

## **A Review of TESCAN Plasma Focused Ion Beam, Scanning Electron Microscopy, and Laser Cross-Sectioning Applications and Instrumentation**

<sup>1</sup>TESCAN ORSAY HOLDING a.s., and <sup>2</sup>TESCAN USA Inc.

TESCAN will review instrumentation and applications of Plasma focused ion beam (PFIB) with Scanning Electron Microscopy (SEM) combined with Laser sectioning. In the first part of this presentation, we will discuss 2D and 3D characterization methods of PFIB/SEM and laser sectioning for materials science applications. TESCAN's unique applications of TRUE-X sectioning and/or the TESCAN rocking stage methods for mitigating curtaining artifacts ubiquitous with PFIB milling will be presented. We will also present unique analytical capabilities of integrated RAMAN and TOF SIMS as well as conventional 2D and 3D uses of EDS and EBSD. Specimen preparation methods for transmission electron microscopy (TEM) will be described. In addition, TESCAN's large chamber and stage designs allows for easy integration of *in situ* holders for electrical, heating or mechanical testing. In the second part of this presentation, we will show examples of biological and life sciences FIB and SEM applications, including 3D FIB-SEM tomography on diverse biological samples. Advantages and benefits of 3D tomography data sets acquired with PFIB vs. Ga FIB will be highlighted. Innovative solutions for serial block face imaging (SBF-SEM) of stained, embedded samples, cryo-EM specimen preparation for cryo-ET and applications of integrated Raman and TOF-SIMS in life sciences applications will also be presented.

<sup>1</sup>Martin Sláma, Product Marketing Manager

Martin Sláma works as a Product Marketing Manager for FIB-SEM 3D characterization and TEM lamella preparation in Materials Science with over 6 years of experience working with the FIB-SEM instruments. During his working career with the FIB-SEM technique, he has mainly focused on conventional and advanced TEM preparation methods using TESCAN's plasma FIB and Ga+ FIB-SEM solutions and materials characterization using FIB-SEM 3D tomography. Prior to joining TESCAN, Martin worked in the field of new material development and characterization at Brno Technological University, CEITEC, and Aston University.

<sup>1</sup>Ondřej Šulák, Ph.D., Product Marketing Director - Life Sciences

Ondřej Šulák received his Master degree from Masaryk University in the Czech Republic. He obtained his Ph.D. and performed Postdoctoral research at Joseph Fourier University in Grenoble where he focused on the structure-functional characterization of carbohydrate-binding proteins, by X-ray crystallography, Electron Microscopy, SAXS, and other techniques. He has worked in a biotechnological company responsible for its biochemistry department. In 2016, Ondřej joined TESCAN as Global Applications Director. Since 2019 he is Product Marketing Director for the Life Sciences segment.

<sup>2</sup>Dean Miller, Ph.D., Senior Scientist

Dean Miller has a B.S. in Metallurgical Engineering and Ph.D. in Materials Science, both from the University of Illinois in Champaign-Urbana. He has more than 30 years of experience in materials characterization using electron and x-ray methods, and is author or co-author of more than 275 publications in peer-reviewed journals.

<sup>2</sup>Lucille A. Giannuzzi, Ph.D., Account Manager

Lucille Giannuzzi has an B.E. and M.S. from Stony Brook University and a Ph.D. from Penn State University. She has over 25-years experience in FIB/SEM/TEM characterization in the physical and life sciences as well an understanding of ion- and electron-solid interactions. She has over 150 (co)-authored publications and is a Fellow of AVS, MSA, and MAS.

<sup>2</sup>Dean Krogman, Director of Sales