EMMA Z. XU

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EDUCATION

Ph.D. Mechanical Engineering, Columbia University, expected: 05/2023
NSF Graduate Research Fellow
M.Phil Mechanical Engineering, Columbia University, 02/2022
M.S. Materials Science & Engineering, Columbia University, 02/2019
B.S. Physics, University of Texas at Dallas, 12/2015

RESEARCH EXPERIENCE

Graduate Research Assistant, Columbia University, New York, NY 01/2018-Present
- Invent innovative viral disinfection technology to combat Covid-19 pandemic with nanoscale engineering.
- Manage collaborative projects with scientists both within the US as well as internationally.

Research Affiliate, Lawrence Berkeley National Laboratory, Berkeley, CA 09/2021-Present
- Synthesis and design novel nanoparticles to revolutionize bioimaging, viral disinfection, and night vision.

Research Assistant, University of Texas, Dallas, TX 01/2014-12/2015
- Performed and improved the crystal growth of graphene and transition metal dichalcogenides.

Research Assistant, University of California, Berkeley, CA 06/2015-08/2015
- Designed and built a conoscope to achieve far field radiation pattern imaging of optical antennas.
- Characterized optical antennas with radiation pattern and scattering spectrum measurements.

Research Assistant, Georgia Institute of Technology, Atlanta, GA 05/2014-08/2014
- Discovered a new and improved recipe for photolithography mm-scale device on SiC substrate.
- Performed magneto infrared spectroscopy experiments at the National High Magnetic Field Laboratory.

TEACHING EXPERIENCE

Teaching Assistant, Columbia University 09/2020-06/2021
- Mentored 30+ students in the graduate-level class: Micro-electromechanical Systems.

Mentor, Columbia Engineering Outreach 07/2019-08/2019
- Supervised and guided 2 high school students to complete 2 hands-on research projects in the lab.

WORK EXPERIENCE

Co-founder & CEO, Avant Photonics, New York, NY 04/2021-Present
- Spun-out a nanotechnology startup from the lab upon wining an Ignition Grant.
- Conducted customer interviews, made financial projections and a business plan.

Process and Integration Engineer Intern, Western Digital, Fremont, CA 06/2018-08/2018
- Worked closely with a dozen engineers to integrated hundreds of fabrication processes to fabricate heads for heat-assisted magnetic recording.

R&D Engineer, Glint Photonics, Burlingame, CA 05/2016-03/2017
- Designed novel actuation systems with thermal, piezoelectric materials and shape memory alloys.
- Worked with the whole engineering team to build and integrate solar panel prototypes.

Intern, Lawrence Berkeley National Laboratory, Berkeley, CA 01/2016-04/2016
- Designed, assembled and operated a custom chemical reactor to convert sugars to plastics.
- Analyzed potential hazards of the system and developed standard operation procedures.

PUBLICATIONS

Emma Z. Xu, Changhwan Lee, Stefanie Pritzl, et al. (INVITED) Infrared-to-ultraviolet upconverting nanoparticles for COVID-19-related disinfection applications. Optical Materials: X, Volume 12, (2021).

Changhwan Lee, **Emma Z. Xu**, Yawei Liu, et al. Giant Nonlinear Optical Responses from Photon Avalanching Nanoparticles. *Nature* 589, 230–235 (2021).

Mingxin He, **Emma Z. Xu,** International Graduate Students Struggle Amid COVID-19. *Physics Today*, vol. 73, issue 11, (2020), pp: 10-10, Published by American Institute of Physics.

PATENTS

System And Method for Providing And/ Or Facilitating Giant Nonlinear Optical Responses from Photon Avalanching Nanoparticles. U.S. Patent Application No. 17/531,266.

Methods And Systems for Efficiently Disinfecting Mask(s) With Upconverting Nanoparticle(s) And Disinfected Mask(s). U.S. Patent Application No. 17/682,053.

PRESENTATIONS

Emma Z. Xu, Changhwan Lee, Stefanie Pritzl, et al. "Efficient N95 Mask Disinfection Method with Photon Upconversion Materials". *American Physical Society (APS) March Meeting.* 03/2021

Emma Z. Xu, Changhwan Lee, Emory Chan, et al. "Upconverting Nanoparticles for Super-resolution Imaging". *American Physical Society (APS) March Meeting.* 03/2020

Zeyan Xu, Brian Neltner, Deepak Dugar. "Optimization of Thermochemical Reactions for Eco-friendly Plastic Materials Production". Lawrence Berkeley National Laboratory Intern Poster Session. 04/2016

Zeyan Xu, Kevin Messer, Eli Yablonovitch. "Radiation Pattern and Scattering Properties of Optical Antennas". *American Physical Society (APS) March Meeting*. 03/2016

Zeyan Xu, Angelica Azcatl, Stephen McDonnell, et al. "Fabrication and Characterization of CVD Graphene". UTD Undergraduate Research Poster Contest. 04/2015

LEADERSHIP

User Executive Committee, Molecular Foundry, Lawrence Berkeley National Laboratory 2022-Present

VP Graduate Society of Women Engineers, at Columbia University 2020-2021

VP Materials Research Society, at UT 2015-2016

President Society of Physics Students, at UT 2014-2015
-For the first time, chapter was recognized as a "Distinguished SPS Chapter", the highest national honor.

VP Society of Physics Students, at UT 2013-2014

HONORS & AWARDS

National Science Foundation Graduate Research Fellowship (NSF GRFP) 2017-Present
Columbia Corning Advanced Materials Prize 2022
Columbia Entrepreneurship Ignition Grant 2021
Undergraduate Research Scholar Award 2014, 2015
Tau Sigma National Honor Society 2013-2015

INTERESTS

Language learning: native/bilingual: Mandarin, English; intermediate: Spanish; beginner: German, French
Road cycling: I have done rides that are 100+ miles in length and 8700+ ft in elevation gain
Reading: 25+ books a year