ERIC W. ROTH

MICROPIST • RESEARCHER
COLLABORATOR • *EXPLORER*

h-index 17
1652 Citations

Research Interest
739.8

621 BRUMMEL ST. APT 7
EVANSTON, IL 60202

872.806.4655

ewgroth@gmail.com

SEARCH: *"Eric W. Roth Linkedin"*

PERSONAL STATEMENT

I'm a dedicated electron microscopist, sample preparation expert, and imaging artist with 15+ years of experience working in academic research. I sincerely enjoy what I do and see every aspect of microscopy as an art form. My life goal is to improve the future for all humans by guiding and training future researchers and collaborating with others throughout the academic world. Do you need images for that one key figure to complete your paper? Did reviewer two ask to see cryoEM? Are you chasing a grant without any spare time to stumble through learning a difficult new technique before the submission deadline? I've got the steady hands and experience you need to keep your research from suffering delays or getting scooped.

I believe in the importance of learning from mistakes, mindful mastery of technique, and building my list of skills rather than accomplishments. I approach every aspect of microscopy with careful planning, confidence, and diligent attention to detail. On the nano-scale, small mistakes cascade into failed experiments. So, my motto is, "take your time, do it once, and do it right!"

My experience crosses disciplines from biology to materials research and I'm not afraid to handle sensitive and challenging samples. My career in microscopy began at NYU where I applied classic electron microscopy sample preparation and imaging techniques to nearly every cell line, organ of a mouse, drosophila anatomy, c. elegans, etc. research models. Today, at Northwestern, I'm applying that experience to biological and material interfaces, hybrid material models, nanoparticles, MOF's, drug discovery, and more, using high-end analytical techniques like cryoTEM, HAADF STEM, and X-Ray microanalysis.

In the world of microscopes, if it uses high voltage in a high vacuum environment, I can play it like a fiddle. In addition to microscope operation, I have experience performing basic maintenance and troubleshooting issues such as alignment or vacuum problems. Sometimes, that means laying on my back and getting covered in oil while reaching into the guts of a microscope, and I love it all!

EXPERIENCE

2011 - PRESENT
Core Scientist / Microscopy Specialist
NORTHWESTERN UNIVERSITY Evanston, IL
Northwestern University Atomic & Nanoscale Characterization Experimental Center (NUANCE), BioCryo Facility
Advanced sample preparation and electron imaging and microanalysis of biological and materials samples, EM facility manager

2012 - PRESENT
Affiliated Scientist/Collaborator
NORTHWESTERN UNIVERSITY Evanston, IL
McCormick School of Engineering
Material Science and Engineering - VPD Group (Vinayak Dravid, Ph. D.)
Collaboration, training, and mentorship for grad-students and post-docs

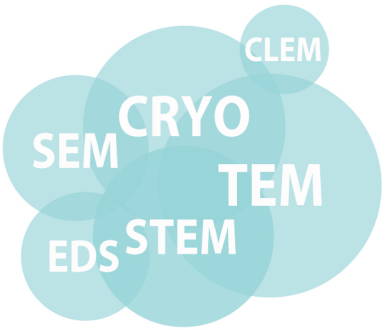
2007 - 2011
Electron Microscopy Technician
NEW YORK UNIVERSITY New York, NY
New York Univeristy School of Medicine
Skirball Institute of Biomolecular Medicine
Office of Collaborative Sciences - Microscopy Core
Tissue and cell sample preparation and electron imaging

EDUCATION

2005 - 2007
MADISON COLLEGE Madison, WI
Associate of Applied Science - Electron Microscopy
High Honors

SKILLS

- MICROSCOPY -



- SAMPLE PREPARATION -

- SPECIMENS -

- SOFTWARE -

ERIC W. ROTH

PUBLISHED WORKS *(2023 - 2020)*

Lin, Y., X. Gao, J. Yue, Y. Fang, J. Shi, L. Meng, C. Clayton, X.-X. Zhang, F. Shi, J. Deng, S. Chen, Y. Jiang, F. Marin, J. Hu, H.-M. Tsai, Q. Tu, E. W. Roth, R. Bleher, X. Chen, P. Griffin, Z. Cai, A. Prominski, T. W. Odom and B. Tian (2023). "A soil-inspired dynamically responsive chemical system for microbial modulation." **Nature Chemistry** 15(1): 119-128.

