

**Leon MISHNAEVSKY Jr.,** Dr. habil., Senior Scientist

Department of Wind Energy, Technical University of Denmark,  
Risø Campus, Bldg. 228, DK-4000 Roskilde, Denmark  
Email: lemi@dtu.dk  
Nationality: German

#### **DEGREES :**

2005 - Habilitation (Doktor habil. in Mechanics), Darmstadt University of Technology, Germany; 1991 - Dr.-Eng., USSR Academy of Sciences (Russia)/Confirmed by German Ministry of Education (1995); 1987 - Diploma., Electro-Mechanical Engineering, State Civil Engineering University (Ukraine)

#### **EMPLOYMENT:**

Since 2005 - DTU, Risø National Laboratory/Risø Campus, Senior Scientist; 2003-2005 - Darmstadt University of Technology, [Heisenberg Fellow](#) (“portable associate professorship” of German Scientific Council, DFG); 1996-2005- University of Stuttgart (Germany), Materials Testing Institute ([MPA](#)) (03-05-Heisenberg Fellow, 98-02 - Rsch Associate, 96-98 –Humboldt Rsch Fellow); 1996 - 99 - Max-Planck Institute for Metal Research (Germany), Research Scientist; 1994 – 95- [Vienna University of Technology](#) (Austria), Institute of Mechanics, Postdoc; 1981 – 94- Inst. Superhard Materials (Ukrainian Acad. Sci, Kiev). Rsch Scientist, Engineer, Technician

#### **VISITING APPOINTMENTS:**

2004- Massachusetts Institute of Technology, Dept. [Materials Science & Engrng](#), Visiting Scholar; 2003- Ecole Nationale Supérieure d’Arts et Métiers ([ENSAM](#), Paris, France), Invited Professor ; 2002 -[Rutgers University](#), Dept. Mechan & Aerospace Engrng (USA). Visiting Research Professor; 2001 - [Science University of Tokyo](#), Computational Mechanics Lab, Visiting Scholar; 2000 - [University of Tokyo](#), Dept. Aeronautics & Astronautics, Visiting Scientist; 2000 - Synergy Ceramics Lab, Natl Industrial Research Inst. Nagoya (Japan). Visiting Scientist

#### **AWARDS, FELLOWSHIPS:**

[Heisenberg Fellowship](#), 2003-2005, Japan Soc. Promotion of Science ([JSPS](#)) Invitation Fellowship, Uni Tokyo, 2000; Invited Professorship, [China Univ. of Mining and Technology](#), China, 2008, 2002; [Japan Science and Technology Agency](#) (STA) Fellowship, [NIRIN](#), Nagoya, 2000; Marquis “Who’s Who in Science and Engineering”, 2000-2001, 2006-2007, 2008-2009; A.v. Humboldt Research Fellowship, 1995-1997; Engineering Foundation Conf. Fellowship, 1996

#### **MANAGEMENT AND ORGANIZATIONAL EXPERIENCE:**

##### **Project Leader:**

- EU FP7 Project Coordinator “[Virtual Nanotitanium](#)” (*Theoretical analysis, design and virtual testing of biocompatibility and mechanical properties of titanium-based nanomaterials*) Collaborative Project in Nanosciences NMP, 6 EU partners (2011-2014, total budget 1.5 Mio EUR),
- Project Coordinator (of both full project and its Danish part) “[High reliability of large wind turbines via computational micromechanics based enhancement of materials performances](#)” (2011-2014, Danish Council for Strategic Research, in collaboration with the Ministry of Science and Technology of China; Budget 5.5 Mio Kroner, about 730 K€ );
- Project Coordinator “[Development of wind energy technologies in Nepal on the basis of natural materials](#)”, Danida, 2007-2011 (5.2 Mio Kroner, about 700 K€);
- Project Leader, Sino-Danish Cooperation Project “[3D virtual testing of composites for wind energy applications: Computational mesomechanics approach](#)”, Danish Agency for Science, Technology and Innovation, 2009-2011 (with Tianjin Univ of Commerce, 112 K kroner);
- Project Leader, “Optimization of materials at the mesolevel on the basis of numerical experiments” (German Research Council, DFG, 2003-2005);
- Project co-leader, “*Modelling failure behaviour of thin heterogeneous films on and between ceramic substrates*” (DFG, 2003-2008, together with Professor D. Gross)

