## 01 JANUARY

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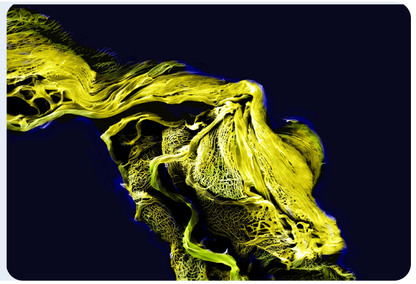

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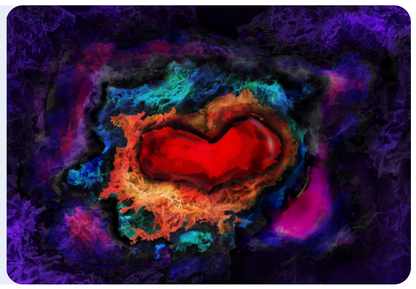

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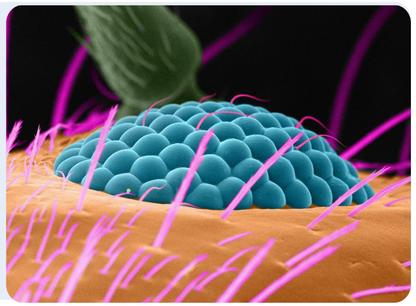

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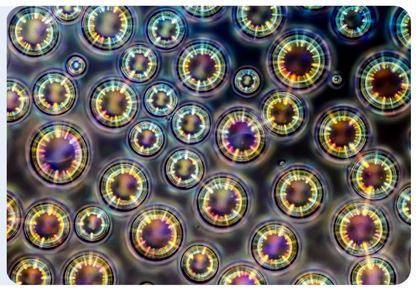

## 05 MAY

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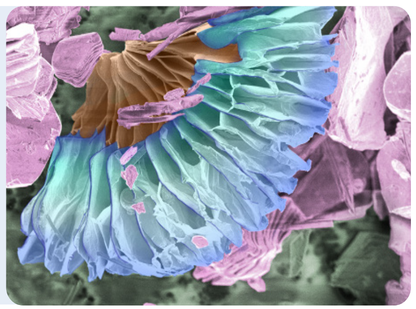

## 06 JUNE

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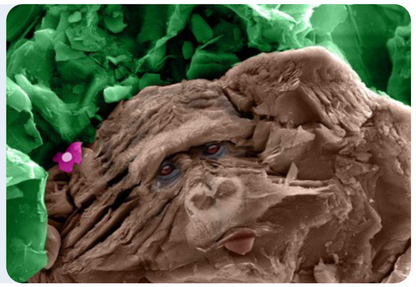

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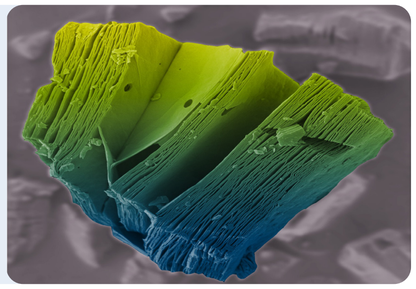

## 08 AUGUST

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## 09 SEPTEMBER

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## 10 OCTOBER

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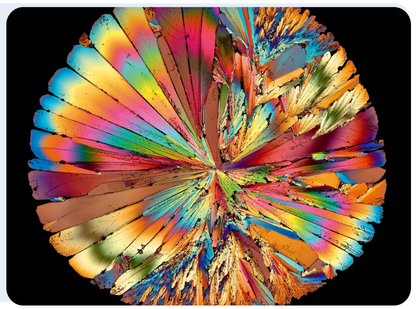

## 11 NOVEMBER

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## 12 DECEMBER

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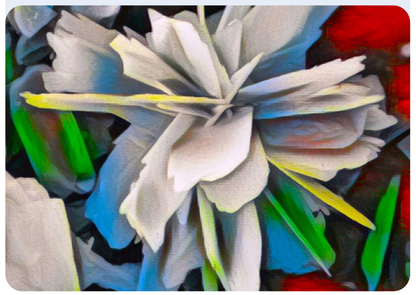