Khan, S., M. Shoaib, N. Molaei, O. B. Wani, Z. Chen, T. V. Vuong, E. W. Roth, L. K. Fiddes, I. Kuzmenko, E. R. Master and E. R. Bobicki (2023). "Cellulose Nanocrystals' Role in Critical Mineral Beneficiation: Dual Aggregate-Dispersant Behavior Supports Environmentally Benign Nickel Processing." **ACS Sustainable Chemistry & Engineering** 11(4): 1294-1304.

Vu, T. Q., J. A. Peruzzi, L. E. Sant'Anna, E. W. Roth and N. P. Kamat (2022). "Lipid Phase Separation in Vesicles Enhances TRAIL-Mediated Cytotoxicity." **Nano Letters** 22(7): 2627-2634.

Shofolawe-Bakare, O. T., J. U. de Mel, S. K. Mishra, M. Hossain, C. M. Hamadani, M. C. Pride, G. S. Dasanayake, W. Monroe, E. W. Roth, E. E. L. Tanner, R. J. Doerksen, A. E. Smith and T. A. Werfel (2022). "ROS-Responsive Glycopolymeric Nanoparticles for Enhanced Drug Delivery to Macrophages." **Macromolecular Bioscience** 22(12): 2200281.

Mills, C. E., C. Waltmann, A. G. Archer, N. W. Kennedy, C. H. Abrahamson, A. D. Jackson, E. W. Roth, S. Shirman, M. C. Jewett, N. M. Mangan, M. Olvera de la Cruz and D. Tullman-Ercek (2022). "Vertex protein PduN tunes encapsulated pathway performance by dictating bacterial metabolosome morphology." **Nature Communications** 13(1): 3746.

McCourt, J. M., S. Kewalramani, C. Gao, E. W. Roth, S. J. Weigand, M. Olvera de la Cruz and M. J. Bedzyk (2022). "Electrostatic Control of Shape Selection and Nanoscale Structure in Chiral Molecular Assemblies." **ACS Central Science**.

Landy, K. M., K. J. Gibson, Z. J. Urbach, S. S. Park, E. W. Roth, S. Weigand and C. A. Mirkin (2022). "Programming "Atomic Substitution" in Alloy Colloidal Crystals Using DNA." **Nano Letters**.

De Mel, J., M. Hossain, O. Shofolawe-Bakare, S. A. Mohammad, E. Rasmussen, K. Milloy, M. Shields, E. W. Roth, K. Arora, R. Cueto, S.-C. Tang, J. T. Wilson, A. E. Smith and T. A. Werfel (2022). "Dual-Responsive Glycopolymers for Intracellular Codelivery of Antigen and Lipophilic Adjuvants." **Molecular Pharmaceutics** 19(12): 4705-4716.

Song, Q., X.-Q. Wang, T. R. Holmes, M. Bonkowski, E. W. Roth, A. Ponedal, C. Mirkin and A. S. Paller (2021). "Epidermal SR-A Complexes Are Lipid Raft Based and Promote Nucleic Acid Nanoparticle Uptake." **Journal of Investigative Dermatology** 141(6): 1428-1437. e1428.

Ribet, S. M., A. A. Murthy, E. W. Roth, R. dos Reis and V. P. Dravid (2021). "Making the most of your electrons: Challenges and opportunities in characterizing hybrid interfaces with STEM." **Materials Today** 50: 100-115.

