Curriculum Vitae
Sébastien FOUCAUD

Personal Informations

First Name:	Sébastien
Family Name:	FOUCAUD
Date and Place of Birth:	December 31, 1975 - La Rochelle (France)
Nationality:	French
Present Position	Euro3D Research Training Network PostDoc Istituto di Astrofisica Spaziale e Fisica cosmica - Sezione di Milano (IASF-MI) - Italy
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Job

2003 - now: Istituto di Astrofisica Spaziale e Fisica cosmica - Milano **PostDoc**

Education

- 1993:	Lycée L. Vieljeux - La Rochelle	**Baccalauréat C** (mathematics, physics)
1993 - 1996:	Lycée C. Guérin - Poitiers	CPGE Mathématiques supérieures et spéciales
1996 - 1997:	Université P. Sabatier - Toulouse	**Licence de Physique**
1997 - 1998:	Université P. Sabatier - Toulouse	**Maîtrise de Physique** - Sciences de l'Univers *equ. to BSc Physical Sciences*
1998 - 1999:	Université C. Bernard - Lyon	**Diplôme d'Etudes Approfondies** **- Astrophysique et milieux dilués** *equ. to MSc in Astrophysics*
1999 - 2003:	Université de Provence - Marseille	**PhD in Astrophysics**

PhD Thesis: "Deep and multi-colour wide field photometry: evolution of galaxy clustering"
Supervisor: Dr. O. Le Fèvre, LAM
thesis defence: january 29, 2003

Thesis summary and prospects

The subject of my dissertation is the clustering evolution of galaxies. I am involved in two international collaborations: the Canada-France Deep Field survey (CFDF - `http://virmos.bo.astro.it/hjmcc/cfdf/`) and the VIRMOS-VLT Deep Survey (VVDS - `http://www.astrsp-mrs.fr/virmos`). Furthermore I have participated in the development of the TERAPIX data reduction pipeline at the Institut d'Astrophysique de Paris, which is processing CFH12k camera data and images coming from the new MEGACAM camera at the CFHT which will being operations in 2003. I have also collaborated with the CUDSS team (Webb et al., 2003, ApJ, 582, 6). As a consequence of these experiences, I am familiar with working in the environment of large international science consortia and collaborations.

The CFDF is a large photometric survey, which data have been available at the beginning of my PhD. From this survey, we were able to measure the angular correlation function to $I_{AB} \sim 25$ for 100,000 galaxies on 1 deg^2 (McCracken et al., 2001, A&A, 376, 756). Furthermore I have extracted a population of high-redshift galaxies (Lyman-break galaxies at $z \sim 3$) and I have studied their clustering properties. It has lead for the first time to the detection of a luminosity segregation of this population within a dataset (Foucaud S. et al., 2003, A&A, submitted).
In parallel, I have worked on the full data reduction of the F10-VVDS field, i.e. the creation of 4 deg^2 images in four bandpasses ($BVRI$) from raw data taken with the CFH12k camera at the Canada-France-Hawaii Telescope (CFHT). Combined with additional ultraviolet and near-infrared bandpasses, the VVDS imaging survey will constitute the photometric database for selecting objects that will be observed with the multi-object spectrograph VIMOS (VIsible

Multi-Object Spectrograph - already in place) using the European Southern Observatory's Very Large Telescope (8m-class telescope). Using this photometric catalog, in addition to the usual angular correlation measurement, I have extracted a population of higher redshift galaxies (Lyman-break galaxies at $z \sim 4$) and I have studied their clustering properties. I have also been associated to the measurement of cosmic shear using the VVDS data set (Van Wearbeke et al., 2001, A&A, 374, 757).

My research prospects include analysis of faint clustered galaxies at different epochs so to constraint the evolution of these structures. With VIMOS, the redshift measurements will enable direct studies of the spatial clustering for a large amount of objects ($\sim 150,000$), and the confirmation of high-redshift candidates. Moreover, we expect to identify several tens of clusters, or their proto-cluster precursors, in a redshift survey covering a few square degrees out to redshifts 3 or more. Furthermore, the integral Field Unit (IFU) of VIMOS will enable this research offering the capability to obtain 6400 spectra simultaneously of a contiguous area on the sky 54×54 arcsec^2, with a spatial sampling of 0.67 arcsec/fiber, or 27×27 arcsec^2 at 0.33 arcsec/fiber. Thanks to that IFU, precise studies of high-redshift clusters will be possible. Since cluster cores have typical scales on the order of 30 arcseconds at $z \sim 1$, integral field spectroscopy of the central region of a cluster can prove extremely efficient to identify the redshifts of large numbers of faint cluster galaxies. The potentiality of 3D spectroscopy is challenging for the knowledge of the far universe. I am also eager to continue to study the galaxy clustering using those instruments.

