CURRICULUM VITAE ET STUDIORUM

First Name:	Maurilio
Family Name:	Pannella
Nationality:	Italian
Family Status:	Married (to Veronica Strazzullo) with one child
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Main Scientific interests

Deep multi-wavelength and radio continuum surveys — Galaxy stellar mass growth and morphological evolution — Star formation and dust attenuation properties of high redshift galaxies — The co-evolution of galaxies and massive black holes.

Education

Sept 2007 **Ph.D.** in Astronomy at the Ludwig Maximilian University of Munich, Thesis title:
The morphological evolution of field galaxies over the last 8 Gyrs
Advisors: Prof. R. Bender, Dr. R.P. Saglia

Oct 2000 **Master degree** in Physics at the University "Federico II" of Naples
Thesis title: *Lyman-α emitters as tracers of the primeval Universe large scale structure*
Advisors: Prof. M.Capaccioli, Dr. M.Arnaboldi.
Marks: 110/110 *cum laude*

Languages

Italian: native. English: very good. Spanish: fair

Fellowships and Grants

Oct 2007 - present Research Associate at the National Radio Astronomy Observatory Socorro, New Mexico

Sept 2005 - Sept 2007 Research Assistant at the Max-Planck Institute for Extraterrestrial Physics, Garching

Sept 2002 - Aug 2005 PhD fellowship of the International Max-Planck Research School (IMPRS) on Astrophysics

Jan 2001 - Aug 2002 Research Assistant at the Astronomical Observatory of Capodimonte, Naples, in the VST Science Group

Schools

Jun 2008 Eleventh Synthesis Imaging Workshop, Socorro, New Mexico (USA)

Sept 2004 International Summer School "Data Analysis in Cosmology", Valencia (Spain)

Sept 2002 - Mar 2004 *International Max-Plank Research School on Astrophysics*, Garching (Germany)

Sept 2002 Italian National School of Astrophysics: Cosmology and Relativistic Astrophysics, Asiago (Italy)

Sept 2000 Italian National School of Astronomical Technologies, Astronomical Observatory of Capodimonte, Naples (Italy)

Conferences and Talks

2010 *The STScI Friday Seminar Series*
January 22, 2010, Space Telescope Science Institute - *invited talk*

2009 *The Gaseous Evolution of Galaxies*
November 15/18, 2009, Ringberg Castle (Germany) - *invited talk*

Assembly, Gas Content and Star Formation History of Galaxies
The Fourth North American ALMA Science Center Conference
September 21/24, 2009, Charlottesville, VA (USA) - *contributed talk*

Harvesting the desert: the Universe between redshift 1 and 3
June/July 2009, Marseille (France) - *contributed talk*

Panoramic Radio Astronomy. Wide-field 1-2 GHz research on galaxy evolution,
June 2009, Groningen (the Netherlands) - *poster*

The 2009 NRAO Postdoctoral Symposium,
April/May 2009, Socorro, NM (USA) - *contributed talk*

2008 *The EVLA vision: galaxies through cosmic time*,
December 2008, Socorro, NM (USA) - *contributed talk*

Great Surveys of Astronomy Workshop,
November 2008, Santa Fe', NM (USA) -*poster*

The 24th Annual New Mexico Symposium,
October 2008, Socorro, NM (USA) - *contributed talk*

Probing Stellar Populations out to the Distant Universe ,
September 2008, Cefalu' (Italy) - *contributed talk*

The 2008 NRAO Postdoctoral Symposium,
April 2008, Charlottesville, VA (USA) -*contributed talk*

2006 *Galaxies and Structures through Cosmic Times*,
March 26-31, Venice, Italy;*poster*

MPE Dark Energy Meeting,
February 27 - March 1, Ringberg Castle, Germany;

2005 *From Simulations to Surveys*,
June 26 - July 1, Ringberg Castle, Germany; *contributed talk*

Stellar Populations, a Rosetta Stone for Galaxy Formation,
July 4-8, Ringberg Castle, Germany;

The Origin of the Hubble Sequence,
June 6-12, Vulcano Island, Italy; *contributed talk*

