Postdocs supervised by Dr. Shardha Jogee

The list of 3 postdocs supervised by Dr. Shardha Jogee, as well as a simplified non-technical description of the scientific work they conducted together, are provided below.

(1) Dr. Fabio Barazza (2004 to 2007) : Dr. Fabio Barazza, received his Ph.D. from the Institute of Astronomy at the University of Basel, Switzerland, where his thesis advisor was Professor Bruno Bingelli. From 2004 to 2007, Dr. Barazza was funded at UT under Dr Jogee's NASA and NSF grants, and supervised by Dr. Jogee. Below is a description of two selected papers, which he published in close collaboration with Dr. Jogee.

• *Barazza, F. D., Jogee, S., & the GEMS collaboration 2006, The Astrophysical Journal, 643, 162: Color, Structure, and Star Formation History of Dwarf Galaxies over the Last 3 Gyr with GEMS and SDSS* — In the currently favored hierarchical models of galaxy evolution, the first galaxies to form over ten billion years ago were low mass galaxies, called primordial dwarfs. These assembled over time to form massive present-day systems, such as our own galaxy, the Milky Way. By studying low mass dwarf galaxies at different epochs, we can provide stringent tests for hierarchical models of galaxy evolution. In this paper, we present a study of the colors, structural properties, and star formation histories of a large sample of $\sim$ 1600 dwarf galaxies, spanning 3 billion years of evolution. The data for this sample are drawn from two surveys: the public Sloan Digital Sky Survey and the large GEMS survey of distant galaxies, to which Dr Jogee has access, in her capacity as GEMS science team member. Our study affords important insights into the color and star formation histories of dwarf galaxies, with implications for the missing satellite problem.

• *Barazza, F. D., Jogee, S., & Marinova, I. 2008, The Astrophysical Journal, 675, 1194: Bars in Disk-dominated and Bulge-dominated Galaxies at $z \sim 0$: New Insights from $\sim$ 3600 SDSS Galaxies* — Stellar bars (non-axisymmetric components of spiral galaxies) are the most important *internal* factor for redistributing the angular momentum within spiral galaxies, and driving their dynamical evolution. In this paper, we characterize the optical properties of stellar bars in nearby spiral galaxies by analyzing the largest such sample of galaxies to date. The methodology and analysis package for this work had been previously developed by Dr. Jogee. Three main goals were achieved in this work. (1) Firstly, we established the optical frequency and properties of stellar bars in the nearby local Universe, thus setting a robust local present-day reference point against which results from surveys of distant young galaxies can be compared. This local reference point is timely as the field of galaxy evolution has been revolutionized over the last 5 years by the advent of large galaxy surveys enabled by the installment of the Advanced Camera for Surveys (ACS) aboard NASA's *Hubble Space Telescope* in 2003. Such surveys have allowed us to look back in time and directly probe the properties of statistically significant samples of young barred galaxies at early epochs, when the Universe was half of its present age. Such studies, including the work done by Jogee et al. (2004), have provided the early-epoch results against which the local results of Barazza et al. (2008) can be compared. (2) Secondly, we found that as many as 20% of spiral galaxies belong to a special class called 'bulgeless disk-dominated' galaxies. These systems present a challenge to the currently favored paradigm of galaxy evolution. (3) Thirdly, we found that the frequency of bars is significantly higher among such 'bulgeless disk-dominated' galaxies. This result has important implications for theoretical models of bar formation, such as the swing amplification model.

(2) Dr. Ingo Berentzen (2004 to 2007) : Dr. Ingo Berentzen, received his Ph.D. from the University of Göttingen, Germany, where his thesis advisers were Prof. Klaus J. Fricke (Göttingen)

and Dr. E. Athanassoula (Univ of Marseille). From 2004 to 2007, Dr. Berentzen was funded jointly by Dr. Jogee's NASA grant and grants of Prof. Shlosman. Below is a description of a selected paper he published, in close collaboration with Prof. Shlosman and Dr. Jogee.

• *Berentzen, I., Shlosman, I., & Jogee, S. 2006, The Astrophysical Journal, 637, 582: Stellar Bar Evolution in Cuspy and Flat-cored Triaxial CDM Halos* — One of the driving philosophy behind Dr Jogee's work is the establishment of close collaborations between observers and theorists, in order to advance the concurrent development of the theoretical framework. This paper is an example of such collaborative work. In the earlier study by Jogee et al. (2004), it was established from large galaxy surveys that spiral galaxies with strong bars are frequent over the last 8 billion years. Following up on these results, Berentzen, Shlosman, & Jogee (2006) conduct numerical simulations to explore the evolution of stellar bars in galactic disks with live, triaxial, flat-core, and cuspy cold dark matter (CDM) halos. One of the key findings of their study is that stellar bars can only survive in CDM halos whose triaxiality is significantly diluted. This dilution may be caused by the halo-bar interaction or by earlier events, such as baryonic collapse within CDM halos. When compared to our empirical results on the abundance of strong bars over the last eight billion years, these findings imply that CDM halos out to these early epochs have a very low triaxiality, with a lower limit of 0.9 for the potential equatorial ratio (b/a). These results agree with independent theoretical work reporting that early baryonic gas cooling strongly dilutes the triaxiality of CDM halos (e.g., Kazantzidis et al. 2004), in contrast to CDM halos in dissipationless cosmological simulations.

(3) Dr. Lei Hao (2007–Present): Dr. Lei Hao received her Ph.D. from the University of Princeton, where her thesis advisor was Professor Michael Strauss. Dr. Lei Hao joined UT Austin in 2007 and is funded by HETDEX grants. Dr Jogee is the main faculty supervisor on the science project below, and is the second author on the accompanying conference and journal papers.

• *Hao, L., Jogee, S., Barazza, F. D., Marinova, I., and Shen, J. 2008, The Astrophysical Journal, in preparation: Bars, Central Starbursts and AGN : A Quantitative Reexamination* — Galactic stellar bars are the primary drivers of secular evolution in galaxies. They efficiently drive gas into the central kiloparsec of galaxies, thus feeding circumnuclear starbursts, and possibly helping to fuel central black holes or active galactic nuclei (AGN). The connection between bars and AGN activity has been actively debated in the past two decades. Previous work focused on fairly small samples and report conflicting results on the correlation between bars and AGN activity. Here, we revisit the bar-AGN and bar-starburst connection using the analysis of bars in a large sample of 2000 SDSS disk galaxies (Barazza, Jogee, & Marinova 2008). The sample has an associated uniform SDSS spectroscopic dataset. Thus, we can obtain consistent spectroscopic classifications of galaxies, and measure the level of starburst and AGN activity using various spectroscopic features. We not only characterize the bar frequency at different nuclear activity types and levels, but also explore how the bar strength is affected by these activities. This study has important implications on the relationship between host galaxies and their central activity.