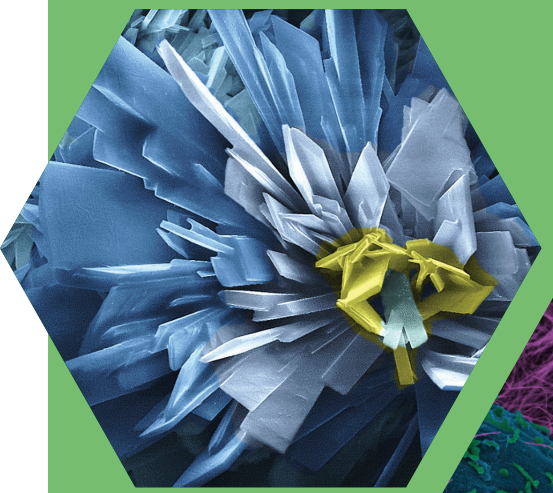
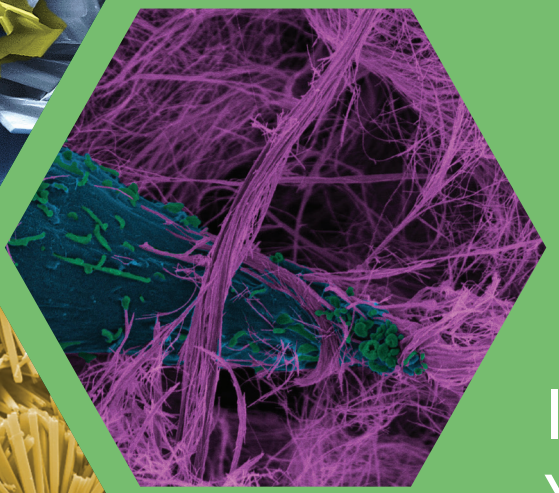
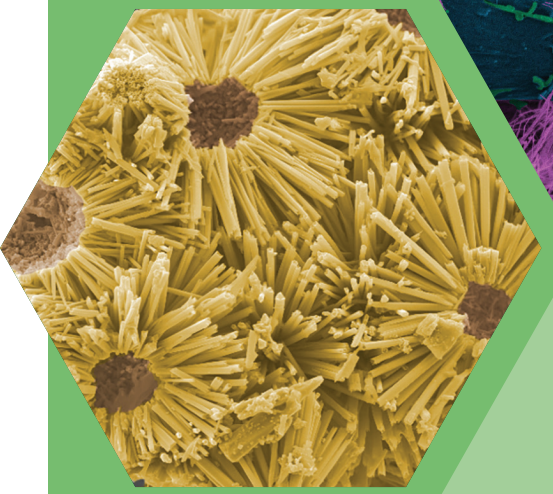
SHyNE