Other Professional Activities

Summer 2009 Supervisor, with V. Strazzullo, of the NRAO REU summer student
R. F. Cardoso from University of Wisconsin for the project:
Disentangling AGN emission and star formation activity
in deep radio continuum surveys.

from 2006 Peer Reviewer for the *Monthly Notices of the Royal Astronomical Society*
and the *Astrophysical Journal*

2005 Member of the Local Organizing Committee for the conference:
Stellar Populations, a Rosetta Stone for Galaxy Formation,
MPE Workshop dedicated to the 65th birthday of Alvio Renzini,
July 4-8, Ringberg Castle, Germany

1998 National Substitutive Service performed at the Social Services Office
of Carrara Town Hall, Italy

Refereed Publications

20 Fiolet, N., Omont, A., Polletta, M., Owen, F., Berta, S., Shupe, D., Siana, B., Lonsdale, C., Strazzullo, V., **Pannella, M.** et al.: *Multi-wavelength properties of Spitzer-selected starbursts at z≈2*, 2009, to appear on *A&A*, eprint arXiv:0910.3097.

19 **Pannella, M.**, Gabasch, A., Goranova, Y., Drory, N., Hopp, U., Noll, S., Saglia, R.P., Strazzullo, V., and Bender, R.: *The Evolution of Early- and Late-type Galaxies in the Cosmic Evolution Survey up to* $z \approx 1.2$, 2009, *Astrophys. J.* **701**, 787.

18 **Pannella, M.**, Carilli, C.L., Daddi, E., McCracken, H.J., Owen, F.N., Renzini, A., Strazzullo, V., Civano, F., Koekemoer, A.M., Schinnerer, E., and 10 co–authors: *Star Formation and Dust Obscuration at* $z \approx 2$*: Galaxies at the Dawn of Downsizing*, 2009, *Astrophys. J.* **698**, L116.

17 Silvotti, R., Catalán, S., Cignoni, M., Alcalá, J.M., Capaccioli, M., Grado, A., and **Pannella, M.**: *White dwarfs in the Capodimonte deep field*, 2009, *Astron. Astroph.* **497**, 109.

16 de Lorenzi, F., Gerhard, O., Saglia, R.P., Sambhus, N., Debattista, V.P., **Pannella, M.**, and Méndez, R.H.: *Dark matter content and internal dynamics of NGC 4697: NMAGIC particle models from slit data and planetary nebula velocities*, 2008, *Monthly Notices of the Royal Astronomical Society* **385**, 1729.

15 Gabasch, A., Goranova, Y., Hopp, U., Noll, S., and **Pannella, M.**: *A deep i-selected multiwaveband galaxy catalogue in the COSMOS field*, 2008, *Monthly Notices of the Royal Astronomical Society* **383**, 1319.

14 Noll, S., Pierini, D., **Pannella, M.**, and Savaglio, S.: *The Evolution of Galaxy Dust Properties for* $1 < z < 2.5$, 2007, *Astron. Astroph.* **472**, 455.

13 Nowak, N., Saglia, R.P., Thomas, J., Bender, R., **Pannella, M.**, Gebhardt, K., and Davies, R.I.: *The supermassive black hole in NGC4486a detected with SINFONI at the Very Large Telescope*, 2007, *Monthly Notices of the Royal Astronomical Society* **379**, 909.

12 Cignoni, M., Ripepi, V., Marconi, M., Alcalá, J.M., Capaccioli, M., **Pannella, M.**, and Silvotti, R.: *The Galactic halo stellar density distribution from photometric survey data: results of a pilot study*, 2007, *Astron. Astroph.* **463**, 975.

11 Halkola, A., Seitz, S., and **Pannella, M.**: *The Sizes of Galaxy Halos in Galaxy Cluster Abell 1689*, 2007, *Astrophys. J.* **656**, 739.

10 Halkola, A., Seitz, S., and **Pannella, M.**: *Parametric strong gravitational lensing analysis of Abell 1689*, 2006, *Monthly Notices of the Royal Astronomical Society* **372**, 1425.

