Nearby Galaxies Catalog

These proceedings offer professional astronomers an overview of the rapidly advancing subject of galaxy interactions at low and high redshifts. The symposium gave participants an exciting glimpse of a developing synthesis highlighting galactic encounters and their role in the history of the Universe.
Presents the Galaxy Catalog created by Zsolt Frei and James E. Gunn. Notes the catalog is a collection of digital images of 113 nearby

galaxies. Provides a guide to the catalog, details on the graphics file formats used, and descriptions of the observations and image processing steps. The information is provided online by the Princeton University Press.

A catalog of all published HI observations of external galaxies has been compiled. Its construction is briefly described. It contains almost 20,000 entries for over 10,000 galaxies based on more than 570 references. Here the reference catalog is presented. It contains the HI data basically just as they were originally

published. No numerical conversions were made and no error correction was attempted.
Contents Summary . . . . . \'
Introduction . . . . . 1\ I. The Compiled Data. . . . . 1\ 1. 1. References Included. . . . . 1\ 1. 2.

Star clusters form the basic building blocks of galaxies. They span a wide range of ages, from a few million years to billions of years, making them exceptional tracers of the star formation histories of their host galaxies. Star formation is the process by which galaxies build up their stellar populations and their visible mass and occurs in a continuous, hierarchical "social" fashion across a large dynamical range, from individual stars up to kiloparsec-scale ensembles of stellar aggregates. It is the formation,

evolution, and eventual destruction of these large hierarchical star-forming complexes that provide an essential role in understanding the physical mechanism and dynamical evolution of star formation on sub-galactic scales. First, using star clusters from local galaxies as part of the LEGUS (Legacy Extragalactic UV Survey) sample, we find that star formation is coherent over scales of a few hundred parsec up to a few kpc depending on the galaxy. In all cases, these hierarchies are short lived and unbound, dissolving in

a few tens to a hundred Myr. The recovered correlations between the spatial separations and ages of star clusters contained within these structures are consistent with theoretical expectations of arising from a turbulence-driven ISM. We also find evidence that the maximum size of correlated star formation is driven by galactic shear. Second, we combine our star cluster catalogs with exquisite molecular gas observations to connect the detailed stellar population information to the natal gas from which it

formed. We find that the timescale for star clusters to lose association with their natal clouds is of order a few Myr, with their ages rising rapidly as they become spatially separated from their molecular clouds. Third, we introduce initial work that employs the use of machine learning as a process to identify star clusters, a quicker and more homogeneous method than traditional visual classification techniques employed for most stellar cluster catalogs. The work contained in this dissertation represents

the first large-scale study of its kind outside of the Local Group to characterize turbulence as the physical driver of correlated star formation and the association timescale of star clusters with their molecular reservoirs, marking a turning point in the effort to link local star forming structures to those that are common at high redshift.

Current Lambda Cold-Dark-Matter cosmology predicts the growth of large scale structure from small, initial perturbations in the dark matter potential

distribution. Gas in the Universe follows this dark matter potential, collapsing along a series of filaments and knots, and eventually forming galaxies. The present-day Universe is left with a rich kaleidoscope of galaxies of different types, colors, and sizes. Observations suggest, however, that the gas from which these galaxies are built continues to play a pivotal role in their evolution. Numerous studies have already found strong evidence for the spatial correlation of neutral hydrogen (\HI; $\rm Ly\alpha$

absorption being our tracer of choice here) in the intergalactic medium (IGM) and galaxies. This thesis examines how intergalactic \HI~interacts with, is influenced by, and depends on the nearby galaxies lying within it. This study is made possible by correlating the positions of archival Cosmic Origins Spectrograph (COS; Hubble Space Telescope) sightlines toward background quasi-stellar objects (QSOs) with the distributions of known galaxies within the nearby, $cz \leq 10,000$ \kms~Universe. To enable this, I

