



MSNO January 2022 Four Point Quarterly

Dear MSNO Community,

Happy New Year!

Welcome to the first 2022 issue of the MSNO Four Point Quarterly (FPQ). Thank you to everyone who renewed your memberships and continue to support MNSO! We are excited to announce several upcoming events below, including the annual Microscopy and Microanalysis hosted by MSA and MAS.

Thank you for your membership this past year! You can renew your membership for 2022 today, by accessing [Membership and Dues](#) page on MSNO.org website. If you are new to MSNO and want to become a MSNO member, please use the same [Membership and Dues](#) link. As a reminder, member benefits include: reduced registration fee for the May Conference and spring and fall meetings, and networking opportunities through regular MSNO meetings and MSNO Board meetings.

If you have content for the next FPQ, please send it to microsocietyneo@gmail.com

1. Upcoming events:

Local:

May meeting – May 2022

2022 Microscopy/Microanalysis Summer School at Advanced Materials and Liquid Crystal Institute (AMLCI), Kent State University, July 2022

National: Don't miss out on the premier microscopy education and networking event of the year - [Microscopy & Microanalysis 2022](#) in Portland, Oregon! If you are planning to submit a paper to M&M 2022 more information is available [here](#)! Mark your calendar and save the date: July 31 – August 4, 2022.

Microscopy Today publishes a comprehensive list of microscopy related meetings and courses monthly. The most recent list can be found [here](#), along with instructions on how to submit information about your event.

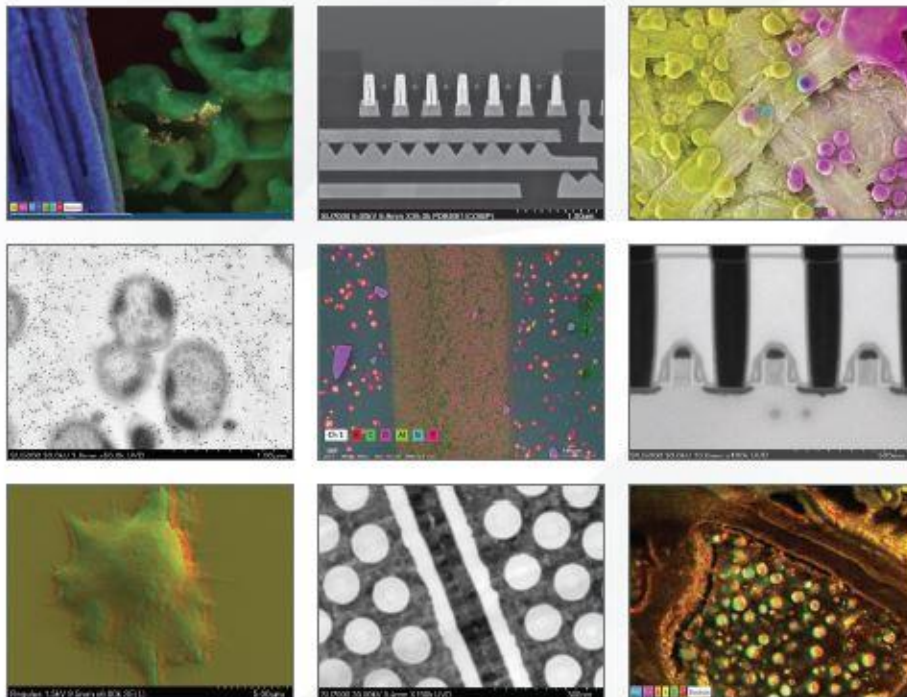
2. This month's featured vendor is Hitachi High-Tech America, Inc.

Specials thanks to Mr. Roger Teppert, Manager, Nanotechnology National Sales for Hitachi's support of the MSNO Newsletter.



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3. Facility Highlight:

Cleveland State University manages a [high-resolution electron microscopy facility](#) built around an FEI Inspect F50 scanning electron microscope. In addition to the secondary-electron detector, the system is equipped with a low kV back-scattered electron detector and a large area Oxford X-Max 80 mm² EDS detector. The system is open to both CSU and external users. For access protocols contact Miroslav Bogdanovski (m.bogdanovski@csuohio.edu).



4. Early Career Research Highlight

Taban Larimian, Ph.D. candidate, Mechanical Engineering, Cleveland State University (CSU).