9 **Pannella, M.**, Hopp, U., Saglia, R.P., Bender, R., Drory, N., Salvato, M., Gabasch, A., and Feulner, G.: *The Evolution of the Mass Function Split by Morphology up to Redshift 1 in the FORS Deep and the GOODS-S Fields*, 2006, *Astrophys. J.* **639**, L1.

8 Drory, N., Salvato, M., Gabasch, A., Bender, R., Hopp, U., Feulner, G., and **Pannella, M.**: *The Stellar Mass Function of Galaxies to* $z \simeq 5$ *in the FORS Deep and GOODS-South Fields*, 2005, *Astrophys. J.* **619**, L131.

7 Gabasch, A., Salvato, M., Saglia, R.P., Bender, R., Hopp, U., Seitz, S., Feulner, G., **Pannella, M.**, Drory, N., Schirmer, M., and Erben, T.: *The Star Formation Rate History in the FORS Deep and GOODS-South Fields*, 2004, *Astrophys. J.* **616**, L83.

6 Alcalá, J.M., **Pannella, M.**, Puddu, E., Radovich, M., Silvotti, R., Arnaboldi, M., Capaccioli, M., Covone, G., Dall'Ora, M., De Lucia, G., and 9 co–authors: *The Capodimonte Deep Field. Presentation of the survey and first follow-up studies*, 2004, *Astron. Astroph.* **428**, 339.

5 Napolitano, N.R., **Pannella, M.**, Arnaboldi, M., Gerhard, O., Aguerri, J.A.L., Freeman, K.C., Capaccioli, M., Ghigna, S., Governato, F., Quinn, T., and Stadel, J.: *Intracluster Stellar Population Properties from N-Body Cosmological Simulations. I. Constraints at z = 0*, 2003, *Astrophys. J.* **594**, 172.

4 Sazhin, M., Longo, G., Capaccioli, M., Alcalá, J.M., Silvotti, R., Covone, G., Khovanskaya, O., Pavlov, M., **Pannella, M.**, Radovich, M., and Testa, V.: *CSL-1: chance projection effect or serendipitous discovery of a gravitational lens induced by a cosmic string?*, 2003, *Monthly Notices of the Royal Astronomical Society* **343**, 353.

3 Masetti, N., Palazzi, E., Pian, E., Simoncelli, A., Hunt, L.K., Maiorano, E., Levan, A., Christensen, L., Rol, E., Savaglio, S., Falomo, R., Castro-Tirado, A.J., Hjorth, J., Delsanti, A., **Pannella, M.**, and 21 co-authors: *Optical and near-infrared observations of the GRB020405 afterglow*, 2003, *Astron. Astroph.* **404**, 465.

2 Arnaboldi, M., Freeman, K.C., Okamura, S., Yasuda, N., Gerhard, O., Napolitano, N.R., **Pannella, M.**, Ando, H., Doi, M., Furusawa, H., and 10 co–authors: *Narrowband Imaging in [O III] and Hα to Search for Intracluster Planetary Nebulae in the Virgo Cluster*, 2003, *Astronomical Journal* **125**, 514.

1 Okamura, S., Yasuda, N., Arnaboldi, M., Freeman, K.C., Ando, H., Doi, M., Furusawa, H., Gerhard, O., Hamabe, M., Kimura, M., Kajino, T., Komiyama, Y., Miyazaki, S., Nakata, F., Napolitano, N.R., Ouchi, M., **Pannella, M.**, Sekiguchi, M., Shimasaku, K., and Yagi, M.: *Candidates for Intracluster Planetary Nebulae in the Virgo Cluster Based on the Suprime-Cam Narrow-Band Imaging in [O III] and Hα*, 2002, *Publications of the Astronomical Society of Japan* **54**, 883.

Other Publications

6.c **Pannella, M.**, Carilli, C.L., Daddi, E., Mc Cracken, H.J., Owen, F., Renzini, A., Schinnerer, E., and Smolčić, V.: *Star formation and dust obscuration at $z\approx2$*, 2009, *American Institute of Physics Conference Series* **1111**, 203.

5.c Noll, S., Pierini, D., **Pannella, M.**, and Savaglio, S.: *The Evolution of Galaxy Dust Properties for $1 < z < 2.5$*, 2007, *Deepest Astronomical Surveys* **380**, 461.

