CURRICULUM VITAE

Dmitry Shakhvorostov PhD (mechanical engineering)

Work Address

Universität des Saarlandes
Lehrstuhl für Materialsimulation
Campus C 6.3, Zi. 7.06
66123 Saarbrücken

Tel. +49 681 302-57456
Fax. +49 681 302-57454
Email: dshakh@mx.uni-saarland.de

Personal Information

Citizenship: Russian
Born: January 22, 1978

Employment Objective

Faculty position in chemistry/ mechanical engineering related to high-pressure research and/or tribology in a technical university or research facility.

Education

2005	PhD: Tribophysics, Department of mechanical engineering, University of technology Berlin
2002	Diploma #2: Applied Physics, University of Applied Sciences Zwickau.
1999	Diploma #1: Mechanical Engineering, Technical State University of Moscow.

Research Interests

Experimental	Physics of pressure induced transitions, chemistry and physics of friction on macro and nano scale, spectroscopy and microscopy.
Modelling	Computational chemistry and physics of friction, molecular dynamics, multiscale modelling.

Scientific Experience

09.2009 - present	*Research associate at the Universität des Saarlandes, Lehrstuhl für Materialsimulation, Saarbrücken Germany* In collaboration with Prof. M. H. Müser

(1) Study of phase change materials based on Sb with help of high pressure experiments and ab initio simulations.

(2) Development and application of Gold Marker Technique (GMT) to determine the ultra low wear rates in single phase materials and multiphase alloys.

09.2007 - 09.2009 *Postdoctoral fellow in the Department of Chemistry, University of Western Ontario*
In collaboration with Prof. P. R. Norton

(1) Development and application of a novel method to determine the ultra low wear rates in single phase materials and multiphase alloys.

(2) Wear mechanisms of multiphase aluminium alloys.

(3) Mechanisms of antiwear action of phosphate based additives.

09.2005 – 09.2009 *Postdoctoral Fellow in the Department of Applied Mathematics, University of Western Ontario*
In collaboration with Prof. M. H. Müser.

(1) Studies of pressure induced phase transitions in phosphates with help of diamond anvil cell experiment and several spectroscopy methods, Raman, IR, X-ray synchrotron diffraction, XPS, XANES. Calculation of IR active vibrational modes.

(2) Studies of GeSb pressure and temperature induced transitions, with help of diamond anvil cell experiment, X-ray synchrotron diffraction, Raman spectroscopy.

03.2002 – 08.2005 *Research Assistant at IAVF Antriebstechnik AG, Karlsruhe, Ph. D. student at Berlin University of Technology, Germany*
Under the direction of Prof. M. Scherge and Prof. V. Popov.

(1) Simultaneous measurement of peak surface temperature, friction and wear with high resolution. Development and application of infrared faser optical thermometry for measurement of peak surface temperature on metal/metal tribocontacts. Application of radioactive tracer technique for continuous in-situ wear measurement.

(2) Characterization of surfaces by means of atomic force microscopy, nanoindentation, Auger electron spectroscopy, focused ion beam.

Honours and Awards

(1) Scholarship of Ministry of Saxony

(2) Diploma#2 1st. Prize German Society of Tribology

Teaching Experience

(1) Weekly seminars "Basics of tribology" at IAVF Antriebstechnik AG

(2) Teaching Assistant, Moscow University, course "Design of machine elements"

(3) Teaching Assistant, University of Western Ontario, course "Scanning Probe Microscopy"

List of Publications

D. Shakhvorostov, M. A. Nicholls, P. R. Norton, and M. H. Müser, Mechanical properties of zinc and calcium phosphates: Structural insights and relevance to anti-wear functionality, (submitted to Eur. Phys. J. B)

D. Shakhvorostov, P. R. Norton, and M. H. Müser, A gold marker technique revealing phase-specific wear and sub-surface deformation with nanometer resolution, (accepted Adv. Mater. 2010)

M. H. Müser and D. Shakhvorostov, Why thick can be slick, (invited commentary) Science 328, 52-53 (2010).

D. Shakhvorostov, M. H. Müser, Y. Song, and P. R. Norton, Smart materials behaviour in phosphates: Role of hydroxyl groups and relevance to antiwear films, J. Chem. Phys. 131, 044704 (2009).

