

## **CURRICULUM VITAE**

**Name:** Tomasz Lekszycki

**Nationality:** Polish

### **Qualifications:**

- MSc (1976) - Warsaw Univ. of Technology, Inst. of Aeronautics and Applied Mechanics
- PhD (1982) - Institute of Fundamental Technological Research, Polish Academy of Sciences, Pawińskiego 5B, 02-106 Warsaw (IPPT PAN) – Optimization of viscoelastic vibrating structures, supervisor prof. Zenon Mróz
- Habilitation (2008) - IPPT PAN – Selected problems of modelling in bone biomechanics

### **Employment:**

Current organizations:

- Professor - since Nov. 2011 - Warsaw University of Technology, Institute of Mechanics and Printing (head of Division of Machine Construction and Biomedical Engineering, Vice Dean for General Affairs and Science) – full time, primary job,
- Researcher - since 2008 – Warsaw Medical University (Head of Laboratory of Tissue Structures and Computer Microtomography) - part time job (20%).

Employment history:

- 1976 - 1981 doct. student – IPPT PAN (supervisor – prof. Zanon Mróz)
- since 1981 till Nov. 2011 – research positions in IPPT PAN – primary job, (recently, till Nov. 2011 - head of Joint Laboratory of Multi-functional Materials – laboratory organized jointly with Warsaw University of Technology and other institute of Polish Academy of Sciences).
- Nov. 2011 – Oct. 2012 - Institute of Fundamental Technological Research, Polish Academy of Sciences (IPPT PAN), Dep. of Ultrasound, Div. of Biomechanics – part time job (20%),

### **The fields of scientific activity:**

- Multidisciplinary research in biomechanics and advanced materials for medical applications (mathematical and computational modeling in bone and cartilage biomechanics based on biological and mechanical tests, nano-materials, biomaterials, optimization of interactions between biomaterials and tissues).
- Optimization of structures and materials (applications in civil engineering, surface and space transportation, bioengineering).
- Selected problems of identification (characteristics of viscoelastic materials, damage identification – applications in civil engineering, surface and space transportation).

### **Experiences:**

- Evaluation of grants proposals
  - REGPOT calls (expert of European Commission since 2009).
  - National and foreign proposals (Germany, Israel, Italy, Slovakia) for research grants.
- Peer Reviews
  - Reviews of papers for Polish and international journals.
  - Reviews of papers for international conferences and congresses.

- Organizational
  - Co-coordination of Center of Excellence for Applied Biomedical Modeling and Diagnostics ABIOMED (funded by EC).
  - Organization and coordination of Interdisciplinary Center of Advanced Medical Technologies IZATEM (consortium of 11 universities, research institutes, clinics and enterprises), 2 big investment grants awarded from Structural Funds.
  - Organization or co-organization of several international congresses, conferences and courses.
  - Coordination of 4 Polish research grants (biomechanics):
  - Head of Joint Laboratory of Multifunctional Materials (organized in IPPT PAN jointly with the Warsaw Univ. of Technology, 2009-2011 and other institutes of Polish Academy of Sciences).
  - Coordinator for IPPT PAN in the consortium CePT - Centre for Preclinical Research and Technology, (awarded 100M EUR for infrastructure development from Structural Funds).

### **Grants:**

- Participation in several Polish research projects on structural optimization, damage identification, damping of vibrations and bone biomechanics.
- Coordinator of four big research national grants on application of optimization methods in bone biomechanics.

### **Participation in international projects:**

- 1991 - 1993 Tempus project JEP-0045 (structural optimization)
- 1994 - 1996 Tempus project JEP-07228 (structural optimization)
- 1998 - 2000 INCO Copernicus EBRIC15CT970706 (damage identification)
- 2001 - 2002 Joint European Res. grant QLTR-2001-02785-MIAB (bone biomechanics)

### **International cooperation:**

Since 1980 scientific cooperation with scientists from China (Dalian Univ. of Technol.); Brasil (Federal Univ. of Santa Catarina, Florianopolis); Denmark (Techn. Univ. of Denmark, Lyngby and Aalborg Univ., Aalborg); Finland (Dep. of Medicine, Institute of Clinical Medicine, Biomedicum Helsinki); Germany (Univ. of Rostock, Aachen Univ. and Leuphanta Univ. Luneburg), Italy (Univ. of Pavia and Univ. La Sapienza, Rome); Ireland (Trinity College, Dublin); Lithuania (Vilnius Univ.); Netherlands (Eindhoven Univ.); Portugal (Technical Univ. of Lisbon); EU Joint Res. Centre, Ispra, Italy; USA (Univ. of Michigan, Ann Arbor and Liberty Mutual, Boston).

Co-supervising (unformal) 2 PhD students abroad (in China and Brasil).

