

Curriculum Vitae (May 2016)

Mykola Tkachuk, Ph.D.

Doctoral fellow

Chair for Theory and Computer-Aided Design
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- Education**
- Ph.D. in "Dynamics and Strength of Machines" (02/2011)
National Technical University "Kharkiv Polytechnical Institut", Kharkiv, Ukraine
 - Ph.D. studies "Dynamics and Strength of Machines" (11/2005–10/2008)
National Technical University "Kharkiv Polytechnical Institut", Kharkiv, Ukraine
Advisor: Professor Gennady I. Lvov
Thesis: *Contact interaction of complex shaped elements of machines with kinematically conjugate surfaces.*
 - M.Sc. in "Computational Mechanics of Materials and Structures", COMMAS (5/2010)
with distinction,
University of Stuttgart, Germany
 - M.Sc. studies COMMAS (10/2008–5/2010)
University of Stuttgart, Germany
Advisor: Junior Professor Christian Linder
Thesis: *A Micromechanically motivated Diffusion-Based Transient Network Model and its Incorporation into Finite Rubber Viscoelasticity.*
 - M.Sc. and B.Sc. in "Applied Mathematics" (07/2005 and 06/2004)
with distinction,
Kharkiv Karazin National University, Kharkiv, Ukraine
 - M.Sc. and B.Sc. studies "Applied Mathematics" (09/2000–07/2005)
Kharkiv Karazin National University, Kharkiv, Ukraine
Advisor: Yuriy V. Gandel
Thesis: *Mathematical model and numerical experiment in diffraction task for flat periodic grids.*

- Academic experience**
- Doctoral Fellow (since 10/2014)
Chair for Theory and Computer-Aided Design of Machines and Mechanisms
Machine Building Department
National Technical University "Kharkiv Polytechnical Institute"
 - Research Associate (01/2014–09/2014)
Chair for Theory and Computer-Aided Design of Machines and Mechanisms
Machine Building Department
National Technical University "Kharkiv Polytechnical Institute"
 - Postdoctoral Scholar (02/2013–12/2013)
Computational Micromechanics of Materials Lab Department of Civil & Environmental Eng.
Stanford University
 - Research Associate (07/2010–12/2012)
and Member of the "Micromechanics of Materials Group"
Institute of Applied Mechanics (CE), Chair I
Department of Civil and Environmental Engineering
University of Stuttgart, Germany
 - Research Assistant (09/2005–10/2008)
Institute of Theory and Systems for Automated Design of Machines
Department of Transport Machine Building
National Technical University "Kharkiv Polytechnical Institute", Kharkiv, Ukraine
- Awards**
- Supporting scholarship by German Academic Exchange Service (DAAD) at University of Stuttgart, Germany (2009–2010).
 - Best Young Scientist Award by Science and Education Department of Kharkiv Region State Administration, research project *Geometry synthesis technique and pilot plant of two-parameter gear mechanism* (2006).
 - Euler Scholarship by DAAD, research project *Rigorous calculation of energy losses in cavity of ITER relevant coaxial gyrotron* jointly with Institute E-3 for High Frequency Technology and Technical University Hamburg-Harburg (October 2004–April 2005).
 - Scholarship of the President of Ukraine (2004–2005).
 - 1st prize in All-Ukrainian Student Olympiad in Mechanics, Dnepropetrovsk, Ukraine (April 2004).