D. Shakhvorostov, R. A. Nistor, L. Krusin-Elbaum, G. J. Martyna, D. M. Newns, B. G. Elmegreen, X. Liu, Z. E. Hughes, S. Paul, C. Cabral Jr., S. Raoux, D. B. Shrekenhamer, D. N. Basov, Y. Song, and M. H. Müser, Evidence for electronic gap-driven metal-semiconductor transition in phase-change materials, Proc. Natl. Acad. Sci. USA 106, 10907-10911 (2009).

D. Shakhvorostov, M. H. Müser, N. J. Mosey, Y. Song and P. R. Norton, Correlating cation coordination, stiffness, phase transition pressures, and smart materials behavior in metal phosphates, Phys. Rev. B 79, 094107 (2009).

Y.-R. Li, D. Shakhvorostov, G. Pereira, A. Lachenwitzer, W. N. Lennard and P. R. Norton, A Novel Method for Quantitative Determination of Ultra-low Wear Rates of Materials, Part I: on Steels, Tribology Letters, 33 (2008) 143-152.

Y.-R. Li, D. Shakhvorostov, W. N. Lennard and P. R. Norton, A Novel Method for Quantitative Determination of Low-wear-rate of Materials, Part II: Effects of surface roughness and roughness orientation on wear, Tribology Letters, 33 (2008) 63-72.

D. Shakhvorostov, N. J. Mosey, D. J. Munoz-Paniagua, G. Pereira, Y. Song, M. Kasrai, P. R. Norton, M. H. Müser, On the pressure-induced loss of crystallinity in zinc- and calcium-phosphates, Journal of Chemical Physics, 128, 074706 (2008).

D. Shakhvorostov, L. Jian, E. Nold, G. Beuchle, M. Scherge, Influence of Cu grain size on running-in related phenomena, Tribology Letters 28 (2007) 307-318.

D. Shakhvorostov, B. Gleising, R. Büscher, W. Dudzinski, A. Fischer, M. Scherge, Microstructure of tribologically induced nanolayers produced at ultra low wear rates, Wear 263 (2007)1259-1265.

D. Shakhvorostov, K. Pöhlmann, M. Scherge, Structure and mechanical properties of tribologically induced nanolayers, Wear 260 (2006) 433-437.

D. Shakhvorostov, H. Pinto, A. Pyzalla, S. Enders, K. Pöhlmann, M. Scherge Mechanical Properties of Tribologically Modified Nano-layers, Tribotest journal, December (2004) 11-2, 95-102.

D. Shakhvorostov, K. Pöhlmann, M. Scherge, An energetic approach to friction, wear and temperature, Wear 257 (2004) 124–130.

D. Shakhvorostov, K. Pöhlmann, M. Scherge, Zum Einlaufverhalten geschmierter metallischer Kontakte, Tribologie und Schmierungstechnik 2 (2004) 5–7.

M. Scherge, D. Shakhvorostov, K. Pöhlmann, Nano-effects of friction and wear Erdöl Erdgas Kohle 2 (2004) 76-80.

D. Shakhvorostov, H. Pinto, A. Pyzalla, S. Enders, K. Pöhlmann, M. Scherge, Structure, hardness and stress state analysis on metal-metal tribocontacts with oil lubrication, Materialwissenschaft und Werkstofftechnik, 35 (2004), 10/11, 741-749.

M. Scherge, D. Chakhvorostov, K. Pöhlmann, Fundamental wear mechanism of metals, Wear 255 (2003) 395–400.

In proceedings:

D. Shakhvorostov, K. Pöhlmann, M. Scherge, On the measurement of nano-wear events, Tribology and Lubrication Engineering TAE 2004.

N.Bushe, G. Fleischer, D. Shakhvorostov, Tribologische Verträglichkeit in Tribosystemen, Tribologie Fachtagung Göttingen 2004.

D. Shakhvorostov, B. Flößer, M. Scherge, Verschleiß und EHD-Simulation, Tribologie Fachtagung Göttingen 2004.

D. Chakhvorostov, K. Pöhlmann, M. Scherge, B. Flößer, J. Lushnov, Simultane Bestimmung von Verschleiß, Reibung und Temperatur, Tribologie Fachtagung Göttingen 2002.

J. Lushnov, T. Chan, S. Soloviev, D. Shakhvorostov, Open tribological systems under high load, Tribology Congress Beltrib 2002 (russian).

