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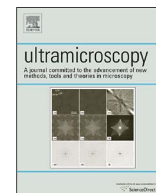

# Ondrej Krivanek: A research life in EELS and aberration corrected STEM

This special issue of Ultramicroscopy is in honour of Ondrej Krivanek's tremendous achievements in the field of aberration-corrected analytical electron microscopy. We celebrate two landmarks this year for which we cordially congratulate him: 20 years of NION and 30 years of PEELS.

A whole generation of scientists and researchers is active, whose work is influenced by Ondrej's accomplishments and this Festschrift aims to show the breath of his impact on the fields of electron microscopy and electron spectroscopy. The various technologies and instruments introduced by Ondrej have enabled ground-breaking experiments and have led to new insights in materials and life sciences as well as theoretical disciplines. By incorporating parallel detectors into electron spectrometers for instance, faster and more dose-efficient spectrum acquisition became feasible, permitting a meaningful spectral analysis. The use of CCD cameras and multipole lenses in electron optics, realized in imaging energy filters, has brought energy-filtered TEM to new levels. And with STEM aberration correction and electron beam monochromation, packaged into an all new class of STEM instrumentation, atomic-level, high-energy resolution analysis now again enables entirely new levels of microscopy research. Besides innovating in hardware, Ondrej early foresaw the potential of advanced computing and intelligent algorithm design, establishing software that allowed for more powerful data acquisition and processing as well as computer-assisted tuning of microscope- and spectrometer parameters.

His passion for new challenges and pioneering research will surface in all of the manuscripts in this collection of mostly single- and dual-author original contributions, representing invited-only papers. They contain personal reflections, mini reviews, technical monographs and current research that show how broad aberration-corrected STEM and parallel EELS have fanned out into various disciplines.

We thank all contributing authors for their hard work and dedication. At the same time, we insert a general apology from those authors who were invited and willing to contribute, but were not able to find the required time to write a contribution. Each manuscript has been peer-reviewed by two or more referees, to whom the guest editors are obliged for their efficient and speedy work. This special issue starts with a short biography of Ondrej, followed by several other personal contributions. The subsequent papers are globally ordered by subject, starting with theoretical contributions, then imaging, EELS and applications.

We also thank Elsevier for providing us with a platform for this special issue, and particularly Angus and Keiren Kirkland for their hard work behind the screens.

Modern scanning transmission electron microscopes nowadays can generate diffractive- and spectral images with extraordinary speed at impressive resolutions – spatial, spectral and temporal, and thereby reveal a plethora of new condensed-matter phenomena. Ondrej's work has opened up new experimental pathways to greater insight into the nature of solids in years to come, to which we truly look forward.

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