Taban has been working on the use of spark plasma sintering and laser selective melting as methodologies for synthesizing or enhancing the properties of complex alloys. She is using scanning electron microscopy (SEM) to study the microstructure of different metals, metallic alloys and metal matrix composites. During the past 5 years she has used CSU's SEM lab extensively to collect imaging and energy dispersive spectroscopy (EDS) data to support 7 peer-reviewed papers and 2 book chapters that she has authored or co-authored. Data collected from SEM and EDS has been crucial for her research work and having unrestricted and frequent access to the SEM lab expedited her research. Several of Taban's papers are listed below:

1. T. Larimian, B. AlMangour, D. Grzesiak, G. Walunj, and T. Borkar, Effect of Laser Spot Size, Scanning Strategy, Scanning Speed, and Laser Power on Microstructure and Mechanical Behavior of 316L Stainless Steel Fabricated via Selective Laser Melting, *J. Materials Engineering and Performance*, DOI: 10.1007/s11665-021-06387-8, Nov. 2021.
2. M.U.F. Khan, T. Larimian, T. Borkar, and R.K. Gupta, Corrosion Behavior and Hardness of Binary Mg Alloys Produced via High-Energy Ball-Milling and Subsequent Spark Plasma Sintering, *Corrosion*, Vol. 77 (2), 2021, 228-241.



3. T. Larimian, V. Chaudhary, M.U.F. Khan, R.V. Ramanujan, R.K. Gupta, T. Borkar, Spark plasma sintering of Fe–Si–B–Cu–Nb/Finemet based alloys, *Intermetallics*, Vol. 129, DOI: 10.1016/j.intermet.2020.107035, 2021.
4. G. Walnuj, A. Bearden, A. Patil, T. Larimian, J. Christudasjustus, R.K. Gupta, and T. Borkar, Mechanical and Tribological Behavior of Mechanically Alloyed Ni-TiC Composites Processed via Spark Plasma Sintering, *Materials*, Vol. 13 (22), DOI: 10.3390/ma13225306, 2020.
5. T. Larimian, V. Chaudhary, J. Christudasjustus, R.V. Ramanujan, R.K. Gupta, and T. Borkar, Bulk-nano spark plasma sintered Fe-Si-B-Cu-Nb based magnetic alloys, *Intermetallics*, Vol. 124, DOI: 10.1016/j.intermet.2020.106869, 2020.
6. T. Larimian, M. Kannan, D. Grzesiak, B. AlMangour, and T. Borkar, Effect of energy density and scanning strategy on densification, microstructure and mechanical properties of 316L stainless steel processed via selective laser melting, *Materials Science and Engineering A-Structural Materials Properties Microstructure and Processing*, Vol. 770, 138455, DOI: 10.1016/j.msea.2019.138455, 2020.
7. N. Mavros, T. Larimian, J. Esquivel, R.K. Gupta, R. Contieri, and T. Borkar, Spark plasma sintering of low modulus titanium-niobium-tantalum-zirconium (TNTZ) alloy for biomedical applications, *Materials & Design*, Vol. 183, 108163, DOI: 10.1016/j.matdes.2019.108163, 2019.

Samantha Tietjen, MS Physics & Richard Sent, Physics Major, Cleveland State University (CSU). Samantha and Richard have been developing methodologies for imaging soft-matter systems, such as microgel particles, using electron microscopy, that avoid the requirement of drying or cryo-freezing the samples of interest. One method they have developed involves transferring the particles of interest into an ionic solution. Given the low saturation pressure of the ionic liquid the samples can then be directly imaged in the SEM system without further fixation or preparation steps. As the particles are free to move, the methodology allows not only morphological information to be obtained, but enables the visualization of the particle dynamics as well. Preliminary studies of the observed diffusional and rotational motion of nanoparticles have been published in *JURP*. Future work will be focused on developing a better understanding of the response of these particles to environmental effects, such as temperature changes. Samantha's and Richard's paper is listed below:

1. Samantha Tietjen, R. Sent, P.S. Fodor, and K.A. Streletzky, [Microgel Dynamics Characterization Using SEM](#), *Journal of Undergraduate Reports in Physics (JUPR)*, Vol. XXX, Issue 1, 2021.