compile a catalog of all known galaxies in this redshift range, and homogenized measurements of their diameters, axis ratios, position angles, and magnitudes. This effort ensures that I can compare galaxy measurements from different sources with confidence. I introduce a novel likelihood method to automate the process of matching galaxies from this catalog with nearby absorption and also to quantify the relative isolation of these absorbers versus their proximity to galaxies. To test this method, I built a

pilot sample with 33 QSO sightines chosen for their proximity to large ($D \ge 25$ kpc) galaxies. In each I identify all $\rm Ly\alpha$ lines within $cz \leq 10,000$ \kms~and match each line with the highest-likelihood galaxy. I discover a preference for $\rm Ly\alpha$ to be detected near high inclination galaxies at a 3.6σ significance level. I attribute this to the combination of a $

In order to outline possible future directions in galaxy research, this book wants to be a short stopover, a moment of

self-reflection of the past century of achievements in this area. Since the pioneering years of galaxy research in the early 20th century, the research on galaxies has seen a relentless advance directly connected to the parallel exponential growth of new technologies. Through a series of interviews with distinguished astronomers the editors provide a snapshot of the achievements obtained in understanding galaxies. While many initial questions about their nature have been addressed, many are still open

and require new efforts to achieve a solution. The discussions may reveal paradigms worthwhile revisiting. With the help of some of those scientists who have contributed to it, the editors sketch the history of this scientific journey and ask them for inspirations for future directions of galaxy research.

Nearby Galaxies in the LOFAR Two-metre Sky Survey

Galaxy Interactions at Low and High Redshift

The Rate of Supernovae in the Local

Universe
NSSDC Data Listing
Galaxies and the Cosmic Frontier
Investigating the Central Environments of the Nearby Galaxies with Adaptive Optics and the Hubble Space Telescope

The morphological scheme devised by Hubble and followers to classify galaxies has proven over many decades to be quite effective in directing our quest for the fundamental pa rameters describing the extragalactic manifold. This statement is however far more true for spirals than for ellipticals.

Echoing the concluding remarks in Scott Tremaine's sum mary talk at the Princeton meeting on Structure and Dynamics of Elliptical Galaxies, "the Hubble classification of spirals is useful because many properties of spirals (gas con tent, spiral arm morphology, bulge prominence, etc.) all correlate with Hubble time. By contrast, almost nothing correlates with the elliptical Hubble sequence El to E7. " During the last few years much effort has been put into the search for a more meaningful classification of ellipticals than Hubble's. Concomitantly, forwarded by some

provocative conjectures by R. Michard, the classical question of whether E galaxies form a physically homogeneous family has been brushed up once more. Results of these and other parallel studies look rather promising and point to suture part of the dichotomy between ellipticals and disk galaxies which had become popular in the early eighties, owing to dynamical arguments. At the same time it appears more and more clear that, besides the usual genetic varieties of galaxies, products of environmental evolution must also be contemplated in building our modern picture of

the "reign of galaxies" . The above considerations prompted us to solicit Prof.

Relativity theory is based on a postulate of locality, which means that the past history of the observer is not directly taken into account. This book argues that the past history should be taken into account. In this way, nonlocality---in the sense of history dependence---is introduced into relativity theory. The deep connection between inertia and gravitation suggests that gravity could be nonlocal, and in nonlocal gravity the fading gravitational memory of past events must then be

taken into account. Along this line of thought, a classical nonlocal generalization of Einstein's theory of gravitation has recently been developed. A significant consequence of this theory is that the nonlocal aspect of gravity appears to simulate dark matter. According to nonlocal gravity theory, what astronomers attribute to dark matter should instead be due to the nonlocality of gravitation. Nonlocality dominates on the scale of galaxies and beyond. Memory fades with time; therefore, the nonlocal aspect of gravity becomes weaker as the universe expands. The implications of nonlocal

gravity are explored in this book for gravitational lensing, gravitational radiation, the gravitational physics of the Solar System and the internal dynamics of nearby galaxies, as well as clusters of galaxies. This approach is extended to nonlocal Newtonian cosmology, where the attraction of gravity fades with the expansion of the universe. Thus far, scientists have only compared some of the consequences of nonlocal gravity with astronomical observations.