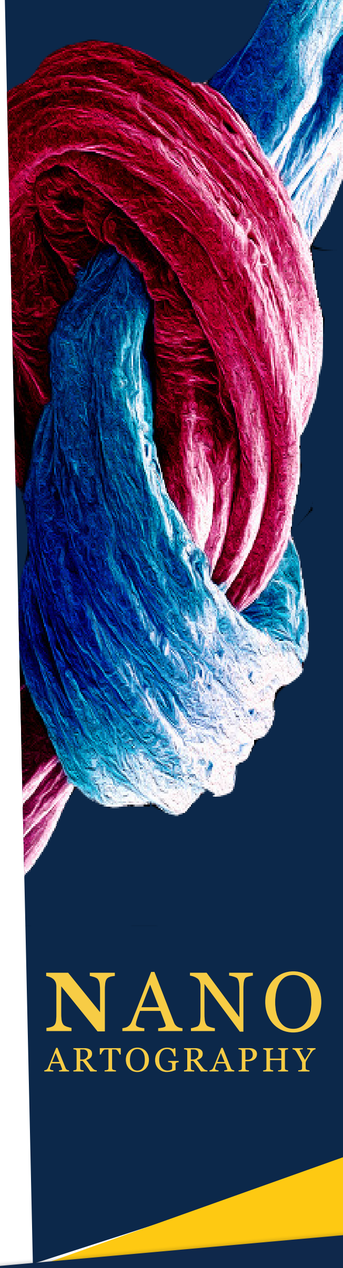

# NANO
ARTOGRAPHY

# 2024 Calendar

DREXEL UNIVERSITY
A.J. Drexel Nanomaterials Institute

DREXEL UNIVERSITY
A.J. Drexel Nanomaterials Institute

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research.coe.drexel.edu/mse/nanomaterials/
Gogotsi@drexel.edu

Dear Colleagues and Friends,

As another year ends, I reflect on 2023 with immense pleasure. I am inspired by the efforts made and impressed with the numerous accomplishments achieved by the A.J. Drexel Nanomaterials Institute. Our students, postdocs, and alumni remain active in obtaining great jobs, winning numerous national and international awards, publishing in high-impact journals (over 40 papers in 2023), building important collaborations, presenting our work at conferences around the globe, and participating in exciting, sponsored research supported by industry, private foundations, and funding agencies in the US and abroad.

2023 has been a banner year, marking a significant upswing in awareness of MXenes and their potential impact on a broad range of crucial social and environmental topics. Publications, seminars, and general recognition for this family of materials continue to grow rapidly. This year alone, there were several symposia dedicated to MXenes, and more conferences saw MXenes as a prominent topic in their programs. At least 10 group members attended each of the MXene symposia at Spring (San Francisco) and Fall (Boston) MRS meetings. Graduate students, Lingyi Bi and Alex Inman, presented their work at Puzzle X, a conference renowned for the broad scope of cutting-edge technology, in Barcelona, Spain, in early November. Kyle Matthews and Katerina Shevchuk presented their research at international conferences in Korea and Sweden, respectively. Danzhen Zhang won the award for Best Oral Presentation Award at the MXene symposium during the MRS Fall meeting. Also in Boston, in October, our PhD Schlumberger Fellow Sokhna Dieng presented her work at the Faculty for the Future Fellows Forum.

Several of our undergraduate group members also presented at important conferences, Yan Burets and Jeffrey Busa at the AAAS meeting in Washington DC in March, and Marley Downes presented her research at the TMS meeting in San Diego after being offered a scholarship from them, as well as at the Fall MRS Meeting in Boston.