Ribet, S., A. Murthy, E. Roth, X. Hu, R. dos Reis and V. Dravid (2021). "Emerging Opportunities in STEM to Characterize Soft-Hard Interfaces." **Microscopy and Microanalysis** 27(S1): 616-618.

Mills, C. E., C. Waltmann, A. G. Archer, N. W. Kennedy, C. H. Abrahamson, A. D. Jackson, E. W. Roth, S. Shirman, M. C. Jewett and N. M. Mangan (2021). "Vertex protein PduN tunes encapsulated pathway performance by dictating bacterial metabolosome morphology." **bioRxiv**.

Lee, H. C., J. L. Balough, E. W. Roth, S. Vaccari and F. E. Duncan (2021). "A decellularized oocyte-derived scaffold provides a "sperm safe" to preserve mammalian spermatozoa." **Andrology**.

Hershewe, J. M., K. F. Warfel, S. M. Iyer, J. A. Peruzzi, C. J. Sullivan, E. W. Roth, M. P. DeLisa, N. P. Kamat and M. C. Jewett (2021). "Improving cell-free glycoprotein synthesis by characterizing and enriching native membrane vesicles." **Nature Communications** 12(1): 1-12.

De Mel, J. U., S. Gupta, S. Harmon, L. Stingaciu, E. W. Roth, M. Siebenbuerger, M. Bleuel and G. J. Schneider (2021). "Acetaminophen Interactions with Phospholipid Vesicles Induced Changes in Morphology and Lipid Dynamics." **Langmuir** 37(31): 9560-9570.

Zhang, F., X. Hu, E. W. Roth, Y. Kim and S. T. Nguyen (2020). "Template-Assisted, Seed-Mediated Synthesis of Hierarchically Mesoporous Core–Shell UiO-66: Enhancing Adsorption Capacity and Catalytic Activity through Iterative Growth." **Chemistry of Materials** 32(10): 4292-4302.

Wang, S., S. S. Park, C. T. Buru, H. Lin, P.-C. Chen, E. W. Roth, O. K. Farha and C. A. Mirkin (2020). "Colloidal crystal engineering with metal–organic framework nanoparticles and DNA." **Nature Communications** 11(1): 1-8.

Li, Y., A. Eshein, E. Roth, R. Bleher and V. Backman (2020). "Quantifying Three-Dimensional Chromatin Packing through Electron Tomography." **Biophysical Journal** 118(3): 334a.

Kim, J.-H., S. Koppolu, E. Akturk, E. Roth and M. A. Walters (2020). "Formation of a Lanthanoid Complex Shell on a Nanoparticulate Wax Core." **Inorganica Chimica Acta**: 119725.

Continued on page 3/3..

MINI GALLERY

ERIC W. **ROTH**

1 PROFESSIONAL DEVELOPMENT AND HONORS

Landmark Worldwide
- Landmark Forum 2023.05
- Advanced Course 2023.06
- Living Passionately 2023.06
- Leadership training Program 2023.08

Guest Lecturer
- Northwestern IBiS, Practical Training in Chemical Biology Methods and Experimental Design, 2021, 2022, 2023

Cover Images
- Andrology Vol 9, Issue 3, May 2021
- Nature Chemical Biology Vol 13, No 8, August 2017
- Integrative Biology, Vol 9, No 2, February 2017
- Cell Host and Microbe Vol 10 Issue 3, September 2011

Museum of Science and Industry
- Chicago, IL, Image on display, May 2018

Northwestern University Office for Research Outstanding Core Facility Award: 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019 (discontinued >2020)

Northwestern Kellogg School of Management, *Leadership and Management in Core Facilities* November 2017

Microbiology, 3e, by Slonczewski/Foster for WW Norton Publishers, Sept. 2013 Segmented Filamentous Bacteria colorized SEM image featured figure in textbook

Peer Reviwer, Microscopy and Microanalysis, Cambridge University Press, 2012-2013

Cell.com Cell Picture Show Immunology 2010 Featured Image

PUBLISHED WORKS CONT. *(2020 - 2017)*

Kennedy, N. W., J. M. Hershewe, T. M. Nichols, E. W. Roth, C. D. Wilke, C. E. Mills, M. C. Jewett and D. Tullman-Ercek (2020). "Apparent size and morphology of bacterial microcompartments varies with technique." PloS one 15(3): e0226395.