- Projects**
- State-financed project (1/2015–12/2016)
Methods for analysis of contact interaction of machine elements that have complex geometry.
 - Research project (7/2010–12/2012)
funded by the “Juniorprofessorenprogramm des Landes Baden-Württemberg” *Atomistic FE Ansatz to model failure in solids with inherent microstructure.*
 - Industrial project #120K/923 (2007–2009)
on demand of General Specialized Engineering and Design Institute, Azovmash corp.
Development of mathematical, geometrical and finite-element models for analysis of dynamics and stress-strain state of a shake-out machine.
 - State-financed project # IT / 480 – 2007 (2007–2008)
Development of theoretical grounding of computer cluster technology and a unique hardware-software complex for investigation of complicated and extra-complicated mechanical systems.
 - Research project 1064 (2001–2003)
funded by Science and Technology Center in Ukraine (STCU) *Development of research methods and experiment-simulation techniques based on finite elements method and holographic interferometry.*
- Teaching**
- Fall 2005–Fall 2006, *Mathematical analysis and Analytical geometry*, NTU “KhPI”, Ukraine, exercises and consultations in russian, Core courses for Mechanical Engineering Bachelor students.
 - Spring 2012, *Statistical mechanics of materials*, University of Stuttgart, Germany, exercises in english, Elective course for Computational Mechanics of Materials and Structures Master students; Elective course for Civil Engineering Master students.
- Student supervision**
- “Dynamic relaxation method for statics of nonwoven textile with fiber sliding ” by Marcus Ganser, visiting Simtech student, “Computational Micromechanics of Materials Lab”, Stanford University (07/2013–10/2013)
 - “Generation of random fiber networks and modeling of nonwoven textile with full discrete resolution of their microstructure” by Yuan Zhao, student research assistant, “Micromechanics of Materials Group”, Stuttgart University (05/2012–10/2012)

- Selected publications
- Tkachuk MM, Chepurnoy A, Skripchenko N, Litvinenko O, Tkachuk MA (2014). "Multilevel models for analysis of contact interaction of complex-shaped bodies: algorithms, implementation and application" (series of publications), *Forging and Stamping Production. Material Working by Pressure*, 6:10–16 — 7:10–20 — 8:6–8, in russian.
 - Tkachuk MM, Movshovich I, Tkachuk MA, Skripchenko N, Litvinenko O (2014). "Analysis of contact interaction of smooth and rough bodies with boundary element method: methods and resolving equations" (series of publications), *Forging and Stamping Production. Material Working by Pressure*, 3:3–10 — 4:3–8, in russian.
 - Tkachuk M, Linder C (2012). "The maximal advance path constraint for the homogenization of materials with random network microstructure", *Philosophical Magazine*, 92:2779–2808.
 - Linder C, Tkachuk M, Miehe C (2011). "A micromechanically motivated diffusion-based transient network model and its incorporation into finite rubber viscoelasticity", *Journal of the Mechanics and Physics of Solids*, 59:2134–2156.
 - Tkachuk M (2008). "Experimental investigation of contact interaction of complex-shaped bodies", *Mechanics and Machine Building*, 1:41–52, in russian.
 - Tkachuk M (2008). "Methods and models for investigation of the contact interaction between a spherical piston and a running groove in a radial hydrovolumetric transmission", *Bulletin of NTU "KpPI"*, 2:159–166, in russian.
 - Tkachuk M, Lvov G (2008). "Analysis of contact between complex-shaped bodies: modification of the method of boundary integral equations", *Bulletin of NTU "KpPI"*, 42:81–95, in russian.
 - Zolochovsky A, Tkachuk M, Viricelle JP, Pijolat C (2007). "Chemically induced stresses in the cathode of single chamber solid oxid fuel cell", *Bulletin of NTU "KpPI"*, 23:148–157, in english.
 - Tkachuk M (2007). "Virtual prototyping of mechanisms with kinematically generated surfaces", *Science of Machines*, 6:26–32, in russian.
- Academic reports
- Tkachuk M (2011). "Contact interaction of complex shaped elements of machines with kinematically conjugate surfaces", Ph.D. Thesis, Department of Dynamics and Strength of Machines, National Technical University "Kharkiv Polytechnical Institut", Ukraine.
 - Tkachuk M (2010) "A micromechanically based model for viscoelasticity of rubbery polymers", M.Sc. Thesis, Computational Mechanics of Materials and Structures, University of Stuttgart, Germany.
 - Tkachuk M (2005). "Mathematical model and numerical experiment in diffraction task for flat periodic grids", M.Sc. Thesis, Department of Mathematics and Mechanical Engineering, Kharkiv Karazin National University, Ukraine.