4.c Cignoni, M., Ripepi, V., Marconi, M., Alcalá, J.M., Capaccioli, M., **Pannella, M.**, and Silvotti, R.: *Reconstructing the spatial distribution of the Galactic stellar halo*, 2007, *IAU Symposium* **241**, 237.

3.c Drory, N., Bender, R., Feulner, G., Gabasch, A., Hopp, U., Noll, S., **Pannella, M.**, Saglia, R.P., and Salvato, M.: *The Evolution of Galaxies in the FORS Deep and GOODS-S Fields*, 2006, *The Messenger* **125**, 15.

2.c Capaccioli, M., Alcalá, J.M., Radovich, M., Silvotti, R., **Pannella, M.**, and 11 co–authors: *The Capodimonte Deep Field: research projects*, 2003, *Memorie della Societa Astronomica Italiana* **74**, 452.

1.c Alcala, J.M., Radovich, M., Silvotti, R., **Pannella, M.**, and 13 co–authors: *Data reduction and astrometry strategies for wide-field images: an application to the Capodimonte Deep Field*, 2002, *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series* **4836**, 406.

Submitted Publications

2.s Strazzullo V., **Pannella M.**, Owen F.N., Drory N., Morrison G.: *The Deep Swire Field. V. Stellar mass evolution of faint radio galaxies*, 2009, to be submitted to ApJL

1.s Strazzullo V., **Pannella M.**, Owen F.N., Morrison G., Wang W.H., Bender R. : *The Deep Swire Field. IV. First properties of the sub-mJy galaxy population: redshift distribution, AGN activity and star formation*, 2009, submitted to ApJ

Successful Observational Proposals

2010	GN-2010A-Q-77	*The assembly of the brightest cluster galaxies: Abell 2125 as a test-case* (P.I.:G. Morrison, 22.4 hours at GEMINI/GMOS)
	CNTAC10A_048	*Constraining the epoch of the build-up of the red-sequence through IFU spectroscopy of AGN galaxies* (P.I.: A. Romeo, 3 nights at 6.5m Baade/IMACS)
	EVLA_AO255	*CO 1-0 in a proto-cluster at z=2.4* (P.I.: F. Owen, 40 hrs Ka band/spectroscopy)
	EVLA_AC975	*Testing models of galaxy formation during the epoch of galaxy assembly* (P.I.: C. Carilli, 160 hrs Q band/spectroscopy)
2009	GN-2009B-Q-96	*NIRI Hα Imaging of Cluster Members in XMMU J2235 at z~1.4* (P.I.:G. Morrison, 14.4 hours at GEMINI/NIRI)
2006	ESO-077.B-0790	*A deep survey of fossil groups* (P.I.: N.R. Napolitano, 3.5 nights at 2.2m ESO-MPG/WFI)
	TNG-AOT13-TAC_66	*A test for the CDM theory: the galaxy luminosity function of fossil groups from deep spectroscopy* (P.I.: E. D'Onghia, 2 nights at 3.5m TNG)
2005	ESO-076.A-0677	*A test for the CDM theory: the galaxy luminosity function of fossil groups from deep spectroscopy* (P.I.: D. Pierini, 3 nights at 3.5m NTT and 9 hrs at 2.2m ESO-MPG/WFI)
	TNG-AOT11-TAC_27	*A test for the CDM theory: the galaxy luminosity function of fossil groups from deep spectroscopy* (P.I.: E. D'Onghia, 3 nights at 3.5m TNG)
	ESO–075.A-0716	*A test for the CDM theory: the galaxy luminosity function of fossil groups from deep spectroscopy* (P.I.: D. Pierini, 21 hrs at VLT/VIMOS and 12.6 hrs at 2.2m ESO-MPG/WFI)
2003	ESO-072.B-0308	*Determining the harassment origin of intracluster stars in Virgo* (P.I.: M. Arnaboldi, 20 hrs at 2.2m ESO-MPG/WFI)
	ESO-71.B-0147	*Harassment and the distribution of baryonic mass in the Virgo cluster* (P.I.: M. Arnaboldi, 10 hrs at VLT/FLAMES)
2002	ESO-70.B-0086	*Harassment and the distribution of baryonic mass in the Virgo cluster* (P.I.: M. Arnaboldi, 48 hrs at 2.2m ESO-MPG/WFI)
	ESO-69.A-0661	*Characterization of Candidate Gravitational Lenses in the OACDF* (P.I.: G. Covone, 10 hrs at 3.6m ESO/EFOSC2)