Hershewe, J. M., K. F. Warfel, S. M. Iyer, J. A. Peruzzi, C. J. Sullivan, E. W. Roth, M. P. DeLisa, N. P. Kamat and M. C. Jewett (2020). "Improving cell-free glycoprotein synthesis by characterizing and enriching native membrane vesicles." bioRxiv.

Zhang, X., S. Hao, G. Tan, X. Hu, E. W. Roth, M. G. Kanatzidis, C. Wolverton and V. P. Dravid (2019). "Ion Beam Induced Artifacts in Lead Based Chalcogenides." Microscopy and Microanalysis 25(S2): 2262-2263.

Wang, S., J. S. Du, N. J. Diercks, W. Zhou, E. W. Roth, V. P. Dravid and C. A. Mirkin (2019). "Colloidal Crystal "Alloys"." Journal of the American Chemical Society.

Moreau, L. M., M. R. Jones, E. W. Roth, J. Wu, S. Kewalramani, M. N. O'Brien, B.-R. Chen, C. A. Mirkin and M. J. Bedzyk (2019). "The role of trace Ag in the synthesis of Au nanorods." Nanoscale 11(24): 11744-11754.

Li, Y., E. Roth, V. Agrawal, A. Eshein, J. Fredrick, L. Almassalha, A. Shim, R. Bleher, V. P. Dravid and V. Backman (2019). "Quantifying three-dimensional chromatin organization utilizing scanning transmission electron microscopy: Chromstem." bioRxiv: 636209.

Thomas, S. A., K. E. Rodby, E. W. Roth, J. Wu and J.-F. o. Gaillard (2018). "Spectroscopic and microscopic evidence of biomediated Hgs species formation from Hg (II)-cysteine complexes: implications for Hg (II) bioavailability." Environmental science & technology 52(17): 10030-10039.

Mansukhani, N. D., L. M. Guiney, Z. Wei, E. W. Roth, K. W. Putz, E. Luijten and M. C. Hersam (2018). "Optothermally Reversible Carbon Nanotube-DNA Supramolecular Hybrid Hydrogels." Macromolecular rapid communications 39(2): 1700587.

Hujsak, K. A., E. W. Roth, W. Kellogg, Y. Li and V. P. Dravid (2018). "High speed/low dose analytical electron microscopy with dynamic sampling." Micron 108: 31-40.

Hujsak, K. A., E. Roth, W. Kellogg, L. F. Drummy and V. P. Dravid (2018). "High Speed/Low Dose Analytical Electron Microscopy with Machine Learning and Multi-Objective Dynamic Sampling." Microscopy and Microanalysis 24(S1): 1954-1955.

Cho, S., W. Park, H. Kim, J. R. Jokisaari, E. W. Roth, S. Lee, R. F. Klie, B. Lee and D.-H. Kim (2018). "Gallstone-Formation-Inspired Bimetallic Supra-nanostructures for Computed-Tomography-Image-Guided Radiation Therapy." ACS Applied Nano Materials 1(9): 4602-4611.

Que, E. L., F. E. Duncan, A. R. Bayer, S. J. Philips, E. W. Roth, R. Bleher, S. C. Gleber, S. Vogt, T. K. Woodruff and T. V. O'Halloran (2017). "Zinc sparks induce physiochemical changes in the egg zona pellucida that prevent polyspermy." Integrative Biology 9(2): 135-144.