Soft and Hybrid Nanotechnology Experimental Resource

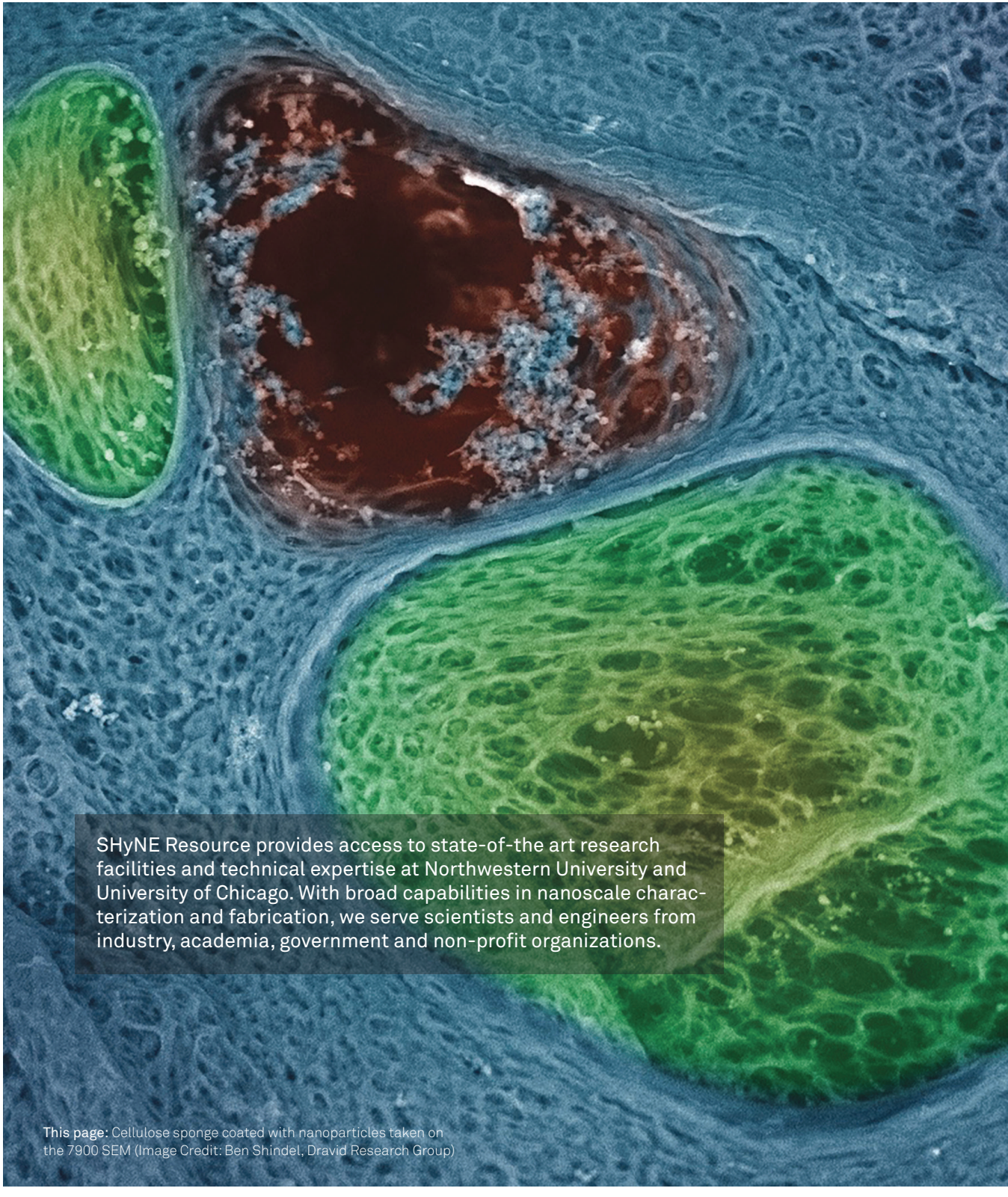






Illuminate Your Research

Begin Your Project
shyne.northwestern.edu



SHyNE Resource provides access to state-of-the art research facilities and technical expertise at Northwestern University and University of Chicago. With broad capabilities in nanoscale characterization and fabrication, we serve scientists and engineers from industry, academia, government and non-profit organizations.

This page: Cellulose sponge coated with nanoparticles taken on the 7900 SEM (Image Credit: Ben Shindel, Dravid Research Group)

SHyNE Resource

Facilities

NUANCE: Microscopy and Microanalysis
NUFAB: MEMS, Prototype Fabrication
IMSERC: Molecular Characterization
SQI: Peptide Synthesis and Characterization
XRD: X-Ray Diffraction
NUCAPT: Atom Probe Tomography
PLD: Pulsed Laser Deposition
PNF: Wafer-scale Fabrication

Key Capabilities

- Materials Characterization
- Cleanroom Fabrication
- Advanced Metrology
- Molecular Characterization
- Electron Microscopy
- Electrical Characterization
- X-Ray Diffraction
- Atom Probe Tomography
- Thin Film Depostion
- Atomic Force Microscopy
- X-Ray Photoelectron
- Spectroscopy
- Mass Spectrometry
- Peptide Synthesis
- Raman Spectroscopy

Access Modes

Self-Service: We'll provide training so you can complete your project on your own terms.

Assisted Use: Need more help? Our technical staff will be on-site with you to help you get the most from our instruments and tools.

Full Service: Not an expert? Consult with our SHyNE staff and guide them as they execute the project according to your specifications.