Research Interests

- Observational Cosmology
- Evolution of large scale structures
- Evolution and properties of galaxies
- Evolution and properties of clusters of galaxies

Languages

- **French:** mother tongue
- **English:** fluent

Observational Experience

- **April 2000:** run in optical imaging on Canada-France-Hawaii Telescope (CFH12k) - 5 nights
- **October 2000:** run in optical imaging on Canada-France-Hawaii Telescope (CFH12k) - 4 nights

Computational Experience

- Operating systems: UNIX/LINUX and Windows
- Programming languages: C (developpement of codes to measure correlation function, ...), PERL, Shellscripts, FORTRAN, HTML
- Astronomical software and data reduction: IRAF, DAOphot, SExtractor, SWarp
- Data analysis and report: SuperMongo, LaTeX, awk, emacs

Collaborations

- CFDF science team (data reduction/clustering groups)
- VVDS science team: member of the working groups on data reduction and clustering
- TERAPIX (tests on the data reduction pipeline)

Meetings

- *2nd Marseille International Conference* "Clustering at high redshift", 29 June - 2 July 1999, Marseille, France.
- *Goutelas Astronomical school 2001* "Large Surveys and Virtual observatories", 2 - 6 april 2001, Château de Goutelas, Marcoux, France.

- *3rd Marseille International Conference* “Where’s the matter? Tracing dark and bright matter with the new generation of large-scale surveys”, 25 - 29 June 2001, Marseille, France. (Poster contribution)
- *XXXVIIth Moriond Workshop* “The Cosmological Model”, 16 - 23 March 2002, Les Arcs, France. (Oral contribution)
- *VIth Luminy School on Cosmology* “Dark Matter/Energy in the Universe”, 16 - 21 September 2002, Marseille, France.

Seminars

- Laboratoire d’Astrophysique de Marseille, 11 December 2000, “Study of the clustering of Lyman-break galaxies in the CFDF survey”, Marseille, France.
- Journées Jeunes Chercheurs, 11 December 2001, “Photometric and spectroscopic surveys: study of the galaxy clustering”, La Hume (Arcachon), France.
- Colloque de l’Ecole doctorale Physique et Sciences de la Matière de Marseille, 23 April 2002, “Tracing matter with photometric and spectroscopic surveys”, Marseille, France.
- Laboratoire d’Astrophysique de Marseille, 11 October 2002, “Study of the clustering of Lyman-break galaxies in the CFDF and VVDS deep surveys”, Marseille, France.
- Institut d’Astrophysique de Paris, 18 October 2002, Paris, France.
- Observatoire Midi-Pyrénées, 14 November 2002, Toulouse, France.
- Istituto di Astrofisica Spaziale e Fisica cosmica - Sezione di Milano, 26 February 2003,“Clustering of high-redshift galaxies in the CFDF and VVDS deep surveys”, Milano, Italy.