- Conference papers
- Tkachuk M (2015). "Micromechanics of nonwoven materials", *Proceedings of the 12th International Symposium of Ukrainian Mechanical Engineers (ISUME 2015)*, Lviv, 25–26.
 - Tkachuk MA, Skripchenko N, Grabovskiy A, Tkachuk MM (2015). "Numerical tools for analysis of complex-shaped bodies in mechanical contact", *Book of Proceedings of the 56th International Conference of Machine Design Departments (ICMD 2015)*, Slovak University of Technology Bratislava, 393–398.
 - Krischok A, Tkachuk M, Linder C (2014). "A thermodynamically consistent and numerically stable formulation for the description of diffusion in polymeric gels", *Proceeding in Applied Mathematics and Mechanics*, 14(1): 487–488.
 - Raina A, Tkachuk M, Linder C (2013). "Modeling reorientation phenomena in non-woven materials with random fiber network microstructure", *Proceeding in Applied Mathematics and Mechanics*, 13(1): 249–250.
 - Tkachuk M, Linder C (2012). "Homogenization of random elastic networks with non-affine kinematics", *Proceeding in Applied Mathematics and Mechanics*, 12(1): 417–418.
 - Tkachuk M, Linder C (2011). "Microstructural driven computational modeling of polymers", *Proceedings in Applied Mathematics and Mechanics*, 11(1):557–558.
 - Peklich M, Tkachuk M (2007). "Geometrical synthesis and stress-strain analysis of complex-shaped parts that are in movable contact", *Proceedings of the 8th International Symposium of Ukrainian Mechanical Engineers*, 1:88–89, in ukrainian.
 - Zaginaylov G, Tkachuk M, Scherbinin V, Schunemann K (2005). "Rigorous calculation of energy losses in cavity of ITER relevant coaxial gyrotron", *Proceedings of the 35th European Microwave Conference*, 2:4–7.

- Conference presentations • Tkachuk M, Gander M., Linder C. *Inelastic deformation of nonwoven textiles due to the frictional sliding of bonded fibers*, 11th World Congress on Computational Mechanics (WCCM XI), Barcelona, Spain, July 20-25 2014.
- Tkachuk M, Linder C. *Dynamic Relaxation With Local Artificial Modes For The Analysis of Floppy Fiber Networks*, 13th Pan American Congress of Applied Mechanics (PACAM XIII), Houston, Texas, May 22-24 2013.
 - Tkachuk M, Linder C. *The maximal advance path constraint for the homogenization of materials with random network microstructure*, ECCOMAS 2012, Vienna, Austria, September 10-14 2012.
 - Linder C, Tkachuk M. *The maximal advance path constraint for the elastic homogenization of soft matter*, ESMC 2012, Graz, Austria, July 9-13 2012.
 - Tkachuk M, Linder C. *The maximal advance path constraint for the homogenization of materials with random network microstructures*, GAMM 2012, Darmstadt, Germany, March 26-30 2012.
 - Tkachuk M, Linder C. *The maximal advance path constraint for the homogenization of materials with random network microstructures*, GAMM Seminar on Microstructures, Essen, Germany, January 20-21, 2012.
 - Linder C, Tkachuk M. *A microstructural driven transient network model for finite rubber viscoelasticity*, ICMM2, Paris, France, August 31-September 2 2011.
 - Linder C, Tkachuk M. *A new diffusion based transient network model for finite rubber viscoelasticity*, GAMM2011, Graz, Austria, April 18-21 2011.
 - Linder C, Tkachuk M. *A new diffusion based transient network model for finite rubber viscoelasticity*, GAMM2011, Graz, Austria, April 18-21 2011.
 - Tkachuk M, Linder C. *Microstructural driven computational modeling of polymers*, GAMM2011, Graz, Austria, April 18-21 2011.
 - Tkachuk M, Linder C. *A micromechanically based model for viscoelasticity of rubbery polymers*, 10th GAMM Seminar on Microstructures, Darmstadt, Germany, January 21-22 2011.
 - Linder C, Tkachuk M, Miehe C. *A diffusion based micromechanical model for viscoelasticity of rubbery polymers*, 4th GAMM Seminar on Multiscale Material Modelling, Bochum, Germany, July 9-10 2010.