Observational Experience

March 2005	La Palma Observatory	3.5m TNG, DOLORES: optical spectroscopy (MOS)
May 2002	ESO-La Silla	3.5m NTT, EMMI: optical spectroscopy (MOS)
April 2001	ESO-La Silla	2.2m ESO/MPG, WFI: wide field imaging
April 2001	ESO-La Silla	3.5m NTT, EMMI: optical spectroscopy (MOS)

Technical Experience

– General IT knowledge

Operating Systems:UNIX, LINUX, WINDOWS

Programming Languages: Fortran, SuperMongo, Shell Script, Python, IDL

Word/Graphical Processing: LaTeX, OpenOffice, Gimp, Xfig

– Astronomical data

Data reduction:	Good experience with imaging (optical/near infrared) and multi object spectroscopy data reduction tools (IRAF, MVM-Alambic, VIPGI, SIMPLE, SDFRED). Basic knowledge of radio data reduction tools (AIPS/CASA).
Multiwavelength datasets:	Extensive experience with the TERAPIX group softwares (SExtractor, Swarp, Scamp, Stuff, Skymaker) in assembling and testing multiwavelength catalog. Experience in handling and analyzing large dataset (Tbyte domain) from the COSMOS survey (OPTICAL/HST-ACS/NIR/SPITZER/RADIO).
Image stacking:	Development of fully automated and multiwavelength image stacking routines. The python procedures which I developed make use of both IRAF and two-dimensional fitting routines and apply to very different kind of data (radio interferometry – HST/ACS – SPITZER IRAC/MIPS) incorporating specific solutions (e.g. ”Dirty Beam” Cleaning – PRF/PSF fitting).
Photometric redshifts:	Extensive experience with the *photoz* code developed by R. Bender, but also with the most used public softwares (HyperZ, BPZ, Le Phare)
Morphological analysis:	Extensive experience with the most used public softwares both parametric and non-parametric (GIM2D, Galfit, Morpheus)
SED analysis:	Good experience with SED fitting procedure as a tool to to study galaxy stellar population properties. I have mostly used the code *sedfit* developed by N.Drory.

Hobbies

Photography, Trekking, Cinema, Literature, Music & Cooking

References

Dr. Frazer N. Owen
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Outline of recent research activity

Signals out of the noise: Properties of high redshift galaxies from radio stacking

How and when galaxies build up their stellar mass is still a major question in observational cosmology. While a general consensus has been reached in the last years on the evolution of the galaxy stellar mass function (e.g. [8,9,19] and references therein), the redshift evolution of the star formation rate (SFR) as a function of stellar mass still remains unclear. UV–derived SFRs suffer from a major unsolved issue: the amount of dust attenuation affecting the UV light in the inter-stellar medium [14]. Often the dust attenuation factor is the result of a highly degenerate fit to the multiwavelength photometry available or, when the photometric coverage is not sufficient, a median attenuation factor is usually applied to the whole galaxy sample.

An alternative estimate of the star formation, not biased by the galaxy's dust content, is provided by its radio continuum emission, due to processes dominated by young massive stars. By means of the radio-FIR correlation (e.g. Condon 1992, Kennicutt 1998, Yun et al. 2001) it is possible to estimate the total star formation rate in a galaxy from its radio luminosity. Thanks to their arcsecond resolution and relatively wide field of view, radio interferometric observations offer several advantages over present-day FIR facilities which are limited by their $\sim 10''$ resolution, small field of view and relatively poor sensitivity. For this very reason radio continuum observations turn out to be an excellent tool for tracing the dust-unobscured star formation in the high redshift Universe.