In the hierarchical view of star formation, the densest regions of the interstellar medium (ISM)

undergo gravitational collapse to form stars. Typically, many stars are formed in tandem to produce a star cluster. In turn, these star clusters are grouped together to form larger associations of clusters and these form together to shape the large-scale galactic structures like spiral arms. Charting the connection between the star formation at small-scales and the large-scale galactic properties is crucial for understanding the evolution of galaxies. We begin this dissertation in Chapter 1 with an introduction to the current understanding of star formation, the cold gas of

the ISM, and how the two are related. We also outline the big-picture questions we seek to answer in this dissertation and the tools needed in these studies. In Chapter 2, we discuss the first step in a joint analysis of Hubble Space Telescope (HST) observations and Atacama Large Millimeter/submillimeter Array (ALMA) dust continuum maps. This study aims to correlate the emission from young star clusters with the properties of the observed dust. Chapter 3 sets up the spectral energy distribution modeling effort for the Physics at High Angular Resolutions in Nearby

GalaxieS-HST (PHANGS-HST) star cluster data pipeline. This chapter goes into great detail on testing, validating, and characterizing how well we can model the star clusters. This modeling provides estimates of the physical properties of the star clusters which are critical for the analysis presented in Chapter 4. In this study, we utilize the PHANGS-HST star cluster catalogs in 11 nearby galaxies combined with the PHANGS--ALMA giant molecular cloud (GMC) catalogs in order to spatially correlate the star clusters with their natal gas clouds. With this

correlation, we constrain the timescale for dissipation of the GMCs after the onset of star formation.

Star Formation Conditions in Nearby Galaxies

Nearby galaxies

Groups of Galaxies in the Nearby Universe

Galaxy Catalog

An Atlas of High-resolution IRAS Maps of Nearby Galaxies

Outskirts of Galaxies

This catalogue is a companion to the Nearby Galaxies Atlas. The principal table in the

catalog provides information on the 2,367 galaxies that are mapped in the atlas. Awarded the American Astronomical Society (AAS) Rodger Doxsey Travel Prize, and with a foreword by thesis supervisor Professor Shardha Jogee at the University of Texas at Austin, this thesis discusses one of the primary outstanding problems in extragalactic astronomy: how galaxies form and evolve. Galaxies consist of two fundamental kinds of structure: rotationally supported disks and spheroidal/triaxial structures supported by random stellar motions. Understanding the balance between these galaxy components is

vital to comprehending the relative importance of the different mechanisms (galaxy collisions, gas accretion and internal secular processes) that assemble and shape galaxies. Using panchromatic imaging from some of the largest and deepest space-based galaxy surveys, an empirical census of galaxy structure is made for galaxies at different cosmic epochs and in environments spanning low to extremely high galaxy number densities. An important result of this work is that disk structures are far more prevalent in massive galaxies than previously thought. The associated challenges raised for

contemporary theoretical models of galaxy formation are discussed. The method of galaxy structural decomposition is treated thoroughly since it is relevant for future studies of galaxy structure using next-generation facilities, like the James Webb Space Telescope and the ground-based Giant Magellan Telescope with adaptive optics. This timely book presents an overview of the galaxies within the Local Volume, including the Local Group and our closest neighbours, the Andromeda Galaxy and the Magellanic Clouds. Presented here are the latest results from radio, infrared and optical surveys as

well as detailed multi-wavelength studies of individual galaxies. The book aims to provide a vibrant forum for presentations and discussions across a broad range of astrophysical topics.

Mapping the Galaxy and Nearby Galaxies

The catalogue

Dynamical Evolution of Galaxies

A catalog of 2810 nearby galaxies

Photometric and Structural Properties of Early-type Galaxies

A Catalog of 2810 Nearby Galaxies

This unique atlas is the first to present maps of the

structure that exists in the distribution in space of the nearby galaxies. The atlas has three groups of maps. The first group illustrates the distribution of 2,367 known galaxies on the plane of the sky. The second group is a representation of the three-dimensional characteristics of the same group of galaxies. The third suite of maps situates the nearby galaxies within the structure on a much larger cosmic scale.