By the Numbers

Team
50+ Total Technical & Administrative Staff

Capabilities
100+ Instruments, Tools, and Services

Users
200+ Faculty Groups
1,700+ Annual Users

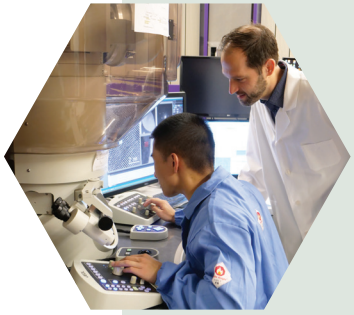
Space
50,000+ sq. ft. Research Space

Research
$100+ million in research, education, infrastructure & facilities

Publications
350+ publication acknowledgments each year

Nanocharacterization

SHyNE facilities offer many tools to assist in characterizing structures from macro to atomic scales. With our advanced instruments and expert technical staff, we can provide composition analysis, electrical/mechanical characterization, Life Science Analysis, and more. For more information on our incredible equipment, check out our website.



TEM Facility Staff helps a user

Nanofabrication

Our streamline access to the nanofabrication facilities at Northwestern University and the University of Chicago provide in-house experts to help you design and execute projects. Our facility has dedicated staff and researchers ready to help with silicon, III-V, MEMS, and emerging applications in our combined cleanroom space of nearly 18,000 ft². Contact our specialists now to learn how your idea can turn into a reality.

