Biological structures, such as organelles, bacteria, somatic cell layers, tissues and model organisms are inherently three-dimensional. A far greater understanding of the structure-function relationship in cells and tissues is now achievable via high resolution correlation of chemical markers and structural components in the third dimension. To achieve this, recent developments in Field Emission Scanning Electron Microscopy (FE-SEM), such as automated tape collecting of serial sections and block face imaging will be highlighted. 3D EM data can be directly overlaid with 3D LM and/or super-resolution images, referred to as Correlative Light and Electron Microscopy (CLEM). Exciting advanced applications applying 3D correlative techniques such as Correlative Array Tomography (CAT) and cryo-Airyscanning with FIB-FESEM also will be shown.