RESEARCH SUMMARY
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Although significant progress has been made in understanding the star formation history of galaxies, there remain a number of unresolved issues. One of the key mysteries for extragalactic astronomy is the formation and evolution of low surface brightness (LSB) galaxies. LSB galaxies are typically defined as those galaxies with central surface brightness 1-2 magnitudes fainter than the 'normal' spiral galaxy population, or about $\mu_B(0) \geq 23$ mag arcsec^{-2}. Due to their intrinsic diffuseness, the optical characteristics of LSB galaxies are poorly known, leading to a large gap in our knowledge of their stellar population. When this is combined with the recent studies showing LSB galaxies to numerically dominate the local galaxy population, this gap becomes a severe deficiency in our understanding of galaxy formation and evolution as a whole.

What is known about LSB galaxies shows them to be possibly the most enigmatic objects in the sky. Beyond the distinction of surface brightness, LSB galaxies are a large and varied group. They span the entire range of galaxy sizes and luminosities, from dwarf to giant. They can be small or massive and are often dark matter dominated. Morphologically, LSB galaxies are typically (albeit not exclusively) late types, and have optical colors ranging from the very blue through the red.

Turning the observed properties of LSB systems into star formation histories is an extremely difficult task. It can be said with certainty that the majority of LSB galaxies are slowly evolving, with a low over star formation rate punctuated by localized bursts of stellar activity. Yet a large number of questions remain, such as – Does the low density environment of LSB galaxies inhibit the formation of high mass stars? What percentage of the QSO Lyman-α absorption lines are caused by LSB galaxies? Is there a smooth transition between H I clouds and LSB galaxies, or is there a density cut-off below which stars cannot form? Is there an inverse relation between galaxy density and dark matter content? – Answers to these and other questions will considerably aid our understanding of star formation and galaxy evolution and will help determine the density and structure of baryonic matter in the Universe.

To further our understanding of diffuse stellar systems, and answer some of the questions listed above, my research over the last few years has focused on determining the history and efficacy of star formation in LSB galaxies. A few of my more notable accomplishments with these observations include:

- Discovery of over 300 previously un-identified galaxies;
- The first multi-filter CCD survey for LSB galaxies;
- The first attempt at (space-based) near-UV imaging of LSB galaxies;
- Discovery and subsequent study of red LSB galaxies;
- The first detection of molecular gas in an LSB galaxy;
- Discovery of the most massive galaxies known;
- Discovery and study of LSB galaxies which do not adhere to the Tully-Fisher relation;
- The first determination of the local luminosity function to $\mu_B(0)$ =25mag arcsec^{-2};
- Discovery of the highest M_{HI}/L_B galaxies known;

Additionally, I have had the opportunity to take observations using a variety of methods and wavelengths, ranging from the UV through millimeter wavelengths, and including ground and space-based observations, direct imaging, optical and radio spectroscopy, and both single dish and synthesis radio/mm observations. Through these, and other, studies, I believe we have made significant progress towards understanding LSB galaxy formation and evolution. Yet in spite of our advances there is still much to be learned. As the next generation of telescopes and instruments come online rapid and exciting advances in the field of galaxy formation and evolution will occur, and I look forward to being a part of it.

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