### **Visiting appointments:**

- The Techn. Univ. of Denmark, Lyngby, Denmark: 1979-1980 (10 months, ses scholarship); 1980-1981 (7 months, visiting prof.)
- The Univ. of Aalborg, Denmark: 1990 (5 months- visiting prof.); 1991 (3 months); 1992 (1 month); 1993 (1 month).
- Dalian Univ. of Technol., China: 1988 (1 month - visiting prof.); 1998 (2 months - visiting prof.); 2001 (3 weeks - visiting prof.)
- Univ. of Michigan, Ann Arbor, USA: 1992 (2 weeks); 1996 (4 months - visiting researcher).
- Wright State Univ., Dayton, USA: 1992 and 1996 (2 weeks - visiting prof.)
- Univ. di Pavia, Italy: 1995 (2 months); 1997 (1 month).
- Technical Univ. of Lisbon, Portugal: 1993 (3 months); 1996 (4 months - visiting prof.)
- Univ. di Roma la Sapienza, Italy: since 2001 every year 1-3 visits (1-4 weeks)



each)

- Numerous short visits and given seminars among them: in European Joint Res. Centre, Ispra, Italy; Fiat Research Centre, Orbassano, Italy; Wright Patterson University, Ohio, USA; University of Aachen and Berlin Univ. Germany; Beijing University, China; Eindhoven University, Netherlands; Leuphana University, Lüneburg, Germany. Federal Univ. of Uberlândia, Brazil

•

#### **Cooperation with industry and orthopedic clinician:**

- Polish SME manufacturers of endoprotheses and other orthopedic instruments,
- Several clinics, institutes and orthopedic hospitals.

#### **Membership in the international societies:**

- International Society for Structural and Multidisciplinary Optimization (Coordinator of Working Group "Optimization in Biomechanics").
- European Society of Biomechanics (Corresponding Member for Poland during a period 2003-2005).

#### **Awards:**

- Silver Cross of Merit adjudicated by the President of Republic of Poland (2002).

#### **Selected publications in the fields of a) structural optimization; b) identification of damage or material characteristics; c) biomechanics:**

- a1. Lekszycki T., Olhoff N., Optimal design of viscoelastic structures under forced steady state vibrations, J. Struct. Mech., 9 (4), 363-387, 1981.
- a2. Lekszycki T., Mróz M., Variational Principles in Analysis and Synthesis of Elastic Systems with Damping, Solid Mech. Arch., Vol.14, No.3-4, (The special issue dedicated to the memory of Prof. H. Leipholz) 1989.
- a3. Lekszycki T. Eigenvalues optimization - new view about the old problem, Control and Cybernetics, vol.19, No 3-4, 1990.
- a4. Lekszycki T., Application of Variational Methods in Analysis and Synthesis of Viscoelastic Continuous Systems, Mech. of Struct. and Mach., 19(2), 1991, 163-192
- a5. Lekszycki T., Optimal Design of Vibrating Structures, in "Concurrent Engineering: Tools and Technologies for Mechanical System Design", ed. E.J. Haug, Springer Verlag, 1993.
- b1. Lekszycki T., Olhoff N. and Pedersen J.-J., Modelling and identification of viscoelastic properties of vibrating sandwich beams, Int. J. Composite Structures, vol.22, 1992, 15-31.
- b2. Frischmuth K., Kosiński W., Lekszycki T., Free vibrations of finite memory material beams, Int. J. Eng. Sc., vol. 31, No. 3, 1992, 385-395.
- b3. Dietrich L., Lekszycki T., Turski K., Problems of identification of mechanical characteristics of viscoelastic composites, Acta Mechanica, 1997, 1-15.
- b4. Mróz, Z. and Lekszycki, T., Identification of damage in structures using parameter dependent modal response, Proc. of ISMA23, 1998, vol.1.
- b5. Zhao H., Gu Y., Lekszycki T., Identification of Structural Damage Based on Energy and Optimization Methods, WCSMO-4, Proc. of WCSMO-4 the Fourth World Congress of Structural and Multidisciplinary Optimization, 2001, Eds. G. Cheng, Y. Gu, S. Liu, Y. Wang, Liaoning Electronic Press.
- c1. Lekszycki T., On simple model of self-adapting bone material, in Synthesis in Bio Solid Mechanics (Eds. P. Pedersen and M. P. Bendsøe), Solid Mechanics and its Applications, Volume 69, Kluwer Academic Publishers, 1999, pp 265-276.
- c2. Lekszycki, T. Modelling of Bone Adaptation Based on an Optimal Response Hypothesis, Meccanica, 37, 2002, 343-354.
- c3. Lekszycki T., Functional adaptation of bone as an optimal control problem, J.

Theoret. Appl. Mech, 43, 3, 2005, 2-22.

- c4. Madeo A., Lekszycki T., dell'Isola F., A continuum model for the bio-mechanical interactions between living tissue and bio-resorbable graft after bone reconstructive surgery, C. R. Mecanique 339 (2011) 625-640.
- c5. Lekszycki T., dell'Isola F., A continuum mixture model with evolving Lagrangian mass densities for the description of living tissue synthesis and resorption and bio-resorbable materials replacement in reconstructed bones, Zeitschrift fur Angewandte Mathematik und Mechanik, 29 June 2011.