Vladislav Krzyžánek, Ph.D.

Head of Microscopy for Biomedicine

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Scientific interest

General: Instrumental and methodological developments of electron microscopy for life sciences and soft matters

Main research activities: quantitative imaging techniques in electron microscopy (STEM/BSE), 4D-STEM, combined detection in SEM, cryo-EM sample preparation, cryo-SEM, quantitative image processing with simulations, applications for life sciences and soft matters

Microscopy related activities

Czechoslovak Microscopy Society, CSMS (member since 2010; board member since 2015, vice-resident 2017-2019, president since 2019)

European Microscopy Society, EMS (member since 2003)

German Society for Electron Microscopy, DGE (member 2003-2012)

Conference chair of 16th Multinational Congress on Microscopy, 16MCM, 4-9.9.2022, Brno, https://www.16mcm.cz/

Co-organization of IMC2014 in Prague and annual CSMS meetings “Mikroskopie”

Organization of cryo-SEM, STEM and 4D-STEM workshops at ISI CAS Brno

Other professional activities

Supervision of Ph.D. and Master students

Member of evaluation panel of the Czech Science Foundation

Member of evaluation panel of the Ministry of the Industry and Trade of the Czech Republic

Executive manager of Centre of Electron and Photonic Optics (Czech National Centre of Competence)

Potential of contributing to the aims of the EMS

Communication bridge between EMS scientific community and Czech EM companies (almost 35% of world EM production is located in Brno)

Engaging younger scientists in the community (CSMS recently created a young microscopists section)

Active participation in EMS events and planning process

Curriculum vitae

1990-1995: Technical University of Brno, Czech Republic (M.Sc. degree in physical engineering)

1995-1998: Technical University of Brno, Czech Republic (Ph.D. degree in physical and material engineering)

1998-1999: Warsaw University of Technology, Poland (visiting scientist at the Faculty of Physics)

1999-2000: Technical University of Brno, Czech Republic (research scientist at the Institute of Physical Engineering)

2000-2011: University of Münster, Germany (research scientist at the Institute of Medical Physics and Biophysics)

2011-present: Institute of Scientific Instruments, the Czech Academy of Sciences, Brno, Czech Republic (research scientist; since 2012 head of Microscopy for Biomedicine)

Publications

69 peer-reviewed publications in scientific journals, incl. PNAS, Ultramicroscopy, Small Methods, etc. Citation data: cited ~1200 times, h-index: 20

Five most cited papers:

Kucera D. et al: Characterization of the promising poly(3-hydroxybutyrate) producing halophilic bacterium Halomonas halophila. *Bioresource Technology* **256** (2018), 552-556

Banerjee S. et al: Der p 11 Is a Major Allergen for House Dust Mite-Allergic Patients Suffering from Atopic Dermatitis. *Journal of Investigative Dermatology* **135** (2015), 102-109

Smarda J. et al: S-layers on cell walls of cyanobacteria. *Micron* **33** (2002), 257-277

Ernst A.M. et al: Sieve element occlusion (SEO) genes encode structural phloem proteins involved in wound sealing of the phloem. *PNAS* **109** (2012), E1980-E1989

Edlmayr J. et al: Antibodies induced with recombinant VP1 from human rhinovirus exhibit cross-neutralisation. *European Respiratory Journal* **37** (2011), 44-52

Selected microscopy-related technical papers:

Krzyzanek V. et al: MASDET-A fast and user-friendly multiplatform software for mass determination by dark-field electron microscopy. *Journal of Structural Biology* **165** (2009), 78-87

Pfaff M. et al: Low-energy electron scattering in carbon-based materials analyzed by scanning transmission electron microscopy and its application to sample thickness determination. *Journal of Microscopy* **243** (2011), 31-39

Krzyzanek V. et al: Polyelectrolyte multilayer capsules: nanostructure and visualisation of nanopores in the wall. *Soft Matter* **7** (2011), 7034-7041

Hrubanova K. et al: The innovation of cryo-SEM freeze-fracturing methodology demonstrated on high pressure frozen biofilm. *Micron* **110** (2018), 28-35

Tacke S. et al: A Versatile High-Vacuum Cryo-transfer System for Cryo-microscopy and Analytics. *Biophysical Journal* **110** (2016), 758-765

Skoupy R. et al: Quantitative STEM imaging of electron beam induced mass loss of epoxy resin sections. *Ultramicroscopy* **202** (2019), 44-50

Skoupy R. & Krzyzanek V.: Nanoscale estimation of coating thickness on substrates via standardless BSE detector calibration. *Nanomaterials* **10** (2020), 332

Mrazova K. et al: Urany-Less Low Voltage Transmission Electron Microscopy: A Powerful Tool for Ultrastructural Studying of Cyanobacterial Cells. *Microorganisms* **11** (2023), 888

Skoupy R. et al: Robust Local Thickness Estimation of Sub-Micrometer Specimen by 4D-STEM. *Small Methods* **7** (2023), 2300258

Further information:

http://www.isibrno.cz/~vlk

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