A'Lester C. Allen

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EDUCATION AND TRAINING

Ph.D. Candidate, Chemistry Department, University of California Santa Cruz, 2021
Dissertation Title: "Theory, synthesis, and application of plasmonic nanoparticles to the detection of protein and lipid biomarkers using surface-enhanced Raman scattering."

M.S., Materials Engineering Department, San Jose State University, 2016.
Thesis Title: Preliminary investigation of commercially available pluronics as UV curable 3D printing inks for tissue engineering applications

B.S., Chemistry Department, Stanford University, 2012.

RESEARCH INTERESTS AND PROFESSIONAL EXPERIENCE

Research interests include the detection of molecules using Raman spectroscopy and SERS, nanoparticle synthesis, characterization, and functionalization.
Zhang Lab, University of California Santa Cruz, Graduate Student Researcher. 2015-Present.
Designed several novel nanoparticles for SERS based disease detection and catalysis.
National Center for Electron Microscopy, Berkeley Labs, Instrument User. 2017-Present.
AMES Research Center, Mountain View, CA. Graduate Student Researcher. 2016-2021.
IBM Almaden Research Center, Research Intern. 2013-2015.
Functionalized biocompatible PEO and PPO triblock copolymers with acrylate end groups to form UV curable gels for 3D printed scaffolds for tissue engineering.
Louisiana State University, Undergraduate Researcher, Warner lab. Summer 2010
Explored the photothermal properties of an organic salt nanomaterial for use as hyperthermia therapeutic.
Stanford University, Undergraduate Researcher, Zare lab. Summer 2007
Investigated the non-ideal behavior of carbon dioxide gas via expansion

AWARDS AND FELLOWSHIPS

STARS Re-Entry Scholarship 2021
President's Dissertation Year Fellowship. 2020
New Generation Learning Fellow. 2019.
UC Chemical Symposium 1st Place in Poster Presentations. 2019.
MACES Center Grand Slam 2nd place. 2018.
University of California Santa Cruz Regents Fellowship. 2015.
SPE Foundation Louis Temesvary Memorial Scholarship. 2015.
California State University (CSU) Innovation Corps (I-Corps) Micro-Grant. 2014.
American Chemical Society Scholar. 2007.

PUBLICATIONS

1st – 3rd Author Publications

Allen, **A**., Getahun, A., et al. “Hollow Gold Nanostars and His-Tagged Antibodies: A Simple Solution for Detecting SARS-CoV-2," submitted.

Allen, **A**., Efrem, M., et al. “Hollow Gold Nanosphere Templated Synthesis of PEGylated Hollow Gold Nanostars and Use for SERS Detection of Amyloid Beta in Solution," submitted.

Allen, **A**., Amberchan, G., et al. “Real-time monitoring of organic reduction reactions using Raman spectroscopy,” A*CS Sustainable Chem. Eng.* 2021.

Liu, L., Xu, K., **Allen, A.** et al. “Enhancing the Photoluminescence and Stability of Methylammonium Lead Halide Perovskite Nanocrystals with Phenylalanine,” *The Journal of Physical Chemistry C*, 2021.

Xu, K., **Allen**, **A**., et al. "Tuning from quantum dots to magic sized clusters of CsPbBr3 using novel planar ligands based on trivalent nitrate coordination complex," *JPCL*, 2019.

Allen, **A**., Romero-Mangado, J., et al. "Detection of saturated fatty acids associated with a self-healing synthetic biological membrane using fiber-enhanced surface-enhanced Raman scattering," *The Journal of Physical Chemistry B*, 2018.

Adams, S., Bonabi S., **Allen**, **A**., Roseman G., Ramirez A. P., Millhauser G., & Zhang J. Z. "The effect of polymer and gold functionalization on the magnetic properties of magnetite nanoparticles," *Biomedical Spectroscopy and Imaging*, 2018.

Adams, S., Hauser, J., **Allen**, **A**., et al. "Magnetic and plasmonic properties of gold nanoparticle decorated magnetite particles functionalized with silica and poly (vinyl pyrrolidone,)" *ACS Applied Nano Materials*, 2018.

Luo, B., Naghadeh, S. B., **Allen**, **A**., Li, X., & Zhang, J. Z. "Peptide passivated lead halide perovskite nanocrystals based on synergistic effect between amino and carboxylic functional groups," *Advanced Functional Materials*, 2017.

Allen, A. "Preliminary investigation of commercially available pluronics as UV curable 3D printing inks for tissue engineering applications," Master's thesis, San Jose State University, CA, 2016.

Co-Authored Publications

Amberchan, G., 4 others, **Allen, A.,** et al. “Hydrogen Generation Made Easy: Waste Aluminum, any water source and a reusable liquid metal.” submitted

Xu, K., two others, **Allen, A.**, & et al. "First synthesis of Mn-doped cesium lead bromide perovskite magic sized clusters at room temperature." *J. Phys. Chem. Lett.* 2020.