**Work Package Leader:** WP Leader “Micromechanics” in “Danish Centre for Composite Structures and Materials for Wind Turbines (DCCSM)” (2010-2017), Activity Leader Denmark in Nepali-Danish project “Development of commercially viable wind power system in Nepal”, RenewableNepal Programme, Kathmandu University, Nepal, 2011-2013 (50 KKroner), Framework Program “Interface design of composite materials” (FTP, 2004-2007), etc.

**Organizer, Chairman or Co-Chairman of Conferences:**

- International Conference on [Computational modelling of nanostructured materials](#), September 4-6, 2013, Frankfurt am Main, Germany
- International Workshop on [Nanostructured titanium based alloys for medical applications](#), January 21-23, 2013, Ein Gedi, Israel,
- Indo-Danish International Conference on Wind Energy: Materials, Engineering and Policies ([WEMEP-2012](#)), November 22-23, 2012, Hyderabad,
- International [Symposium on Materials for Wind Energy Applications](#), September 17-19, 2012, Beijing, China,
- [International Workshop on Small Wind Energy](#), November 15-17, 2010, Pokhara, Nepal,
- [International Workshop on Small Wind Energy for Developing Countries](#), September 14-16, 2009, Nairobi, Kenya,
- [International Workshop on Natural and Low-Cost Materials in Wind Energy](#), 10-12 November 2008, Dhulikhel, Nepal.

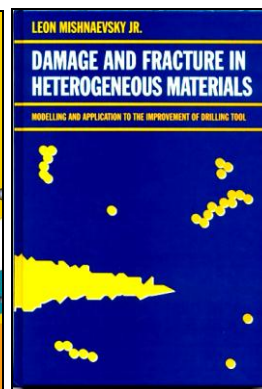
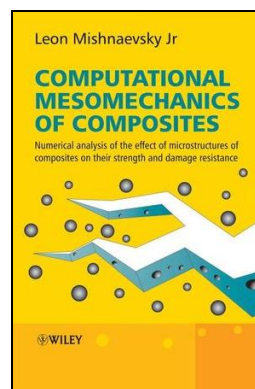
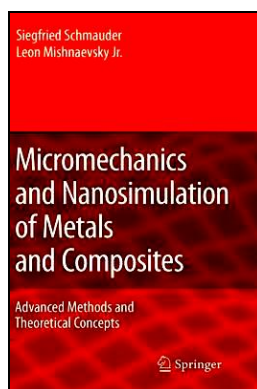
**PUBLICATIONS:** totally more than 100 publications, including 3 books and about 70 scientific papers in refereed journals.

**PROFESSIONAL ACTIVITIES:** Expert Board Member “Skolkovo” Foundation (2012-2014), Reviewer for Czech Science Foundation, Belgian Federal Science Policy Office, etc. **Member:** Editorial [Board, International Journal of Composite Materials](#), International Scientific/Organizational Committees of Conferences: Indo-Danish bilateral workshop on [Future Composite Technologies for Wind Turbine Blades](#) (New Dehli, 2012), 32<sup>nd</sup> and 30<sup>th</sup> Risø Symposia (Roskilde, 2009, 2011), 11th International Symposium Continuum Models and Discrete Systems (Paris, France, 2007), International Conference on Micro/Nano Fabrication Technologies (ICM/NFT’06, Bangkok, Thailand, 2006), NATO Advanced Resch Workshop „Probabilities & Materials“ (Russia, 1997), 2nd Intern. Conf „Mesofracture-96“ (Russia, 1996).

