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## **JPK reports on the use of optical tweezers in the Schieber Research Group at Illinois Institute of Technology.**

*Berlin, 18<sup>th</sup> March 2015: JPK Instruments, a world-leading manufacturer of nanoanalytic instrumentation for research in life sciences and soft matter, reports on the use of their NanoTracker™ optical tweezers system to study collagen fibrils at Illinois Institute of Technology in Chicago.*

The Schieber Research Group is led by Jay Schieber, Professor of Chemical Engineering at the Illinois Institute of Technology where he is also Director of the Center for Molecular Study of Condensed Soft Matter. Current research focuses on the kinetic theory of macromolecules to model the rheological, thermodynamic and thermal behaviour of polymeric fluids. These models are then used to predict the properties of advanced materials during and after processing.

The group purchased a JPK Instruments NanoTracker™ to help them to investigate micro-rheological processes. Micro-rheology (or microbead rheology) is a fairly new branch of rheology. It allows the measurement of the viscoelastic properties of media by tracking thermal fluctuations of Brownian particles contained in the media. The key value of this method is the resolution of the tracking.

The early work with NanoTracker™ took a different direction. One of the post-doctoral workers is Pavel Dutov. He has looked extensively at the use of optical tweezers and published a paper with Professor Schieber on the calibration of optical traps by dual trapping of one bead.\* Mr Dutkov also studied the elastic modulus of collagen fiber before embarking on the micro-rheological work with the study of collagen type I gel. Here, he looked at the anisotropic viscoelastic properties of the gel as these are very important aspects for wound healing biomedicine and there is no other experimental method can be used for such studies.

In the measurement of collagen single fiber elastic modulus, NanoTracker™ has shown precision unreachable by use of AFM alone and has the ability to conduct experiments in conditions close to those *in vivo*. For the anisotropic microbead rheology experiments, NanoTracker™ provided great combination of spatial and temporal resolution with data analysis transparency.

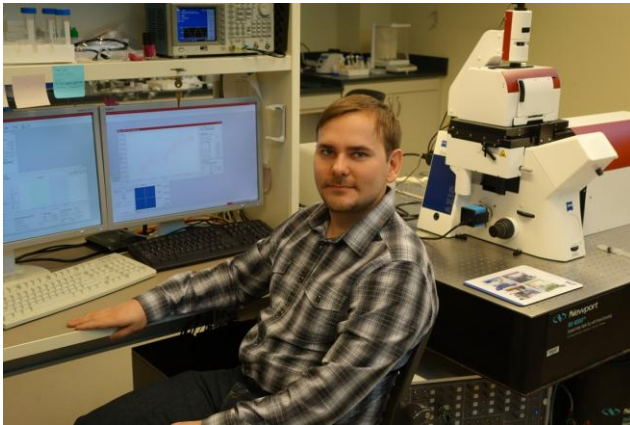
For more details about JPK's NanoTracker™ Optical Tweezers system and NanoWizard® AFM and its applications for the bio & nano sciences, please contact JPK in the USA on (408) 807 8878 and in Germany on +49 30726243 500. Alternatively, please visit the web site: [www.jpk.com](http://www.jpk.com) or see more on Facebook: [www.jpk.com/facebook](http://www.jpk.com/facebook) and on YouTube: <http://www.youtube.com/jpkinstruments>.

## Reference

\* Optics Letters, Vol. 38, Issue 22, pp. 4923-4926 (2013)

<http://dx.doi.org/10.1364/OL.38.004923>

## Attachment



*Pavel Dutov at the Illinois Institute of Technology with his JPK NanoTracker™ Optical Tweezers system.*

## About JPK Instruments

*JPK Instruments AG is a world-leading manufacturer of nanoanalytic instruments - particularly atomic force microscope (AFM) systems and optical tweezers - for a broad range of applications reaching from soft matter physics to nano-optics, from surface chemistry to cell and molecular biology. From its earliest days applying atomic force microscope (AFM) technology, JPK has recognized the opportunities provided by nanotechnology for transforming life sciences and soft matter research. This focus has driven JPK's success in uniting the worlds of nanotechnology tools and life science applications by offering cutting-edge technology and unique applications expertise. Headquartered in Berlin and with direct operations in Dresden, Cambridge (UK), Singapore, Tokyo, Shanghai (China), Paris (France) and Carpinteria (USA), JPK maintains a global network of distributors and support centers and provides on the spot applications and service support to an ever-growing community of researchers.*



*Nanotechnology for Life Science*

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