



## Editorial

# Introduction to a special issue on Frontiers of Aberration Corrected Electron Microscopy in honour of Christian Colliex, Archie Howie and Hannes Lichte on the occasion of their 75th, 85th and 75th birthdays



This special issue of Ultramicroscopy is a Festschrift in honour of Christian Colliex, Archie Howie and Hannes Lichte on the occasion of their 75th, 85th and 75th birthdays, respectively, as well as a compilation of invited presentations given at PICO 2019 – the Fifth Conference on Frontiers of Aberration Corrected Electron Microscopy held in Kasteel Vaalsbroek, The Netherlands, from 6 to 10 May 2019.

It contains original research and review articles, in particular those written by colleagues who have had the privilege of working together with Christian Colliex, Archie Howie and Hannes Lichte or have benefited from their achievements in both theoretical and applied electron microscopy research. It also contains manuscripts based on some of the keynote presentations given during the PICO 2019 conference organised by the Ernst Ruska-Centrum für Mikroskopie und Spektroskopie mit Elektronen jointly operated by RWTH Aachen University and Forschungszentrum Jülich GmbH, Germany.

PICO 2019 attracted approximately 150 participants from academia, industry and national laboratories and received major sponsorship from Thermo Fisher Scientific, JEOL (Germany) GmbH, Forschungszentrum Jülich GmbH, CEOS GmbH, DENSolutions BV, Gatan GmbH, Hitachi High-Technologies Europe GmbH, NanoMEGAS SPRL, Quantum Detectors Ltd, Protochips Inc and NION Company or their German representatives. The conference owes its success to meticulous organisational work carried out by Stephanie Steinmann and Gabriele Waßenhoven, who deserve very special thanks.

This special issue begins with an overview written by Peter Hawkes highlighting the careers and most important scientific achievements of Christian Colliex, Archie Howie and Hannes Lichte, all of whom have developed and applied the latest electron microscopy techniques to

understand a wide range of condensed matter phenomena, as well as teaching and supporting generations of students and young scientists. Subsequent manuscripts are arranged alphabetically in order of the first author's surname. Each manuscript has been peer-reviewed by two or more referees, to whom the guest editors are very grateful for their efficient and speedy work.

The pioneering research carried out by Christian Colliex, Archie Howie and Hannes Lichte is recognised in the form of review articles and original manuscripts, which describe research activities in electron optics, electron microscopy and electron spectroscopy at the highest spatial resolution. The manuscripts include both a snapshot and a cross-section of the state-of-the-art in measurement techniques that make use of aberration corrected instrumentation and its application to challenging problems in condensed matter physics, as well as in materials science and the life sciences. They demonstrate the importance and relevance of Christian Colliex's, Archie Howie's and Hannes Lichte's achievements over many decades. Their work has had a profound and lasting influence on numerous aspects of modern research in applied transmission electron microscopy, as well as on the careers of many other scientists.

Rafal E. Dunin-Borkowski<sup>a</sup>, Joachim Mayer<sup>b</sup>, Carsten Sachse<sup>a</sup>,  
Karsten Tillmann<sup>a,\*</sup>

<sup>a</sup> *Ernst Ruska-Centrum für Mikroskopie und Spektroskopie mit Elektronen,  
Forschungszentrum Jülich GmbH, Germany*

<sup>b</sup> *Ernst Ruska-Centrum für Mikroskopie und Spektroskopie mit Elektronen,  
RWTH Aachen, Germany*

*E-mail address: [k.tillmann@fz-juelich.de](mailto:k.tillmann@fz-juelich.de) (K. Tillmann).*

\* Corresponding author.