Other members of our group have been working through exciting developments and opportunities this year. PhD student Teng Zhang developed a MXene ink for calligraphy and was featured in an article in *The Philadelphia Inquirer*. Our group banded together for a substantial project scaling up MXenes to kilograms, and we continue to make the highest quality MXenes. A great feat for our Nanomaterials Research Lab, and its spinoff company, MXene Inc., is underway, which we expect to take off in 2024. Speaking of taking off, graduate student Benjamin Chacon joined our former group member and ongoing collaborator Dr. Laura Fusco in Bordeaux, France, for a parabolic flight on which they tested MXenes in cell samples to see how MXenes can benefit immune systems in zero gravity environments. This opportunity introduced Benj to new collaborators from the Université Libre de Bruxelles who were testing hydrogels seeded with fibroblasts to promote wound healing.

Our week-long MXene Synthesis and Characterization course offered in February and August included a growing number of lectures on biomedical and electronics applications, as well as a more in-depth presentation on MXenes in electrochemistry, and we received wonderful feedback from the participants. We are excited about our next course (February 2024) with fresh updates to our presentations and many new instructors. We are also gearing up for our biennial conference, **MXenes: Changing the World**, the 3rd International Conference at Drexel University. The conference will be held the first week of August, the 5th-7th, and we expect up to 300 participants.

This year we celebrated the graduation of a PhD student Mark Anayee, who took an NRC post-doc position with AFRL in Ohio, and several MS students, including Adam Goad, Kateryna Shevchuk, Mykhailo Yelipashev, and Nastya Morozova. We also celebrated a contingent of post-docs from our group who moved up in their careers. Our Research Assistant Professor, Dr. Christopher Shuck, took a faculty position at Rutgers University, and Drs. Mikhail Shekhirev and Robert Lord accepted roles in industry. We also bid farewell to Fulbright Fellows Drs. Mohit Saraf and Praveen Kumar, and a Raman Fellow Dr. Pooja Devi, who returned to India. Marie Curie visiting fellow, Dr. Laura Fusco, returned to her home institution in Italy, the University of Padua, and we are pleased to continue collaborating. As folks leave, new members are welcomed, and this year Dr. Yuan Zhang joined us in February on the prestigious Feodor-Lynen research fellowship from the Alexander von Humboldt Foundation, and our new graduate student and Fulbright Fellow, Ms. Deniz Çakir, began her program this fall. Furthermore, we welcomed a new postdoc Ben Davis, and the Lab Manager, Ms. Molly Peek, who has helped to define a more organized and productive lab. Multiple other members of our group have come and gone, as well, and we are delighted to be able to stay connected to each of them.

Along with reveling in the transitions of our team, we are also proud of the well-deserved accolades our current and former group members have received. Dr. Ruocun (John) Wang won the prestigious Cotswold Fellowship for future faculty, which supported him and his research throughout this year. He and PhD student Kyle Matthews also won fellowships from The Electrochemical Society (ECS). A phenomenal achievement for our group to win 2 of 5 ECS fellowships (Uhlig and Garfield) this year in the worldwide competition! Ms. Marley Downes was named a Barry Goldwater Scholar this year, adding to her numerous merited awards. John Wang, Kyle Matthews, Sokhna Dieng, and Alex Inman won Phase 1 of the Microbattery Design Prize competition presented by the DOE and they are currently hard at work on Phase 2. This year's Nanoartography Competition received more than 300 entries, and Marley Downes, Mark Anayee, and Yong-Jae Kim won 3rd place for their beautiful "MXene Jeobeon Fan." From Drexel University, our PhD student Danzhen Zhang won the Research Excellence Award, Kyle Matthews won the Outstanding Mentorship Award, and Lingyi Bi received the 2nd place award for her poster in the Drexel Emerging Graduate Scholars Conference (DEGS) in the spring. Kyle also presented the award-winning pitch at Drexel's Startup Fest.

In addition to the individual achievements of our group members, MXenes were featured in Drexel University's ad campaign, including a print ad in the New York Times and a TV commercial that has just aired this holiday season. With great respect for all the hard work put forth by DNI, I was extremely honored to be inducted into the National Association of Inventors. I also received the 2023 Jan Czochralski Award from E-MRS in Warsaw, Poland, and again, was recognized as a Highly Cited Researcher in both Chemistry and Materials Science by Clarivate, along with our alumni Michael Naguib, Maria Lukatskaya, Chuanfang (John) Zhang, Babak Anasori, and Volker Presser. It is an honor to be listed among this outstanding group.