**SOME PUBLICATIONS:**

**Books:**

- S. Schmauder, L. Mishnaevsky Jr, [Micromechanics and Nanosimulation of Metals and Composites](#), Springer, 2008, 420 pp.
- L. Mishnaevsky Jr, [Computational Mesomechanics of Composites](#), John Wiley, 2007, 280 pp.
- L. Mishnaevsky Jr, [Damage and Fracture of Heterogeneous Materials](#), Balkema, Rotterdam, 1998, 230 pp



**Edited Journals:**

- L. Mishnaevsky Jr, E. Levashov, (Guest-Editors) Computational Materials Science, Special Issue “Virtual Nanotitanium” (in preparation)
- L. Mishnaevsky Jr, D. Wood (Guest-Editors) Journal of Wind Engineering, Special Issues, [Vol. 33, No. 2, 2009](#), Vol. 34, No. 3, 2010

## **Selected Publications in Refereed Journals for the last years:**

### **2013:**

- H.W. Zhou, H. Y. Yi, L. L. Gui, L. Mishnaevsky Jr. R. D. Peng, H.W. Wang, Experimental investigations of compressive strength and failure mechanism of laminate GFRP composites (in preparation)
- L. Mishnaevsky Jr, E. Levashov, [Editorial](#), Special Issue of Journal devoted to the ViNaT Project, *Computational Materials Science*, 2013, (in print) <http://dx.doi.org/10.1016/j.commatsci.2012.12.001>
- G.M. Dai, L. Mishnaevsky Jr., Fatigue of hybrid carbon/glass composites: 3D Computational modelling (in preparation)
- L. Mishnaevsky Jr. H.W. Zhou, H. Y. Yi, L. L. Gui, R. D. Peng, H.W. Wang, Microscale damage mechanisms and degradation of fiber reinforced composites for wind energy applications: Results of Danish-Chinese collaborative investigations (submitted)
- H.S Liu, W. Pantleon, L.Mishnaevsky Jr, Ultrafine grained titanium: Computational analysis of grain boundary effects (in preparation)
- G.M. Dai, L. Mishnaevsky Jr., Damage evolution in nanoclay-reinforced polymers: a three-dimensional computational study, *Composites Science & Technology*, 74 (2013) 67–77
- H.S Liu, L.Mishnaevsky Jr, [Martensitic transformations in nanostructured nitinol: FE modelling of grain size and distribution effects](#), *Computational Materials Science*, Special Issue: Virtual Nanotitanium (in print), 2013, <http://dx.doi.org/10.1016/j.commatsci.2012.11.032>
- H.W. Zhou, H.Y Yi., D.J Xue., Z.Q.Duan, C.H. Zhang, L. Mishnaevsky Jr., Influence of fibers' orientation angle on failure mechanism of glass fiber reinforced polymer composites, *Scientia Sinica Physica, Mechanica & Astronomica*, 2013, Vol. 43, No. 2, pp. 167–176, doi: 10.1360/132011-1237

### **2012. Nanomaterials and hierarchical materials**

- L.Mishnaevsky Jr, [Micromechanical analysis of nanocomposites using 3D voxel based material model](#), *Composites Science & Technology*, 72 (2012) 1167–1177
- L. Mishnaevsky Jr., [Micromechanics of hierarchical materials: a brief overview](#), *Reviews on Advanced Materials Science*, 30 (2012) 60-72
- R.D. Peng, H.W. Zhou, H.W. Wang, L. Mishnaevsky Jr. Modeling of nano-reinforced polymer composites: Microstructure effect on the Young's modulus, *Computational Materials Science*, 60 (2012) 19–31

### **2012. Wind blade materials and composites**

- L. Mishnaevsky Jr., P. Brøndsted, R. Nijssen, D. J. Lekou and T. P. Philippidis, [Materials of large wind turbine blades: Recent results in testing and modelling](#), *Wind Energy*, Vol. 15, No.1, pp, 83–97, 2012
- H.S. Toft, K. Branner, L. Mishnaevsky Jr., J.D. Sørensen, Uncertainty modeling and code calibration for composite materials, *J Composite Materials* (accepted), doi:10.1177/0021998312451296
- L.Mishnaevsky Jr, Micromechanical modelling of wind blade materials, Chapter 15, In: *Wind turbine blade design and materials*, Edited by: P. Brøndsted, and R. Nijssen, Woodhead, 2012 (in print)
- L. Mishnaevsky Jr, Composite materials for wind energy applications: Micromechanical modelling and future directions, *Computational Mechanics* Vol.50, No. 2, 2012, pp. 195-207