SHyNE's NUFAB Facility

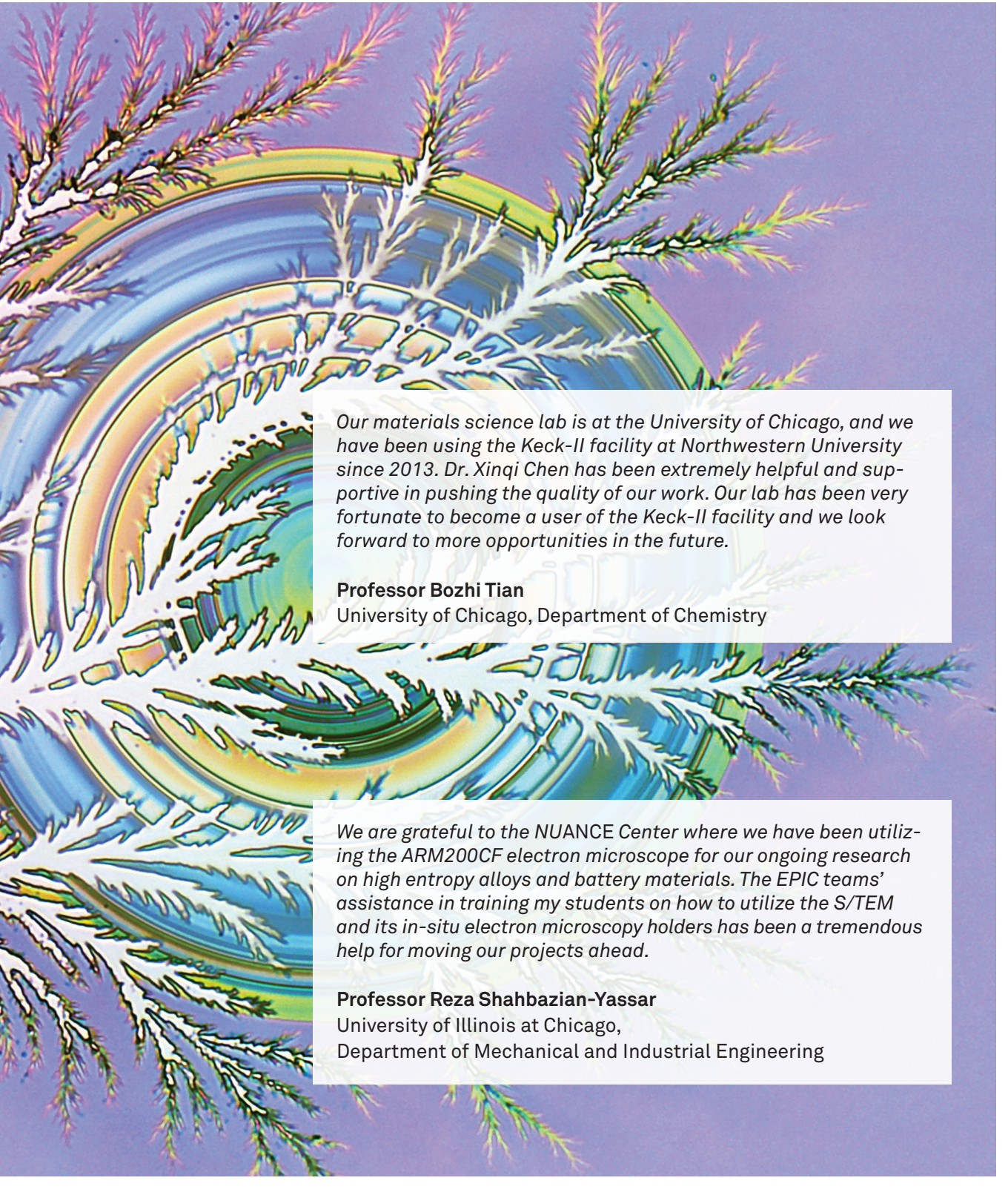
Educational & Outreach

SHyNE leads efforts to help build more regional connections with both other academic and research institutions as well as professional societies. Our outreach efforts have a broad reach in the Chicago region, supporting K–12 educational activities with a strong impact on underrepresented groups.

- Magnifying Minds middle school program
- Research Experience for Teachers (RET): Bringing nanoscience to the classroom
- Research Experience for Undergraduates (REU)
- Community college partnerships
- Women in Microscopy Annual Conference
- "Art of Science" Annual Image Contest
- 10+ academic courses taught in labs

SHyNE RET learning in the lab

Opposite page: Electron discharge using Differential Image Contrast mode on Nikon LV150 at NUFAB (Image credit: Serkan Butun, Equipment Manager - NUFAB Facility)



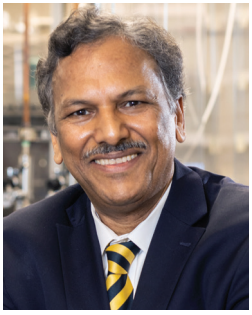
Our materials science lab is at the University of Chicago, and we have been using the Keck-II facility at Northwestern University since 2013. Dr. Xinqi Chen has been extremely helpful and supportive in pushing the quality of our work. Our lab has been very fortunate to become a user of the Keck-II facility and we look forward to more opportunities in the future.

Professor Bozhi Tian
University of Chicago, Department of Chemistry

We are grateful to the NUANCE Center where we have been utilizing the ARM200CF electron microscope for our ongoing research on high entropy alloys and battery materials. The EPIC teams' assistance in training my students on how to utilize the S/TEM and its in-situ electron microscopy holders has been a tremendous help for moving our projects ahead.

Professor Reza Shahbazian-Yassar
University of Illinois at Chicago,
Department of Mechanical and Industrial Engineering

This page: Molybdenum oxide taken on JEOL JSM-7900FLV (Image credit: Arthur Shih, Haile Research Group)



Professor Vinayak P. Dravid

- Director of SHyNE
- Founding Director, NU*ANCE* Center
- Abraham Harris Chaired Professor of Materials Science and Engineering, McCormick School of Engineering Northwestern University
- Director of Global Initiatives, International Institute for Nanotechnology
- Founder & Co-Director, McCormick Global Initiatives

