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Microscopy Education in the Fourth Industrial Revolution

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The Fourth industrial revolution [1] has been drastically dynamic. In this era, microscopy needs of industry, academia, and research institutes has been on the rise. In addition, advancements in science, technology, and medicine require changes in our methods of education. Therefore, past microscopy education will not suffice today's need.

Traditionally and even currently, most universities will only train Master and PhD (graduate school level) students on advanced microscopes (electron, light/photon, and even ion microscopes). Such graduate degrees are not in microcopy, and the trainings are focused on means to assist the students in obtaining their degree. Although such training is still needed, this need does not scale up to the need of the current industrial revolution. To fulfill the current need for microscopists, microscopy education needs to focus early on the K-12 students so that as they graduate from high school they can take the efficient path to a career in microscopy.

Following are microscopy education outcomes that will be presented:

- Associate of Science Degrees, such as the 2-year Biological and Material Electron Microscopy associate degrees at the Electron Microscopy program at San Joaquin Delta College, Stockton California [2].
- Certificates, such as the light microscopy certificates at Merritt College, Oakland California [3]
- Enhance the education of STEM undergraduate students [4]
- Bachelor Degree

The pros and cons of each outcome will be discussed. What are their current obstacles? Is Career Technical Education (CTE) the answer to today's advanced technology employers?

References:

[1] Klaus Schwab, "The Fourth Industrial Revolution, World Economic Forum", New York, 2016

[2] https://www.deltacollege.edu/program/electron-microscopy

[3] https://www.merritt.edu/microscopy

[4] Suhas Eswarappa Prameela et al., Nature Reviews Materials, volume 5, pages865–867 (2020)