UNITED STATES COAST GUARD ACADEMY

Science Lecture Series

How & Why We Perform Stellar Autopsies

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When the vast majority of stars, including our very own Sun, reach the end of their lives, they will ultimately leave behind a dense and hot white dwarf star. The study of these stellar corpses can be likened to performing an autopsy. This presentation will explore the concept and application of "stellar autopsies"—the observational and physical study of white dwarf stars to reconstruct stellar evolution and galactic history. By examining spectral features such as Hydrogen Balmer lines, astrophysicists measure surface temperature (Teff) and surface gravity (log g) to derive white dwarf masses and radii, which are governed by electron degeneracy pressure. Analogous to human forensic autopsies, these analyses enable scientists to determine stellar cooling ages, identify progenitor star characteristics, and quantify mass loss in late evolutionary stages. Key insights include dating the Milky Way's galactic disk, applying statistical methods to accurately model white dwarf mass distributions, and how white dwarf binaries can even be sources of gravitational waves.

Thursday, December 3rd, 2026
2000 - 2100
Dimick Auditorium
U.S. Coast Guard Academy

Dr. Alexandros Gianninas is an Associate Teaching Professor of Astronomy at Connecticut College. He earned his B.Sc. in Honors Physics from McGill University and his M.Sc. and Ph.D. in Physics at the Université de Montréal. Dr. Gianninas's research specializes in stellar astrophysics, with a focus on white dwarf stars, extremely low-mass binary systems, and stellar atmospheres. A researcher and observer with over 100 nights of telescope experience, he has served as PI on programs using the Hubble Space Telescope and Spitzer Space Telescope. Prior to his appointment at Connecticut College, Dr. Gianninas completed a postdoctoral research fellowship at the University of Oklahoma and held teaching faculty roles at institutions including Amherst College and Trinity College. In addition to his research and classroom instruction, he serves as the Campus Director for the Connecticut Space Grant and frequently contributes to public science outreach.

If you have any questions regarding the event, please contact Dr. Kanani K. M. Lee (kanani.km.lee@uscga.edu) for more information.