However at $z > 1$, even in the deepest present-day surveys (e.g. [1.s,2.s]), radio detections are likely to include a substantial population of AGNs, although extreme ULIRG/SMG–like starbursting galaxies do exist. Therefore the best way to explore, with existing radio facilities, the dust-unbiased SFRs of normal galaxy populations is to use a stacking analysis of the radio data, which allows the investigation of large samples of galaxies drawn from optical-NIR surveys, which are individually undetected in the radio. In this context the Cosmic Evolution Survey (COSMOS, Scoville et al. 2007), with its state-of-the-art multiwavelength coverage all the way from X-rays to radio of a 2 square degrees field, provides an ideal opportunity to build large high redshift galaxy samples with well characterized spectral properties.

I have taken advantage of the COSMOS database to select a large sample of $1 < z < 3$ star-forming galaxies, and derive dust-unbiased SFRs by stacking the 1.4 GHz radio data after removing the AGN contaminants [18]. I found that a single "universal" dust-attenuation correction cannot be applied to the whole sample under study. For instance, the generic factor of 5 often used to correct the UV light of Lyman-break galaxies (LBG) is appropriate only for objects with $M_{*} \sim 3{\times}10^{10}\ M_{\odot}$ –which incidentally is very close to the median stellar mass of LBG galaxies – but would grossly underestimate the correction for more massive galaxies and, likely, overestimate the one for lower mass galaxies. I also found that the SFR of these $z \sim 2$ star-forming galaxies increases almost linearly with the galaxy stellar mass, therefore their specific star formation rate (SSFR=SFR/M_{*}) is about the same at all masses: star forming galaxies at z$\approx$2 have a nearly exponential growth in mass with the same evolutionary timescales, τ, at all stellar masses. Clearly, individual galaxies would enormously overgrow in mass if these SFRs were maintained for long time. One may speculate (see Renzini 2009) that this does not happen because many galaxies turn passive, and do so in a *downsized* fashion, because massive galaxies are the first to reach unsustainable SFR levels and to hexaust the available gas reservoirs: these galaxies are just at their *dawn of downsizing*.

The faintest ever radio populations: galaxies, massive black holes and their coevolution

The nature of the μJy radio sources is still an unsolved topic. The naive expectation that all sources below a few hundreds μJy had radio emission mostly driven by star formation activity has been seriously reconsidered. The departure of radio source number counts from the power law slope of the bright radio sources is definitely due to the arising of a different population, but this latter is not, at least at the flux levels so far explored, a purely star forming population. In fact, a significant fraction of the sub-mJy radio sources have their emission dominated by Low Luminosity AGN. Also, the restframe optical color distribution of the whole faint radio population peaks on the ”green valley”, i.e. the relatively empty region in a magnitude vs. color diagram separating ”red sequence” passive galaxies from ”blue cloud” star forming systems. In the present understanding of galaxy evolution, the ”green valley” phase is thought to be a relatively fast transition stage when the star formation is truncated/switched off and galaxies move from the blue cloud to the red sequence. Especially in the last few years, a particular importance in this process has been given to the galaxy central massive black hole activity (the so–called AGN feedback). The fact that a relevant fraction of the faint radio sources are found in this particular, and potentially short, phase of galaxy evolution is thus particularly intriguing.

Over the last years, I worked in collaboration with V. Strazzullo and F. Owen on the deepest VLA 1.4 GHz continuum survey carried out to date, the SWIRE Deep Field (SDF) in the Lockman Hole (Owen & Morrison 2008). The unprecedented depth (rms $\approx 2.7\mu$Jy at the image center) of this survey allows us to see distant, faint radio populations which are unseen in other surveys. From a wide multi–wavelength dataset (11 passbands from GALEX NUV to IRAC 4.5μm) we assembled a multicolor catalog of sources in the field. Thanks to the arcsec resolution of the VLA image, we were able to match the vast majority (97%) of the radio sources with a optical/NIR counterpart. We then took advantage of the full multi–wavelength information and used the counterpart's observed SED to estimate accurate photometric redshifts for the radio sources, and to derive stellar masses and stellar population properties through comparison with Bruzual & Charlot (2003) spectral population synthesis models, as well as with a library of galaxy semi–empirical templates. Based on their rest–frame optical/NIR SED, we classified the radio sources in three sub–samples of quiescent (red sequence), starforming (blue cloud), and intermediate (green valley) galaxies. As main results of our investigation [1.s, 2.s], we have found that: 1) the relative contributions of low luminosity AGN and starforming galaxies to the μJy population depend on the flux limit of the sample; 2) the fraction of starforming objects reaches 50% only at the faintest flux levels (14μJy< $S_{1.4GHz}$ <24μJy); 3) at all flux levels a significant population of intermediate galaxies, with colors compatible with green–valley objects, is observed; 4) according to our analysis the radio emission in these intermediate objects is generally best explained by a relevant contribution from nuclear activity plus only a residual ongoing star formation.