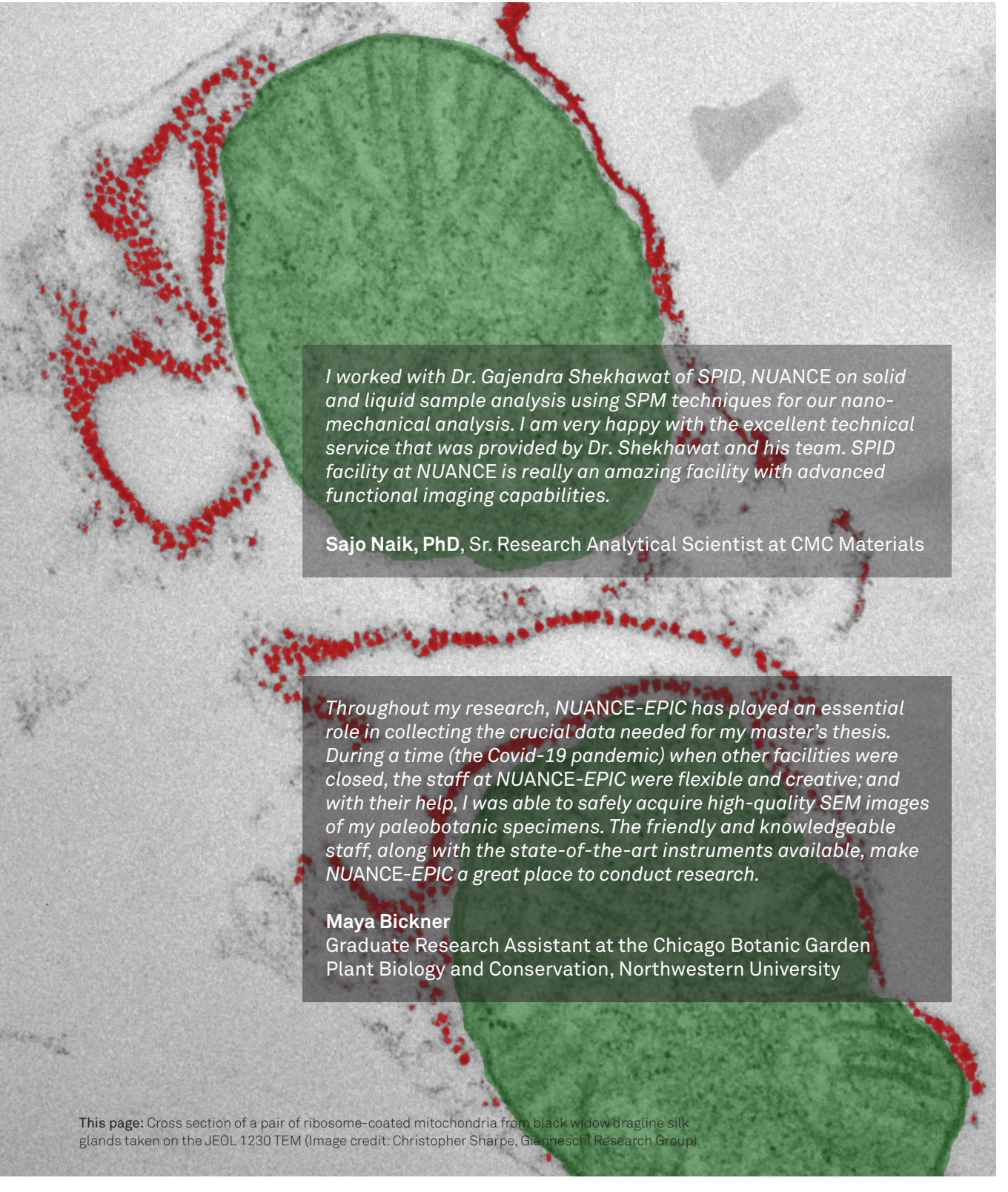
Professor Andrew Cleland

- Co-Director of SHyNE
- John A. MacLean Sr. Professor for Molecular Engineering Innovation and Enterprise, University of Chicago
- Director, Pritzker Nanofabrication Facility

SHyNE Director Vinayak P. Dravid welcomes facility and board members at the SHyNE Annual Meeting

K–12 outreach

REU student & RET teacher in the lab



I worked with Dr. Gajendra Shekhawat of SPID, NUANCE on solid and liquid sample analysis using SPM techniques for our nano-mechanical analysis. I am very happy with the excellent technical service that was provided by Dr. Shekhawat and his team. SPID facility at NUANCE is really an amazing facility with advanced functional imaging capabilities.

Sajo Naik, PhD, Sr. Research Analytical Scientist at CMC Materials

Throughout my research, NUANCE-EPIC has played an essential role in collecting the crucial data needed for my master's thesis. During a time (the Covid-19 pandemic) when other facilities were closed, the staff at NUANCE-EPIC were flexible and creative; and with their help, I was able to safely acquire high-quality SEM images of my paleobotanic specimens. The friendly and knowledgeable staff, along with the state-of-the-art instruments available, make NUANCE-EPIC a great place to conduct research.

Maya Bickner
Graduate Research Assistant at the Chicago Botanic Garden
Plant Biology and Conservation, Northwestern University

This page: Cross section of a pair of ribosome-coated mitochondria from black widow dragline silk glands taken on the JEOL 1230 TEM (Image credit: Christopher Sharpe, Giannesch! Research Group)

Front cover, clockwise from top left:
Metal-Organic Framework microcrystals taken on the Hitachi SU8030 (Image Credit: Haomiao Xie, Farha Research Group)
Stem cell occupying a pore between the filament bundles taken on the Hitachi SU8030 (Image Credit: Jacob Lewis, Stupp Research Group)
Packing formation of zinc-based metal-organic frameworks taken on the 7900 SEM (Image Credit: Kira Fahy, Farha Research Group)

SHγNE Resource
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THE UNIVERSITY OF CHICAGO
NSF
National Nanotechnology Coordinated Infrastructure