D. Shakhvorostov, Tribomutation in machines, Tribology Congress Beltrib 1999 (russian).

In preparation:

D. Shakhvorostov, M. H. Müser, Influence of the Ge content in GeSb on the onset of pressure induced phase transitions, (Journal of Chemical Physics).

D. Shakhvorostov, Y. Song, Smart behavior of the ZDDP antiwear films studied with help of X-ray and IR synchrotron radiation, Journal of Applied Physics.

D. Shakhvorostov, Infrared faser optical sensor for measurement of surface temperature during friction of metal/metal contacts, Optical thermometry.

D. Shakhvorostov, M. Varenberg, Structure evolution of the Cu surface during first several sliding interactions, Tribology International.

D. Shakhvorostov, M. Scherge, Formation of dissipative structures studied via peak surface temperature and wear measurement.

Monographs:

D. Shakhvorostov, *Analysis of dissipation mechanisms in a metal/metal sliding contact by means of radioactive tracer technique and fiber-optic IR-thermometry*, PhD Thesis.

Conferences

"Examining theoretically predicted crosslinking in Zn containing anti-wear films", D. Shakhvorostov, M.H. Müser, P.R. Norton, Y. Song, STLE annual meeting Cleveland 2008.

"Reversible pressure-induced phase change in eutectic GeSb", D. Shakhvorostov, R. Nistor, M. H. Müser, Z. E. Hughes, Y. Song, L. Krusin-Elbaum, G. J. Martyna, D. M. Newns, C. Cabral, Jr., S. Raoux, APS annual meeting, New Orleans 2008.

"Computer simulations and experiments on ZDDP derivatives under pressure", D. Shakhvorostov, M. H. Müser, N. J. Mosey, Y. Song, P. R. Norton, ACS annual meeting, New Orleans 2008.

"Microstructure of tribologically induced nanolayers produced at ultra low wear rates", D. Shakhvorostov, B. Gleising, R. Büscher, W. Dudzinski, A. Fischer, M. Scherge, International Conference Wear of Materials, Montreal 2007.

"Peak temperatures, wear rate, and dissipative structures in lubricated contacts during running-in", D. Shakhvorostov, M. Scherge, Gordon Research Conference, Maine 2006..

"Plastic flow and mechanical intermixing due to tribological interaction", D. Shakhvorostov, M. Scherge, German-Russian Workshop, Berlin 2005.

„Mechanical Properties of Tribologically Modified Nanolayers", D. Shakhvorostov, H. Pinto, A. Pyzalla, S. Enders, K. Pöhlmann, M. Scherge, Tribology and Lubrication Engineering, Technische Akademie Esslingen 2004.

„Verschleiß und EHD-Simulation", D. Shakhvorostov, B. Flößer, M. Scherge, Tribologie Fachtagung Göttingen 2004.

„Simultane Bestimmung von Verschleiß, Reibung und Temperatur", D. Chakhvorostov, K. Pöhlmann, M. Scherge, B. Flößer, J. Lushnov, Tribologie Fachtagung Göttingen 2002.

„Tribomutation in machines", D. Shakhvorostov, Tribology Congress Beltrib 1999.

References

Prof. Martin H. Müser
Universität des Saarlandes
Lehrstuhl für Materialsimulation
Campus C 6.3, Zi. 7.02
66123 Saarbrücken
Tel. +49 681 302-57452
Fax. +49 681 302-57454
martin.mueser@mx.uni-saarland.de

Prof. Valentin Popov
Department of Tribophysics, University of Technology Berlin
Institut für Mechanik
Sekretariat C8-4
TU Berlin
Straße des 17. Juni 135
10623 Berlin
Tel: 030 / 314 214 80
Fax: 030 / 314 214 80
popov@tu-berlin.de

Prof. Dr.-Ing. habil. Matthias Scherge
Mikro- und Nanotribologie
Fraunhofer Institut für Werkstoffmechanik
Wöhlerstr. 11
79108 Freiburg
Tel.: 0761 5142 206
Fax.: 0761 5142 403
scher@iwm.fraunhofer.de

Prof. Peter R. Norton
Department of Chemistry,
University of Western Ontario,
London, ON, Canada
N6A 5B7
(519) 661-4180
Fax: (519) 661-3022
email: pnorton@uwo.ca