### **2012. Others:**

- H. W. Zhou, C. P. Wang, L. Mishnaevsky Jr., Z. Q. Duan, J. Y. Ding, [A fractional derivative approach to full creep regions in salt rock](#), *Mechanics of Time-Dependent Materials* (accepted)

### **2011:**

- L. Mishnaevsky Jr., Hierarchical composites: Analysis of damage evolution based on fiber bundle model, *Composites Sci & Technol*, 71 (2011) 450–460
- H. Qing, L. Mishnaevsky Jr., Fatigue modelling of materials with complex microstructures, *Computational Materials Science*, Vol.50, N.5, 2011, pp. 1644-1650
- L. Mishnaevsky Jr, 2011, *Composite materials in wind energy technology*, in Encyclopedia of Life Support Systems (EOLSS), UNESCO, Eolss Publishers, Oxford

- H. Qing, L. Mishnaevsky Jr, A 3D multilevel model of damage and strength of wood: Analysis of microstructural effects, *Mechanics of Materials*, 43 (2011) 487–495
- H.W. Wang, H.W. Zhou, R.D. Peng, L.Mishnaevsky Jr., Nanoreinforced polymer composites: 3D FEM modeling with effective interface concept, *Composites Scie & Technol*, Vol. 71, No. 7, 2011, pp- 980-988
- L. Mishnaevsky Jr., et al, Small wind turbines with timber blades for developing countries: Materials choice, development, installation and experiences, *Renewable Energy*, Vol.36, No. 8, 2011, pp. 2128-2138
- V.I. Kushch, S.V. Shmegeera P. Brøndsted, L. Mishnaevsky Jr Numerical simulation of progressive debonding in fiber reinforced composite under transverse loading, *Int. J. Eng. Sci.*, Vol. 49, No.1, 2011, pp. 17-29
- A.S. Abhilash, S.P. Joshi, A.Mukherjee, L. Mishnaevsky Jr., Micromechanics of diffusion induced damage evolution in reinforced polymers, *Composites Sci & Technol*, Vol. 71, No. 3, 2011, pp. 333-342
- V.I. Kushch, S.V. Shmegeera and L. Mishnaevsky Jr, Explicit modelling the progressive interface damage in fibrous composite: analytical vs. Numerical approach, *Composites Science and Technology*, Vol.71, No.7, 2011, pp. 989-997
- V.I. Kushch, S.V. Shmegeera and L. Mishnaevsky Jr, Elastic interaction of partially debonded circular inclusions. II. Application to fibrous composite, *Int J Solids and Structures*, Vol. 48, No. s 16-17, 2011, pp. 2413-2421

#### 2010:

- H. Qing, L. Mishnaevsky Jr., 3D constitutive model of anisotropic damage for unidirectional ply based on physical failure mechanisms, *Computational Materials Science*, 50 (2010) 479–486
- R. Sinha, P. Acharya, P. Freere, R. Sharma, P. Ghimire and Leon Mishnaevsky, Jr. Selection of Nepalese timber for small wind turbine blade construction, *J Wind Engineering*, Vol. 34, No. 3, 2010, pp. 263-276
- L. Mishnaevsky Jr, D. Wood, Editorial, *J Wind Engineering*, Vol. 34, No. 3, 2010, pp. i-iv
- V.I. Kushch, S.V. Shmegeera, L. Mishnaevsky Jr. Elastic interaction of partially debonded circular inclusions. I. Theoretical solution, *Int J Solids and Structures*, Vol. 47, No. 14-15, 2010, pp. 1961-1971
- H. Qing, L. Mishnaevsky Jr., 3D multiscale micromechanical model of wood: From annual rings to microfibrils, *Int J Solids and Structures*, Vol. 47, No. 9, 1 2010, pp. 1253-1267
- H.W. Zhou, L. Mishnaevsky Jr, P. Brøndsted, J. Tan, L. Gui, SEM in situ laboratory investigations on damage growth in GFRP composite under three-point bending tests, *Chinese Science Bulletin*, 2010 Vol.55 No.12: 1199–1208 (Cover Story)