From the reviews: "Astronomy and Astrophysics Abstracts has appeared in semi-annual volumes since 1969 and it has already become one of the

fundamental publications in the fields of astronomy, astrophysics and neighbouring sciences. It is the most important English-language abstracting journal in the mentioned branches. ...The abstracts are classified under more than a hundred subject categories, thus permitting a quick survey of the whole extended material. The AAA is a valuable and important publication for all students and scientists working in the fields of astronomy and related sciences. As such it represents a necessary ingredient of any astronomical library all over the world." Space Science Reviews#1 "Dividing the

whole field plus related subjects into 108 categories, each work is numbered and most are accompanied by brief abstracts. Fairly comprehensive cross-referencing links relevant papers to more than one category, and exhaustive author and subject indices are to be found at the back, making the catalogues easy to use. The series appears to be so complete in its coverage and always less than a year out of date that I shall certainly have to make a little more space on those shelves for future volumes." The Observatory Magazine#2

Studies on the populations of luminous stars in

nearby resolved galaxies have revealed a complex distribution in the luminosity–temperature plane (the HR diagram). The fundamentals of massive star evolution are mostly understood, but the roles of mass loss, episodic mass loss, rotation, and binarity are still in question. Moreover, the final stages of these stars of different masses and their possible relation to each other are not understood. The purpose of this volume is to provide a current review of the different populations of evolved massive stars. The emphasis is on massive stars in the Local Group, the Magellanic Clouds, and the nearby

spirals M31 and M33.

Astronomical Catalog Desk Reference

Probing the Environments of Star Formation Using Star Clusters in Nearby Galaxies

Literature 1988, Part 1

Novel Phytoplankton Blooms

Atlas of Nearby Galaxies

A General Catalog of HI Observations of Galaxies

In the local Universe, stars form within molecular clouds. Therefore, the properties of molecular clouds may determine the star formation rate. Conversely, star formation

also gives feedback to the clouds where the stars reside. In this dissertation, I present the interplay between the molecular gas and star formation, through three parts below. First, I identify and characterize the properties of molecular clouds in NGC4526, resulting in the first catalog of molecular clouds in an early-type galaxy. As a population, the molecular clouds in NGC4526 are gravitationally bound and have a steeper mass distribution than that in the Milky Way. These molecular clouds are also more luminous, denser, and have a higher velocity dispersion than their counterparts in the

Milky Way. These different properties may be due to a more intense interstellar radiation field than in the Galactic disk and a weaker external pressure than in the Galactic center. Second, I combine the mm-wave interferometric data from CARMA and the optical Integral Field Unit data from CALIFA to study the molecular depletion time on kilo-parsec scales of nearby galaxies. In particular, the molecular depletion time between the galactic centers and disks is compared. I find that some galactic centers have shorter depletion time than that in the disks, which means that those centers form

stars more efficiently per unit molecular gas mass. This places the galactic centers as an intermediate regime between galactic disks and starburst galaxies. The central drop of depletion time is also correlated with a central increase in the stellar mass surface density, suggesting that a shorter depletion time is associated with the molecular gas compression by the stellar gravitational potential. Third, the feedback from star formation to maintain turbulence in the interstellar matter of M33 is investigated. I show that supernovae have enough energy to maintain atomic gas turbulence inside 4 kpc

radius and within molecular clouds, assuming a constant value of turbulent dissipation time of 9.8 Myrs. In the outer parts, the energy from the differential rotation of galaxy is large enough to maintain atomic gas turbulence through the magneto-rotational instability (MRI). I conclude that the sum of supernovae and MRI energy maintains turbulence at all radii where atomic hydrogen is detected in M33.

