

Research Statement

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I enjoy doing research on stars, broadly defined. Past affiliations include UC Santa Cruz, University of Chicago, School of the Art Institute of Chicago, Clemson University, and Los Alamos National Laboratory. I am currently at Arizona State University where I focus my (continuously funded) research activities on

- ★ Stellar Astrophysics.
Especially the Modules for Experiments for Stellar Astrophysics (MESA) project.
- ★ Explosions.
Emphasis on their progenitor evolution, nucleosynthesis, and multi-messenger signals.
- ★ Seismology. Especially of observed variable white dwarfs.
- ★ Chemical evolution.
Growth of every isotope, atom, and molecule at every point in spacetime.
- ★ Astrobiology.
Production and delivery of bioessential elements to habitable systems.
- ★ Gamma-ray astronomy.
Particularly energetic photons from the decay of radionuclides.
- ★ Neutrino astronomy.
Across all masses and metallicities, and especially from pre-supernova massive stars.
- ★ Thermodynamics, Opacities, and Nuclear Physics.
Stars are gravitationally confined nuclear reactors.
- ★ Software Infrastructure.
Community-driven software is an integral enabler of computation, experiment, theory, and a primary modality for advancing 21st Century astronomy.
- ★ Astronomy Journals.
Evolution of the most cited astronomy & astrophysics articles and journals.
- ★ Digital toolsets for online education at scale.
Effective communication that excites, cultivates curiosity, is active, is applicable, is community driven, doesn't discriminate, allows for failure, and sparks new questions.

For details on my current research projects, contact [me](#) and/or visit cococubed.com.

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