Mechanics Lab, Visiting Professor  
10-11/2000 University of Tokyo, Dept. Aeronautics & Astronautics, Visiting Scientist  
4–5/2000 Synergy Ceramics Lab, Natl Industrial Research Inst. Nagoya (Japan). Visiting Scientist

### EDUCATION :

1996 Dr.-Eng., Ministry of the Science and Arts (Wiesbaden, Germany) (nostrification)  
1991 Cand. Sci., Mining Institute of the USSR Academy of Sciences (Russia)  
1987 Dipl.-Eng., Electro-Mechanical Engineering, State Civil Engineering University (Kiev, Ukraine)

### AWARDS, FELLOWSHIPS:

- Heisenberg Fellowship (German Research Council / Deutsche Forschungsgemeinschaft), 2003-2007;
- Japan Society for the Promotion of Science (JSPS) Fellowship, University of Tokyo, 2000;
- Invited Professorship, China University of Mining and Technology, Beijing (China). 2002;
- “Who’s Who in the World”, 16<sup>th</sup> and 18<sup>th</sup> editions, 1999 and 2001;
- Japan Science and Technology Agency (STA) Fellowship, NIRIN, Nagoya, 2000,
- “Who’s Who in Science and Engineering”, 5<sup>th</sup> edition, 2000-2001 (Millennium Edition);
- A.v. Humboldt Research Fellowship, 1995-1997;
- Engineering Foundation Conference Fellowship, 1996;
- International Science Foundation Travel Award, 1993;
- Best Research Works of the Institute f. Superhard Materials, 1990 and 1992

### FURTHER TRAINING:

2- 3/2000 Inst. Computer Science, Dept. Software Engineering, Uni Stuttgart. Course: JAVA Programming  
11/1999 Technical Academy Esslingen (Germany). Course: “Quality System FMEA”  
1998-1999 Institute for Business Management, University of Stuttgart. Course: Management of the Factors of  
Business Success

## RESEARCH INTERESTS:

<b>Mechanics and micromechanics of materials:</b>	3D Microstructural simulations, Numerical testing and optimal design of materials, Constitutive modeling, Image analysis and statistical analysis of microstructures, Hierarchical modeling, Bio-inspired composite materials
<b>Strength, damage and fracture of materials:</b>	Damage and fracture in heterogeneous materials, Micromechanics and micromechanisms of damage, SEM in-situ experiments, Strength of steels and alloys, Fractal fracture, Probabilistic modelling, Self-organization phenomena
<b>Composites:</b>	Functionally graded materials (FGM), Metal-matrix particle and fiber reinforced composites, Synergy ceramics, Sintering
<b>Micro- and nanomaterials:</b>	Thin film/substrate systems and Multilayers, Nanostructured materials
<b>Machining and tribology:</b>	Machining brittle materials, Microindentation, Contact damage, Composite wear, Multiteeth tools

**COMPUTER SKILLS:** FEM: Patran, Abaqus, Ansys, MSC/Nastran, Pro/Mechanica Struct, I-DEAS Master Series, Programming: Fortran, HTML, Visual C++, C, OS: Unix, Windows, Other: MS Office, Matlab, Maple, Emacs, Latex, Gnuplot, etc.

## PROFESSIONAL ACTIVITIES:

- Member, International Organizing Committee, Intern. Conf „MESOMECHANICS-98“ (Israel, 1998),
- Member Organizing Committee, NATO Advanc Research Workshop „Probabilities and Materials“ (Russia, 1997)
- Member, International Organizing Committee, 2<sup>nd</sup> Intern. Conf „Mesofracture-96“ (Russia, 1996).
- Reviewer for “Appl Mech Reviews”, “Comput Mater Sci“, „Cold Regions Sci & Technology”

## SOME PUBLICATIONS (generally, 1 monograph and about 80 papers):

### Book:

L. Mishnaevsky Jr, *Damage and Fracture of Heterogeneous Materials*, Monograph, Balkema, Rotterdam, 230 pp., 1998

### Some Papers:

1. L. Mishnaevsky Jr and S. Schmauder, Continuum Mesomechanical Finite Element Modeling in Materials Development: a State-of-the-Art Review, *Applied Mechanics Reviews*, Vol. 54, 1, 2001, pp. 49-69
2. L. Mishnaevsky Jr and D. Gross, Deformation and Failure in Thin Films/Substrate Systems: Methods of Theoretical Analysis, *Applied Mechanics Reviews*, 2003, (accepted)
3. L. Mishnaevsky Jr, M. Dong, S. Hoenle and S. Schmauder, Computational Mesomechanics of Particle-Reinforced Composites, *Comput. Material. Scienc.*, 16 (1999) 133-143
4. L. Mishnaevsky Jr, N. Lippmann and S. Schmauder, Computational Modeling of Crack Propagation in Real Microstructures of Steels and Virtual Testing of Artificially Designed Materials, *Int. J. Fracture*, Vol. 120, Nr. 4, 2003, pp. 581-600
5. L. Mishnaevsky Jr, U. Weber and S. Schmauder, Numerical Analysis of the Effect of Microstructures of Particle-Reinforced Metallic Materials on the Crack Growth and Fracture Resistance, *Int. J. Fracture*, Vol. 125, 2004. pp. 33–50
6. L. Mishnaevsky Jr, N. Lippmann, S. Schmauder and P. Gumbsch, In-situ Observations of Damage Evolution and Fracture in AlSi Cast Alloys, *Eng. Fract. Mech.*, 63 :4 (1999)395-411.
7. L. Mishnaevsky Jr and T. Shioya, Optimization of Materials Microstructures: Information Theory Approach, *Journal of the School of Engineering, The University of Tokyo*, Vol. 48, 2001, pp. 1-13
8. L. Mishnaevsky Jr and S. Schmauder, Damage Evolution and Heterogeneity of Materials: Model based on Fuzzy Set Theory, *Eng. Fract. Mech.*, 57 :6 (1997) 625-636

9. L. Mishnaevsky Jr, Methods of the Theory of Complex Systems in Modelling of Fracture: a Brief Review, *Eng. Fract. Mech.* 56 :1 (1997) 47-56
10. L. Mishnaevsky Jr, N. Lippmann and S. Schmauder, Micromechanisms and Modelling of Crack Initiation and Growth in Tool Steels: Role of Primary Carbides, *Zeitschrift f. Metallkunde*, 94, 2003, 6
11. L. Mishnaevsky Jr, Determination for the Time to Fracture of Solids, *Int. J. Fracture*, Vol.79, No.4, 1996, pp.341-350
12. L. Mishnaevsky Jr, A New Approach to the Analysis of Strength of Matrix Composites with High Content of Hard Filler, *Journal of Applied Composite Materials*, Vol.1, 1995, pp.317-324
13. L. Mishnaevsky Jr, A New Approach to Design of Drilling Tools, *Int. J. Rock Mech. & Min. Sci.*, Vol.33, No.1, pp.97-102
14. L. Mishnaevsky Jr, Mathematical Modelling of Wear of Cemented Carbide Tools in Cutting Brittle Materials. *Int.J. Machine Tools and Manufacture*, Vol.35, No.5, 1995, pp.717-724
15. L. Mishnaevsky Jr, Investigation of Cutting of Brittle Materials, *Int. J. Machine & Manufacture*, Vol.34, No.4, pp.499-505, 1994