This book consists of invited reviews written by world-renowned experts on the subject of the outskirts of galaxies, an upcoming field which has been understudied so far. These

regions are faint and hard to observe, yet hide a tremendous amount of information on the origin and early evolution of galaxies. They thus allow astronomers to address some of the most topical problems, such as gaseous and satellite accretion, radial migration, and merging. The book is published in conjunction with the celebration of the end of the four-year DAGAL project, an EU-funded initial training network, and with a major international conference on the topic held in March 2016 in Toledo. It thus reflects not only the views of the experts, but also the scientific discussions and progress achieved

during the project and the meeting. The reviews in the book describe the most modern observations of the outer regions of our own Galaxy, and of galaxies in the local and high-redshift Universe. They tackle disks, haloes, streams, and accretion as observed through deep imaging and spectroscopy, and guide the reader through the various formation and evolution scenarios for galaxies. The reviews focus on the major open questions in the field, and explore how they can be tackled in the future. This book provides a unique entry point into the field for graduate students and non-specialists, and serves as a

reference work for researchers in this exciting new field.

This book is an up-to-date review of the basic elements directly connected to the evolution of galaxies. Owing to recent advances in observational astronomy and astrophysics, data has recently become available about remote galaxies, which are consequently in the first stages of their evolution. It is therefore essential to link these data to the observation of very old populations in our own Galaxy, which are the remnants of the populations which existed in the first stages of galactic evolution. In

this meeting, the relationship between these two different points of view is emphasized in the texts presented by well-known specialists as well as by young researchers active in the field. The difficulties of the problem and the remaining uncertainties are discussed.

Molecular Gas and Star Formation in Nearby Galaxies

Causes and Impacts of Recurrent Brown Tides and Other Unusual Blooms

Resolving Black Hole and Star-Formation Activity in Nearby Galaxies

Nature Or Nurture?

From the Realm of the Nebulae to Populations

of Galaxies

Connecting the Distant Universe with the Local Fossil Record : Proceedings of a Colloquium Held at the Observatoire de Paris-Meudon from 21-25 September, 1998

For the past twelve billion years, galaxies have governed the Universe, bringing form to the firmament, light to the void. Each one a giant system of as many as hundreds of billions of stars, the galaxies are the building blocks of the cosmos, and through new data from modern telescopes—including the Hubble Space Telescope—we are discovering dizzying new facts about how they formed, how they evolve, and what they are made of. This book acquaints readers with these facts and findings--and with what they can tell us about the lives of galaxies over cosmic time, from their

emergence shortly after the Hot Big Bang to their ongoing gyrations and transmutations.

IAU Transactions are published as a volume corresponding to each General Assembly. Volume A is produced prior to the Assembly and contains Reports on Astronomy, prepared by each Commission President. The intention is to summarize the astronomical results that have affected the work of the Commission since the production of the previous Reports up to a time which is about one year prior to the General Assembly. Volume B is produced after the Assembly and contains accounts of Commission Meetings which were held, together with other material. The reports included in the present volume range from outline summaries to lengthy compilations and references.

This research monograph presents a new dynamical framework for

the study of secular morphological evolution of galaxies along the Hubble sequence. Classical approaches based on Boltzmann's kinetic equation, as well as on its moment-equation descendants the Euler and Navier-Stokes fluid equations, are inadequate for treating the maintenance and long-term evolution of systems containing self-organized structures such as galactic density-wave modes. A global and synthetic approach, incorporating correlated fluctuations of the constituent particles during a nonequilibrium phase transition, is adopted to supplement the continuum treatment. The cutting-edge research combining analytical, N-body simulational, and observational aspects, as well as the fundamental-physics connections it provides, make this work a valuable reference for researchers and graduate students in astronomy, astrophysics, cosmology, many-body physics, complexity theory, and other related

fields. Contents Dynamical Drivers of Galaxy Evolution N-Body Simulations of Galaxy Evolution Astrophysical Implications of the Dynamical Theory Putting It All Together Concluding Remarks Appendix: Relation to Kinetics and Fluid Mechanics