#### 2009:

- L. Mishnaevsky Jr and P. Brøndsted, Statistical modelling of compression and fatigue damage of unidirectional fiber reinforced composites, *Composites Sci & Technol*, Vol. 69, 3-4, 2009, pp. 477-484
- H. Qing, and L. Mishnaevsky Jr, Unidirectional high fiber content composites: Automatic 3D FE model generation and damage simulation, *Computational Materials Science*, Vol. 47, 2, 2009, pp. 548-555
- H. Qing, and L. Mishnaevsky Jr, 3D hierarchical computational model of wood as a cellular material with fibril reinforced, heterogeneous multiple layers, *Mechanics of Materials*, Vol. 41, 9, 2009, pp. 1034-1049
- L. Mishnaevsky Jr and P. Brøndsted, Micromechanisms of damage in unidirectional fiber reinforced composites: 3D computational analysis, *Composites Sci & Technol*, Vol. 69, No.7-8, 2009, pp. 1036-1044
- L. Mishnaevsky Jr, P.Freere, R. Sharma, P.Brøndsted, H. Qing, J. I. Bech, R. Sinha, P. Acharya, R. Evans, Strength and reliability of wood for the components of low-cost wind turbines: Computational and experimental analysis and applications, *J Wind Engineering*, Vol. 33, No. 2, 2009 PP 183–196
- H. W. Wang, H.W. Zhou, L. Mishnaevsky Jr., P. Brøndsted, L.N. Wang, Single fibre and multifibre unit cell analysis of strength and cracking of unidirectional composites, *Computational Materials Science*, Vol. 46, No. 4, 2009, Pages 810-820
- V.I. Kushch, S.V. Shmegeera and L. Mishnaevsky Jr., Statistics of microstructure, peak stress and interface damage in fiber reinforced composites. *J Mechanics of Materials and Structures* Vol. 4 (2009), No. 6, 1089–1107
- H. Qing, and L. Mishnaevsky Jr, Moisture-related mechanical properties of softwood: 3D micromechanical modeling, *Computational Materials Science*, Vol. 46, No. 2, 2009, pp.310-320

- L. Mishnaevsky Jr and P. Brøndsted, Micromechanical modeling of damage and fracture of unidirectional fiber reinforced composites: A review, *Comput Materials Science*, Vol. 44, No. 4, 2009, pp. 1351-1359
- V.I. Kushch, I. Sevostianov, L. Mishnaevsky Jr. Effect of crack orientation statistics on effective stiffness of microcracked solid, *Int J Solids and Structures*, Vol. 46, No. 6, 2009, pp. 1574-1588

#### 2008:

- L. Mishnaevsky Jr and P. Brøndsted, Three-dimensional numerical modelling of damage initiation in UD fiber-reinforced composites with ductile matrix, *Materials Science & Engineering: A*, Vol.498, No. 1-2, 2008, pp. 81-86
- L. Mishnaevsky Jr, H. Qing, Micromechanical modelling of mechanical behaviour and strength of wood: State-of-the-art review, *Computational Materials Science*, Vol. 44, No. 2, 2008, pp. 363-370
- V.I. Kushch, S.V. Shmegeera and L. Mishnaevsky Jr., Meso cell model of fiber reinforced composite: Interface stress statistics and debonding paths, *Int J Solids and Structures*, 45: 9, 2008, pp. 2758-2784
- V.I. Kushch, I. Sevostianov, L. Mishnaevsky Jr, Stress concentration and effective stiffness of aligned fiber reinforced composite with anisotropic constituents, *Int J Solids Structures*, 45: 18-19, 2008, 5103-5117

