Wei Sun wins *ABC Best Paper Award*

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Wei Sun, winner of the 2008 *ABC Best Paper Award*

On the threshold of a new chapter in biological imaging

This year's *Best Paper Award* for outstanding work published in *Analytical and Bioanalytical Chemistry (ABC)* goes to Wei Sun (26) for his research in differential interference contrast (DIC) microscopy. Sun is the lead author of a paper which deals with developing advanced tools for in vivo biological imaging, "Endocytosis of a single mesoporous silica nanoparticle into a human lung cancer cell observed by differential interference contrast microscopy." Accompanied by EUR 1,000, the Award is

sponsored by Springer to acknowledge the work of an exceptional young scientist. Moreover, the winning paper is featured on the cover of the current journal issue.

Impact Sun's paper demonstrates the excellent resolving power of DIC microscopy in providing depth-resolved information in a living system in real time. DIC microscopy, a wide-field optical technique based on light interference, can provide excellent resolution and detectability for nonintrusive observation of biological processes. Although DIC microscopes are commercially available, their unique capabilities for biological imaging have rarely been exploited. Sun and his team recorded a complete endocytosis process of a single mesoporous silica nanoparticle (MSN) by a living human lung cancer cell. For the first time, valuable three-dimensional information on particle diffusion and vesicle formation and transport was extracted as a function of time. This approach can be employed to study real-time drug release events in living cells when MSNs or other nanoparticles are used as drug delivery vectors.

Sylvia Daunert, Editor of *ABC*, said, "The work of Wei Sun under the guidance of Professors Ed Yeung and Ning Fang represents an important contribution to the field of real-time in vivo imaging microscopy that, undoubtedly, will help shed light into molecular events. The keen competition and the quality of the manuscripts considered for this year's Award are a homage to the excellent research performed by Wei Sun."

On behalf of the Editors.

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Award winner Wei Sun is a Ph.D. candidate in analytical chemistry at Iowa State University, USA. He received his B.S. in polymer science and engineering in 2004 from the University of Science and Technology of China in Hefei, Anhui Province. His current research work under the

guidance of Edward S. Yeung and Ning Fang includes the application of DIC microscopy in analytical chemistry as well as scanning-angle evanescent field microscopy.

Background Sun's Ph.D. research is the general area of developing advanced tools for in vivo biological imaging and focuses on realizing the full potential of DIC's excellent resolution and detectability, specifically to go beyond the optical diffraction limit. According to the Kramers–Kronig relationship, the refractive indices of noble metal nanoparticles increase when the incident light is close to the wavelength that can induce localized surface plasma resonance. The contrast in DIC images results from the refractive index difference between the sample and the surrounding environment; therefore, by simply changing the wavelength of incident light in DIC, one improves greatly the detection ability.

The Award-winning paper demonstrates that DIC microscopy can be used to study the uptake of a single MSN into a living human lung cancer cell. Thanks to their unique structural features, MSNs have been used, for example, as carriers in controlled-release drug delivery. In the present work, the movement of the MSN could be observed directly without staining the cell. The process of endocytosis was tracked continuously from start to finish. Three physical observables—motion speed, shape, and vertical position—were used to characterize the locations of the MSN (inside/outside the cell or on the cell

membrane) throughout the many stages of the endocytosis process.

The editors warmly congratulate Wei Sun on his outstanding paper and are very pleased to honor him with the *2008 ABC Best Paper Award*. Created with the aim of encouraging exceptional young scientists in establishing their research careers, the *ABC Best Paper Award* is presented annually to a scientist up to 40 years of age who is the lead author of a paper published in *ABC*. All research papers submitted to the journal are considered for the Award. Selection criteria include, for example, that the paper receives two excellent reviews during the peer review process. The editors of *ABC* encourage all young scientists to submit their best analytical or bioanalytical research papers for consideration for this Award.

The online version of the Award-winning paper by Wei Sun, Ning Fang, Brian G. Trewyn, Makoto Tsunoda, Igor I. Slowing, Victor S. Y. Lin, and Edward S. Yeung “Endocytosis of a single mesoporous silica nanoparticle into a human lung cancer cell observed by differential interference contrast microscopy” (*Anal. Bioanal. Chem.* 391:2119–2125, 2008) can be viewed free of charge. Just visit the *ABC* homepage at <http://www.springer.com/abc>. And take a look at the attractive artwork on the cover of the present journal issue that is related to the Award-winning paper and shows an image of the 100-nm MSN used by the authors in their work.