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## **Towards thermo- and superlubricity on the macroscopic scale: from nanostructures to graphene and graphite lubrication**

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## List of publications

1. Yanson, A.I., Antonov, P.V., Rodriguez, P. & Koper, M. Influence of the electrolyte concentration on the size and shape of platinum nanoparticles synthesized by cathodic corrosion. *Electrochimica Acta* **112**, pp. 913-918 (2013)

2. Yanson, A.I., Antonov, P.V., Yanson, Y.I. & Koper, M. Controlling the size of platinum nanoparticles prepared by cathodic corrosion. *Electrochimica Acta* **110**, pp. 796-800 (2013)

3. Antonov, P.V., Zuiddam, M.R. & Frenken, J.W.M. Fabrication of high-aspect ratio silicon nanopillars for tribological experiments. *Journal of Micro/Nanolithography, MEMS and MOEMS* **14(4)**, 044506 (2015)

4. Antonov, P.V. & Frenken, J.W.M. Towards thermolubricity on silicon nanopillar substrates: contact dynamics and effect of relative humidity, in preparation. (Chapter 2 of this thesis)

5. Antonov, P.V. & Frenken, J.W.M. Tribological behaviour of graphene grain boundaries on single crystal copper films, in preparation. (Chapter 6 of this thesis)

6. Antonov, P.V., Valefi, M. & Frenken, J.W.M. Dynamic and static tribological properties of micropatterned DLC under different humidities, in preparation. (Chapter 5 of this thesis)

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## Curriculum Vitae

Pavlo V. Antonov was born on August the 5<sup>th</sup>, 1990, in Kharkov, Ukraine. There, he attended High School #16, from which he graduated in 2007. That year, Antonov started his academic training at the Physics and Technology Faculty of the Kharkov National University. In 2011 he received his BSc degree in Applied Physics. His first research project focused on magnetron sputtering of thin metal films and on the design of a set-up for ion- and plasma-assisted processing of micro- and nanostructures. This experimental project established a collaboration between the University and the Scientific Center for Physical Technologies, under the supervision of Yuriy Rybalko and Prof. Dr. Vladimir I. Farenik. Antonov continued his MSc studies in Applied Physics at the same faculty. He conducted his final MSc project in 2012 during an internship in the Catalysis and Surface Chemistry group of Prof. Dr. Marc T.M. Koper at the Leiden Institute of Chemistry of Leiden University, The Netherlands. The project, under daily supervision of Dr. Alex Yanson, was devoted to cathodic corrosion of platinum, as a method to synthesize nanoparticles. In February 2013, Antonov graduated with honors from the Kharkov National University.

In October 2012 Antonov joined the Interface Physics group of Prof. Dr. Joost W.M. Frenken at the Huygens-Kamerlingh Onnes Laboratory of Leiden University as a PhD student. His research project was aimed at understanding, controlling and reducing dry, unlubricated friction in macroscopic contacts by means of the inherently atomic-scale effects of thermolubricity and superlubricity. In particular, the project focused on understanding the tribological behavior of artificial nanostructures, of graphene coatings and of diamond-like carbon coatings. In parallel to his own research, Antonov also supervised a number of BSc and MSc student projects aimed at unraveling the physical mechanisms of ice-skating. Shortly after Prof. Dr Joost W.M. Frenken started as the Director of the new Advanced Research Center for Nanolithography (ARCNL) in Amsterdam, early 2014, Antonov also moved to ARCNL, where he continued his PhD research.

During his PhD time, Antonov was a member of the Central Works Council of NWO (FOM) and the first Works Council of ARCNL.

In March 2017, Antonov started as a design engineer at the Research department of ASML in Veldhoven. His work focuses on solving friction and wear problems in the context of modern nanolithography technology.