Publications

Refereed Journals

- *“Cosmic shear statistics and cosmology”*
  L. Van Waerbeke, Y. Mellier, M. Radovich, E. Bertin, M. Dantel-Fort, H.J. McCracken, O. Le Fèvre, **S. Foucaud**, J.-C. Cuillandre, T. Erben, B. Jain, P. Schneider, F. Bernardeau and B. Fort, 2001, *A&A*, **374**, 757
- *“The Canada-France deep fields survey I: 100,000 galaxies, 1 deg*^{2}*: A precise measurement of* $\omega(\theta)$ *to* $I_{AB} \sim 25$*”*
  H.J. McCracken, O. Le Fèvre, M. Brodwin, **S. Foucaud**, S.J. Lilly, D. Crampton and Y. Mellier, 2001, *A&A*, **376**, 756
- *“The Canada-UK Deep Submillimeter Survey V: The Submillimeter Properties of Lyman-Break Galaxies”*
  T.M.A. Webb, S. Eales, **S. Foucaud**, S.J. Lilly, H.J. McCracken, K. Adelberger, C. Steidel, D.L. Clements, L. Dunne, O. Le Fèvre, M. Brodwin and W.K. Gear, 2003, *ApJ*, **582**, 6
- *“The Canada-France deep fields survey II: Lyman-break galaxies and galaxy clustering at* $z \sim 3$*”*
  S. Foucaud, H.J. McCracken, O. Le Fèvre, S. Arnouts, M. Brodwin, S.J. Lilly, D. Crampton and Y. Mellier, 2003, *A&A submitted*
- *“The CFH12k-VIRMOS deep imaging survey: optical data for the 0226-04 deep field”*
  H.J. McCracken, M. Radovich, E. Bertin, Y. Mellier, M. Dantel-Fort, O. Le Fèvre, J.-C. Cuillandre, S. Gwyn, **S. Foucaud** and G. Zamorani, 2003, *A&A submitted*

Proceedings

- *“VIRMOS Deep Survey: deep wide field multi-color imaging over* 16 *deg*^{2}*”*
  O. Le Fèvre, Y. Mellier, H.J. McCracken, M. Arnaboldi, E. Bertin, O. Boulade, J.-C. Cuillandre, M. Dantel-Fort, **S. Foucaud**, B. Garilli, A. Iovino, D. Maccagni, A. Mazure, R. Pellò, J.-P. Picat, M. Radovich, V. Ripepi, P. Saracco, L. Tresse and G. Vettolani, 2001, in R.G. Clowes, A.J. Adamson and G.E. Bromage (eds.) ”New Era of Wide-Field Astronomy”, *ASP conference series Vol. 232*, p. 449

- *"Clustering of Lyman-break galaxies in the CFDF"*
  S. Foucaud, H.J. McCracken, O. Le Fèvre, M. Brodwin, S. Arnouts, S.J. Lilly, D. Crampton and Y. Mellier, 2001, in L. Tresse and M. Treyer (eds.) "Where's the matter? Tracing dark and bright matter with the new generation of large-scale surveys", *Global Frontier Group eds.*

- *"Dusty Star Forming Galaxies at High-Redshift: The Canada-UK Deep Submillimeter Survey"*
  T. Webb, S. Eales, S.J. Lilly, D.L. Clements, L. Dunne, W. Gear, K. Adelberger, M. Brodwin, H. Flores, **S. Foucaud**, O. Le Fèvre, H.J. MacCracken, A. Shapley, C. Steidel, M. Yun., 2001, in *American Astronomical Society Meeting Vol. 199*, p. 160.

- *"Investigating the Evolution of Galaxy Clustering with the Canada–France Deep Fields Survey"*
  H.J. McCracken, O. Le Fèvre, M. Brodwin, S.J. Lilly, D. Crampton, **S. Foucaud**, 2001, in S. Cristiani, A. Renzini and R.E. Williams (eds.) "Deep Fields - ESO/ECF/STScI Workshop" *Springer*, p. 231.

- *"The Canada-France Deep Fields Photometric Redshift Survey"*
  M. Brodwin, S.J. Lilly, H.J. McCracken, **S. Foucaud**, O. Le Févre and D. Crampton, 2001, in *American Astronomical Society Meeting Vol. 201*, p. 105.

Training periods

- **May - August 1998:** Laboratoire d'éthologie et psychologie animale de Toulouse, France
  "Study of *Messor Sancta* ant corpses clustering"

- **April - July 1999:** Laboratoire d'Astrophysique de Marseille, France
  "Clustering of faint galaxies up to redshift $z \sim 3$" (DEA Trainee)

Grants

- **1998-1999:** French Ministery of Research grant for the Diplôme d'Etudes Approfondies

- **1999-2002:** French Ministery of Research grant for the PhD

Professional experience

- **July 1995:** Organizer of kid summer camp, Angoulins, France

- **July 1996:** Employee at the Caisse Primaire d'Assurance Maladie (French National Health Service), La Rochelle, France

- **July - August 1997:** Receptionist in a camping site, Ile de Ré, France