During last summer, as part of an REU student program, we have started the analysis of the Chandra X-ray survey on the SDF. We adopted a stacking approach as most of the radio sources are too faint to be detected in the 70ksec X–ray image. We stacked X–ray counts for our subsamples of quiescent, starforming, and intermediate sources. We were able to obtain enough signal to derive hardness ratios and restframe luminosities for the samples at redshift $z \sim 0.5$. These point toward an AGN–dominated nature for both the red and green populations, while blue sources appear close to star formation–dominated systems. While this is still work in progress (Pannella et al. in preparation), the first results have nicely confirmed that deep radio continuum surveys are unique tools to spot samples of galaxies undergoing a very peculiar, but fundamental, phase of galaxy evolution, namely the moving from the blue star forming population to the passive red sequence. Follow up studies of this population will allow in the next future a better understanding of black hole feedback and its role on the host galaxy evolution.

Mass growth and morphological evolution of galaxies in different environments

Galaxy formation and evolution have been a very actively debated topic of observational cosmology in the last years. It is only in the very recent years that models have been able to fully reproduce the observed galaxy stellar mass function up to high redshifts, thus apparently reconciling the theoretical bottom-up assembly of dark matter halos to the claimed top-down *downsized* assembly of galaxies (e.g. Cimatti et al. 2006). Still many hidden details are missed or not completely understood. Questions like: How much merging happens? Is it wet, dry or moist? When and how the black hole feedback is impacting the galaxy life? are still far to be answered in detail by models and verified by observations.

An effective way to constrain models is to understand where the stars were located, i.e. in which kind of galaxies, at different look-back times. This allows us to directly probe when/how galaxies assembled their stars and how their morphology (i.e., at least with some approximation, their dynamical status) evolves. Since merging is driving both mass assembly and dynamical evolution in a hierarchical scenario, these studies offer a direct probe of its role in galaxy evolution.

Starting with my PhD research, I studied the evolution of stellar mass content for galaxies of different morphological types and in different environments, using multiwavelength surveys like GOODS-S, FORS DEEP FIELD and COSMOS, for which high resolution, deep HST-ACS imaging allows an accurate description of the galaxy morphology at least up to redshift 1 [9,19]. In agreement with some other recent studies on the same subject, we have confirmed an evolution of the morphological mix, with the relevance of disk–dominated galaxies in the total stellar mass budget increasing with redshift. Such redshift evolution is also coupled to strong environmental dependence, since the morphological mix is also a function of the local comoving density: at all redshifts we probed, we found evidence of a morphology-density relation. Finally, while the stellar mass function of disk-dominated galaxies is consistent with being constant up to z≈1.2, the stellar mass function of bulge-dominated systems shows a decline in normalization over the same redshift range by at least a factor of two. These observations point toward a scenario in which massive objects almost double their mass from redshift 1 to 0, at the same time evolving toward a bulge-dominated structure. Since the SFR of massive galaxies at $z \sim 1$ is not high enough to double their mass over 7 Gyrs, this study suggests that merging and accretion events must play a key role in the mass pouring from disks to bulges, increasing the stellar mass, moving the galaxy to a bulge-dominated structure, and quenching the star formation possibly after that a merging-triggered burst exhausts the available gas. According to our data, this process has happened first, or more quickly, in the highest density regions of the Universe.

The newly available WFC3 on board HST will allow to push morphological evolution studies up to redshift 2, by surveying the optical restframe light of galaxies, and hence to look into the initial stages of the build up of the Hubble fork.