#### 2005-2007:

- L. Mishnaevsky Jr, A Simple method and program for the analysis of the microstructure-stiffness interrelations of composite materials, *Journal of Composite Materials*, Vol. 41, No. 1, 73-87 (2007)
- L. Mishnaevsky Jr, P. Brøndsted, Modeling of fatigue damage evolution on the basis of the kinetic concept of strength, *Int. J. Fracture*, (2007) 144 , 149-158
- L. Mishnaevsky Jr, Functionally gradient metal matrix composites: numerical analysis of the microstructure-strength relationships, *Composites Sci. & Technology*, 2006, 66/11-12, pp 1873-1887
- L. Mishnaevsky Jr, Computational analysis of the effects of microstructures on damage and fracture in heterogeneous materials, *Key Engineering Materials*, Vol. 306-308, pp. 489-49, 2006
- L. Mishnaevsky Jr, Microstructural effects on damage in composites: Computational Analysis, *Journal of Theoretical and Applied Mechanics*, No. 3, Vol 44, 2006, pp. 533-552
- L. Mishnaevsky Jr, Automatic voxel based generation of 3D microstructural FE models and its application to the damage analysis of composites, *Mats Science & Engineering A*, Vol. 407, No. 1-2, 2005, pp.11-23
- L. Mishnaevsky Jr, Three-dimensional numerical testing of microstructures of particle reinforced composites, *Acta Materialia*, 2004, Vol. 52/14, pp.4177-4188
- A. Trondl, D. Gross, L. Mishnaevsky Jr., N. Huber, 3D FEA of Size Effects in Deformation of Thin Metallic Films, *PAMM (Proceedings in Applied Mathematics and Mechanics)*, 6, pp. 517–518 (2006)
- L. Mishnaevsky Jr and D. Gross, Deformation and failure in thin films/substrate systems: Methods of theoretical analysis, *Applied Mechanics Reviews*, 2005 , Vol. 58, No. 5, pp. pp. 338-353
- L. Mishnaevsky Jr, K. Derrien and D. Baptiste, Effect of microstructures of particle reinforced composites on the damage evolution: probabilistic and numerical analysis, *Composites Sci. & Technology*, Vol. 64, No 12 , 2004, pp. 1805-1818
- 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*, 125: 33-50, 2004
- M. Levesque, K. Derrien, L. Mishnaevsky Jr, M. Gilchrist and D. Baptiste, A Micromechanical Model for Non-Linear Viscoelastic Particle Reinforced Polymeric Composite Materials – Undamaged State, *Composites Part A*, 35 (2004) 905-913

#### Some older publications:

- L. Mishnaevsky Jr., S. Schmauder, 2001, Continuum mesomechanical finite element modeling in materials development: a state-of-the-art review, *Applied Mechanics Reviews*, 54, 1, 49-69
- 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.*, Vol. 63, Nr. 4, 1999, pp. 395-411
- 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

- L. Mishnaevsky Jr, Determination for the time to fracture of solids, *Int. J. Fracture*, Vol.79, No.4, 1996, pp.341-350
- L. Mishnaevsky Jr, Methods of the theory of complex systems in modelling of fracture: a Brief review, *Eng. Fract. Mech.*, Vol.56, No.1, pp.47-56, 1997
- L. Mishnaevsky Jr, Lippmann N; Schmauder S, Computational modeling of crack propagation in real microstructures of steels and virtual testing of artificially designed materials *Int J Fracture*, Vol. 120 No. 4 pp. 581-600, 2003
- L. Mishnaevsky Jr and S. Schmauder, Damage evolution and heterogeneity of materials: model based on fuzzy set theory, *Eng. Fract. Mech.*, Vol.57, No.6, pp.625-636, 1997
- 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, pp. 676-681
- L. Mishnaevsky Jr, A New approach to design of drilling tools, *Int. J. Rock Mech. & Min. Sci.*, Vol.33, No.1, pp.97-102
- 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
- L. Mishnaevsky Jr, Investigation of cutting of brittle materials, *Int. J. Machine & Manufacture*, Vol.34, No.4, pp.499-505, 1994