Liu, L. two others, **Allen, A.,** et al., "Varying the Concentration of Organic Acid and Amine Ligands Allows Tuning between Quantum Dots and Magic-Sized Clusters of CH3NH3PbBr3 Perovskite," *ACS Appl. Nano. Mater.* 2020.

Mercado, R., five others, **Allen**, **A**., Zhang, J.Z., & Chen, S. "Nitrogen-doped porous carbon cages for electrocatalytic reduction of oxygen: Enhanced performance with iron and cobalt dual metal centers," *ChemCatChem*, 2020.

Bonabi, S. B., two others, **Allen**, **A,** et al. "Size and temperature dependence of photoluminescence of hybrid perovskite nanocrystals*," JCP*, (invited special issue on quantum dots,) 2019.

Li, C., two others, **Allen**, **A**., Pengfei, F. "Enhanced photocatalytic activity of directly assembled Fe_2O_3/Gd_2O_3@TiO_2-based nanosheets," *J. Nanosci. Nanotechnol.*, 19, 5, 2678-2687, 2019.

Li, C., three others, **Allen**, **A**., & et al. "Enhanced visible-light-driven photocatalytic hydrogen generation using NiCo2S_4/CdS nanocomposites," *Chem. Eng. J*, 378, 122089, 2019.

Wang, H., four others, **Allen**, **A**., & Zhang, J. Z. "Enhanced photoelectrochemical and photocatalytic activities of CdS nanowires by surface modification with MoS2 nanosheets," *Science China Materials*, 2018, 839-850.

Xu, K., three others, **Allen**, **A**., & Zhang, J. Z**,** "Synergistic surface passivation of $CH_3NH_3PbBr_3$ perovskite quantum dots with phosphonic acid and (3 aminopropyl) triethoxysilane," *Science China Materials*, (invited article), 2017.

PRESENTATIONS

Allen, A. Learning without community versus learning with community. New Gen Learning Graduate Student Researcher Flash Talk, May 2020

NASA AMES research intern poster session, 2017, 2018, 2019.

Allen, A., "Increased detection of saturated fatty acids associated with a self-healing synthetic biological membrane using fiber-enhanced SERS," UC Chemical Symposium, 2019.

Allen, A. "What can Raman spectroscopy do for you, SERS?" UCSC Department Conference, 2019.

Five guest lectures (Thermodynamics, Statistical Mechanics, General Chemistry), 2017-2018.

Thomson, S., Allen, A., et al., "Raman life detection instrument development for icy worlds," NASA AMES, 2017.

Allen, A., Moore, K., Bencini, K. Hollow-fiber filtration as a cancer screening tool. CSUPERB Annual Meeting, Santa Clara, CA. March 2014.

Allen, A. Biocompatible tricoblock polymers as UV curable 3D printing inks for tissue engineering applications. Society of Plastics Engineers (SPE), Pleasant Hill, CA, November 2013.

Undergraduate Summer Research Symposia at LSU, ABRCAMS, 2010.

TEACHING EXPERIENCE

Lecture

Organic Chemistry (Chem 8B), UC Santa Cruz, Spring 2021
General Chemistry (Chem 1B, 1C), UC Santa Cruz, 2017-2018.
Thermodynamics (Chem 163B), UC Santa Cruz, Winter 2018.
Statistical Mechanics (Chem 163C), UC Santa Cruz, Spring 2018.

Laboratory

General Chemistry Lab (1M), UC Santa Cruz, 2019-2020.
Organic Chemistry Lab (Chem 8L), UC Santa Cruz, 2015-2018.
Introduction to Materials Engineering (MatE 25), San Jose State University, 2014-2015.

Instructor of Record

Organic Chemistry (Chem 1M), UC Santa Cruz, 2021

SERVICE, MENTORSHIP AND OUTREACH

Organized Informational Panel on the NIH Funded IRACDA Program

Organized and moderated a 90 minute informational panel with program directors and postdoc fellows from five IRACDA affiliated academic institutions with 55registered faculty, postdoc, and graduate students from the U.S., Japan, and Ghana.

Justice Equity Diversity and Inclusion Committee

Served for one quarter the Chemistry and Biochemistry DEI committee which collaborates with faculty, staff, graduate students, undergraduate students to invite speakers, organize symposia, and instill equitable work and hiring practices within the department.

Mentorship with Underrepresented Groups in STEM

Mentored three undergraduates in the Zhang lab.

1. Awarded MARC scholarship and presented at the 2018 ABRCMS conference.
2. Awarded 2020 ACS Undergraduate Award in Physical Chemistry.
3. Awarded NSF REU scholarship summer 2020.

East O'Keefe Family Center, East Palo Alto, CA. 2012-2015, 2019.

Tutor, Science Demonstration Volunteer and Teen Mentor

Community Outreach

WEST transfer day graduate student poster presenter. 2019.
Judge for SPE undergraduate poster presentation. 2019.