Li, Y., I. C. Di Zhang, K. A. Hujsak, D. Damania, L. Cherkezyan, E. Roth, R. Bleher, J. S. Wu, H. Subramanian and V. P. Dravid (2017). "Measuring the Autocorrelation Function of Nanoscale Three-Dimensional Density Distribution in Individual Cells Using Scanning Transmission Electron Microscopy, Atomic Force Microscopy, and a New Deconvolution Algorithm." Microscopy and microanalysis: the official journal of Microscopy Society of America, Microbeam Analysis Society, Microscopical Society of Canada 23(3): 661.

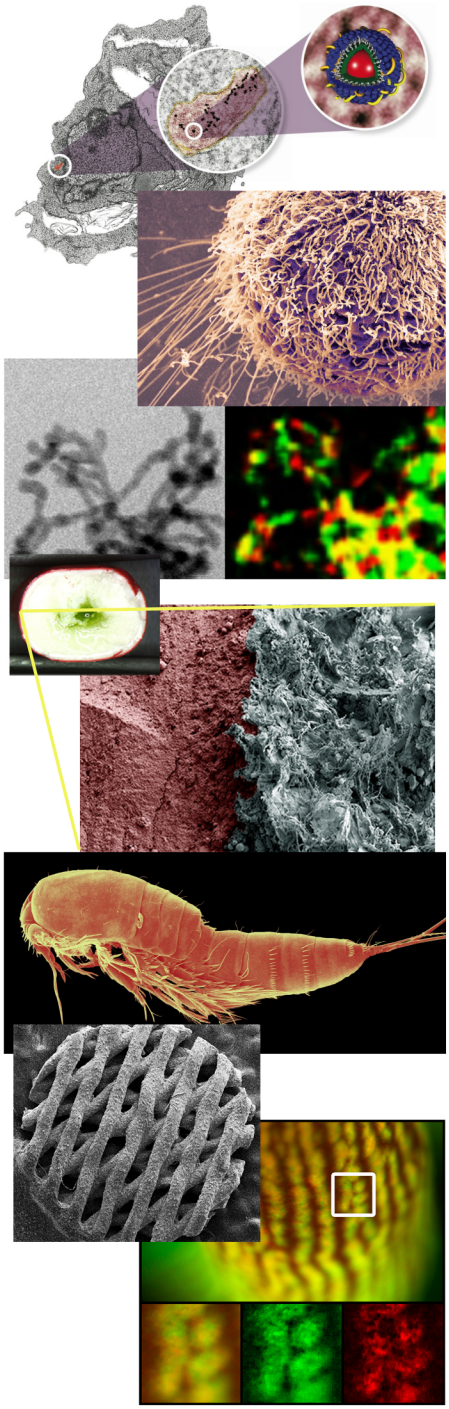
Li, Y., L. Cherkezyan, D. Zhang, L. Almassalha, E. Roth, J. Chandler, R. Bleher, H. Subramanian, V. P. Dravid and V. Backman (2017). Nanoscale chromatin structure characterization for optical applications: a transmission electron microscopy study (Conference Presentation). Biophysics, Biology and Biophotonics II: the Crossroads, International Society for Optics and Photonics.

Li, Y., L. M. Almassalha, J. E. Chandler, X. Zhou, Y. E. Stypula-Cyrus, K. A. Hujsak, E. W. Roth, R. Bleher, H. Subramanian and I. Szleifer (2017). "The effects of chemical fixation on the cellular nanostructure." Experimental cell research 358(2): 253-259.

Laronda, M. M., A. L. Rutz, S. Xiao, K. A. Whelan, F. E. Duncan, E. W. Roth, T. K. Woodruff and R. N. Shah (2017). "A bioprosthetic ovary created using 3D printed microporous scaffolds restores ovarian function in sterilized mice." Nature communications 8(1): 1-10.

Please, see my Google Scholar profile for more published work from 2016-2010..

MINI GALLERY



INSPIRATIONS

Plants · Design · Calligraphy

Aquaculture · Games · Space Exploration