The Circumgalactic Medium of Nearby Galaxies

the effect of the virgocentric flow model on their observed velocities

The Reference Catalog

The Nearby Galaxies Supernova Search Project

Probing Galaxy Evolution by Unveiling the Structure of Massive Galaxies Across Cosmic Time and in Diverse Environments

Proceedings of the ESO Workshop held at Santiago de Chile, December 5 - 9, 2005

Black hole accretion and star formation exhibit different properties with observed spatial scale. To

fully understand them, we must consider the local environment's impact on measured global properties. My dissertation focuses on the spatially resolved excitation mechanisms that power observed emission, and the dust that obscures it. Low ionization nuclear emission regions (LINERs) are common in nearby galaxies, and are often explained by photoionization by low luminosity active galactic nuclei (AGNs). But this energy source is not sufficient to power the observed emission lines that define LINERs on 100 pc scales. Using the Hubble Space Telescope, I resolved the nuclear regions of three nearby LINERs on the 10 pc scale to track the dominant power source with distance from the

nucleus. The resulting physical model involved photoionization from the AGN within the central 20 pc, and shock excitation at larger distances. I conclude that integrated LINER-like emission can be explained by a combination of photoionization by the AGN and shocks on different spatial scales.The advancement and cessation of star formation within a galaxy is vital for understanding galaxy evolution. Furthermore, the rest-frame ultra violet (UV) and optical bands are crucial for disentangling the star formation history, metallicity and age of systems. To that end, I construct a data set of 150 galaxies with Swift Ultra Violet Optical Telescope (UVOT) UV photometry and Sloan Digital Sky Survey-IV Mapping

Nearby Galaxies at Apache Point Observatory (SDSS-IV/MaNGA) optical IFU spectroscopy. I present properties of the data set, and use it to quantify relations between the UV and H-alpha star formation rate proxies.Unfortunately, our understanding of star formation is highly dependent on dust attenuation, which itself depends on the spatial scales and properties on which it is observed. This is especially true in the UV band, where the attenuation laws from literature differ dramatically. Therefore, any attempts to understand star formation histories in using the Swift+MaNGA data catalog will be subject to this systematic. To address this, I studied the attenuation law of kiloparsec-sized star forming

regions using a subset of 29 galaxies. I compared the attenuation from the individual regions with that of the parent galaxy, and find the attenuation of the optical nebular emission is similar between the two physical scales, but that of the UV stellar continuum is not. I attribute this difference to sightline-dependencies of the stellar continuum attenuation and dilution of the UV light by older stars.Through spatially resolved studies of black hole accretion and star formation activity in nearby galaxies, my dissertation work provides context for the integrated properties of nearby galaxies, and provides context for future statistical surveys.

Readers with any kind of an interest in astronomy

will find this work fascinating, detailing as it does the proceedings of the symposium of the same name held in Japan in 2006. The symposium focused on mapping the interstellar media and other components in galactic disks, bulges, halos, and central regions of galaxies. Thanks to recent progress in observations using radio interferometers and optical/infrared telescopes in ground and space, our knowledge on structures of our Galaxy and nearby galaxies has been growing for the last decade.

For every galaxy in the field or in clusters, there are about three galaxies in groups. The Milky Way itself resides in a group. Groups in the local universe offer

the chance to study galaxies in environments characterized by strong interactions. In the cosmological context, groups trace large-scale structures better than clusters; the evolution of groups and clusters appears to be related. All these aspects of research are summarized in this book.
Morphological and Physical Classification of Galaxies
The Effect of the Virgocentric Flow Model of Their Observed Velocities
Structure and propertiess of nearby galaxies
Proceedings of the 186th Symposium of the International Astronomical Union , held at Kyoto, Japan, 26–30 August 1997
Galaxy Evolution: Connecting the Distant Universe

with the Local Fossil Record
The Clustering of Young Stellar Clusters in Nearby Galaxies