Research Interests

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As a graduate student, my research primarily focused on the evolution of early-type galaxies. For the past three years I have been a postdoc on the GOALS (Great Observatories All-Sky LIRG Survey, http://goals.ipac.caltech.edu/index.html) team, studying a complete sample of luminous and ultraluminous infrared galaxies in the local universe using Spitzer, HST, Chandra, GALEX, and ground-based telescopes (PIs: Mazzarella for Spitzer IRAC and MIPS, Armus for Spitzer IRS, Evans for HST, Sanders for Chandra, and Mazzarella for GALEX). My interest is in the influence of AGN on the surrounding ISM, as well as a continuing interest in galaxy evolution. As a member of the GOALS team I have experience in constructing coherent research programs exploiting a suite of different instruments.

I am particularly interested in studying LIRGs with Seyfert nuclei. I have studied three of the closest such galaxies, NGC 1068, NGC 1275, and NGC 6926, with Spitzer (one paper submitted, one in preparation). Howell et al. (2007) showed that the AGN does not destroy the PAH molecules in the intersection of the starburst ring with the ionization cones in NGC 1068 as predicted by earlier observations and models. I have proposed IRS mapping of the entire starburst ring in order to comprehensively measure PAH strengths and the ionization state both within and outside of the ionization cones. The NGC 1275 (Perseus A) system includes a high velocity spiral galaxy falling into the center of the cluster along our line of sight. The high velocity system has been detected with IRAC (Howell et al., in preparation) and with SCUBA (Irwin et al., 2001), indicating the presence of PAHs and a cold ISM component despite the possible influence of shocks or the Perseus A AGN. IR spectra, whether from IRS Cycle 5 or a future facility such as SOFIA, will reveal what happens to a galaxy's ISM as it interacts with the intracluster gas at a relative velocity of 3000 km/s. NGC 6926 is an ideal galaxy in which to study spatial variations in the FIR-radio correlation within a LIRG.

I am also interested in the properties of LIRGs in comparison to lower luminosity galaxies of similar mass and morphology. Specifically, I am working on comparing disk galaxies (isolated or in distant pairs) in the GOALS sample to similar galaxies in the Spitzer Infrared Nearby Galaxy Survey (SINGS, http://sings.stsci.edu). Why did some galaxies achieve significantly higher IR luminosities than other similar galaxies, and what factors (AGN, bar, morphological type, pair separation, etc.) differ between the two samples?