Among numerous achievements of our alumni in the past year, I'd like to mention that Babak Anasori was appointed as Reilly Rising Star Associate Professor with Tenure at Purdue; this is a joint endowed position between the Materials Science and Mechanical Engineering departments – both are among the best in the country. Prof. Michael Naguib received the Young Alumni Emerging Leader Award from Drexel, and alumna Dr. Kathleen Maleski-Yadeski won a spot on Drexel's 40 under 40 list. She is now a Lead Scientist at General Electric. Most importantly, she announced her greatest achievement, as she and her husband are expecting a child in 2024. Our DNI family expanded this year with the wonderful news of Prof. Babak Anasori and his wife, and Prof. Chris Shuck and his wife each welcoming a baby boy to their families. Dr. Ioannis Neitzel and his wife Yulia (a former visiting student at DNI) welcomed a baby girl. Ioannis also moved to the position of Head of R&D at SVT Group of Companies. We couldn't be happier for all of them.

This was a highly transformative year for both DNI and MXenes, with many achievements. We continued to push the boundaries of nanotechnology. With larger projects and programs on the horizon, we step into 2024 with a refreshed focus and a keen sense of excitement for our group and the broader MXene community. After all, it's the year of the dragon.

Best wishes to all for a healthy, peaceful, and successful new year,

*(signed with MXene ink)*

## IMAGE CREDITS

**January:** "Emerging Dragon", Patricia Lyons, Gregory Schwenk, Drexel University, USA *(2nd place winner of 2023 Nanoartography competition)*

**February:** "Copper Heart", Prastuti Upadhyay, Stefano Ippolito, Drexel University, USA

**March:** "Any Eye", Márcio de Paula, University of São Paulo, Brazil *(3rd place winner of 2023 Nanoartography competition)*

**April:** "Tequila", José Manuel Martínez López, Química Tech Mexico, Mexico *(2nd place winner of 2023 Nanoartography competition)*

**May:** "MXene Jeobeon Fan", Marley Downes, Mark Anayee, Yong-Jae Kim, Drexel University, USA *(3rd place winner of 2023 Nanoartography competition)*

**June:** "MXene Gorilla", Motahare S. Mohseni-Salehi, Tarbiat Modares University, Iran *(Honorable Mention of 2023 Nanoartography competition)*

**July:** "MXene Chronicle", Anupma Thakur, Nithin Chandran B S, Purdue University, USA

**August:** "MXene Volcano", Ken Aldren Usman, Nithin Chandran B S, Anupma Thakur, Purdue University, USA *(Honorable Mention of 2023 Nanoartography competition)*

**September:** "MXene Swan", Anupma Thakur, Nithin Chandran B S, Purdue University, USA

**October:** "Drop of Aperol", Bernardo Cesare, University of Padua, Italy *(1st place winner of 2023 Nanoartography competition)*

**November:** "Tertiary Flying Saucers", Bernardo Cesare, University of Padua, Italy

**December:** "Christmas Flower", Sarah Briceño, Gema Gonzalez, Maria Fernanda Vega, Yachay Tech University, Ecuador *(People's Choice winner of 2023 Nanoartography competition)*

**Image on right side:** "Fire and Ice", Ken Aldren Usman, Kartik Nemani, Joselito Razal, Deakin University, Australia, & IUPUI, USA *(People's Choice winner of 2023 Nanoartography competition)*

The 2023 NanoArtography Competition was sponsored by A.J. Drexel Nanomaterials Institute, Drexel University's Department of Materials Science and Engineering, Materials Today, Nanotechnology World Association, and IUPUI Integrated Nanosystems Development Institute.

**For more information about DNI check:**
**research.coe.drexel.edu/mse/nanomaterials/**

*Designed by* Jamie Banks, ArminVahidMohammadi