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Enjoying the Small Things

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Enjoying the small things

The Microscience and Microscopy Congress (mmc) is the standout event of the microscopist's calendar. This July, hundreds of delegates signed into a virtual mmc2021 to see the latest research and advancements in microscopy, spanning both physical and life sciences.

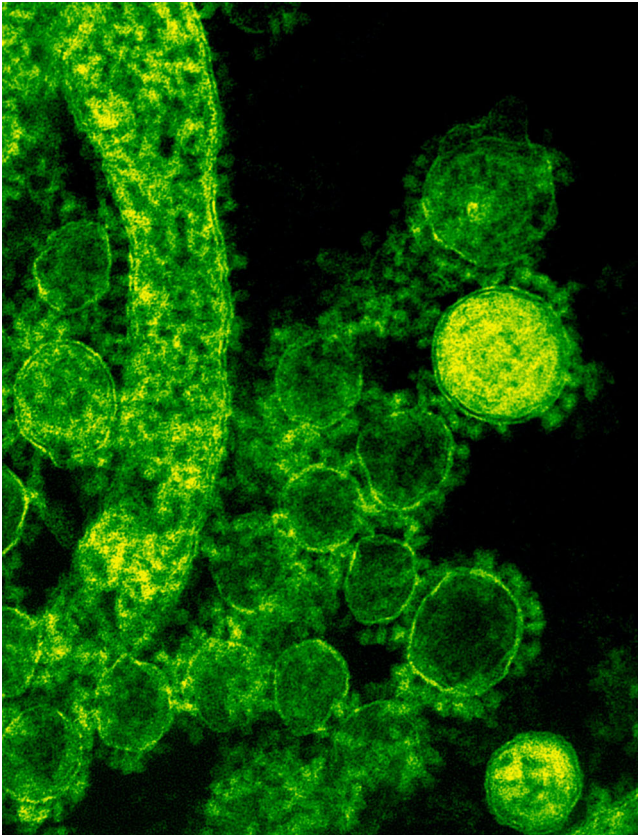
Taking place over 4 days, the congress covered an array of topics with over forty half-day parallel sessions. Suggestive of the future direction of the field, common themes were the need for robust image analysis workflows for complex data, and an emphasis on developing new and exotic instrumentation to study difficult specimens. For example, Lisa Kölln (University of Strathclyde, UK) presented an innovative method for improving structured fluorescence signal by means of a semi-supervised machine learning method, named 'Label2Label'¹. Dr Heba Sailem (University of Oxford, UK) reported a timely resource for presenting complex multi-variable image data, which could be adapted for a variety of data². We also saw the use of 3D single-molecule parallax microscopy from Dr Helen Miller (University of Oxford, UK), whereby parallax optics are combined with Single Molecule Localisation Microscopy (SMLM) to enable rapid and adaptable 3D single-molecule tracking in live systems.

Plenary talks ranged from the use of deep-learning in computational microscopy to the advancements in archaeal imaging—ancient extremophilic microbes that could contain clues to the origins of life. Prof. Joanne Etheridge (Monash University, Australia) provided an excellent overview of 4D-STEM (four-dimensional scanning transmission electron microscopy) for materials science, while Prof. Janet Iwasa (University of Utah, USA) gave stunning insights to her work on creating informative and accessible data visualisations—see the Animation Lab.

Measurement tools for materials science was a recurring topic at mmc2021. Methods optimised for the characterisation of 2D materials, nanostructures, and soft and hybrid materials each received dedicated sessions. One standout presentation on this topic was given by Dr Wing Chung Tsoi (Swansea University, UK), whose Raman-based approach allows the changing properties of optoelectronic and semiconducting devices to be tracked in situ in technologically relevant environments³. In addition, free-electron techniques such as ultrafast transmission electron microscopy and photon-induced near-field electron microscopy are permitting new insight into extreme light-matter interaction in the quantum regime, as described by Prof. Ido Kaminer (Technion, Israel).

My personal highlight was the Early Career Symposium, which featured a selection of great talks from Early Career Researchers (ECRs). Dr Michele Conroy (Imperial College London, UK) provided thought-provoking insights to her latest research, where she furthered the field of materials science by using 4D-STEM with in situ biasing to analyse charged topologies in ferroelectric thin films⁴. Dr Kevin Whitley (Newcastle University, UK), winner of the Royal Microscopical Society Early Career Award 2021, presented his technical solution to study bacterial division by innovative microfluidics combined with SMLM⁵. Moreover, the ECR panel on alternate career pathways and funding was highly engaging and interactive—as good as any in-person alternative.

The mmc meetings are held biennially and feature different scientific themes during each event. This provides a regular forum for the dissemination of new research findings in topical areas of microscopy and measurement science. The smooth transition to an online mmc2021 ensured the continuation of this forum and widened participation from overseas delegates. The next mmc will return to Manchester in 2023 and will, once again, welcome researchers from across the globe to showcase their findings.



Credit: Center for Disease Control's Public Health Image Library

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Competing interests

The author declares no competing interests.

Additional information

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