

## PERSONAL DATA

Date of birth: 25-03-1973  
Place of birth: Poggibonsi (Italy)  
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## CURRENT POSITION

*Staff astronomer*, working at INAF - Osservatorio Astrofisico di Arcetri, Florence (Italy)

## EDUCATION

<i>PhD in Astronomy</i>	University of Florence	2001 – 2004
<i>Laurea in Fisica (Physics degree)</i>	University of Florence	1993 – 2000
<i>Diploma di maturità scientifica</i>	Liceo Scientifico "A. Volta", Colle V.E., Italy	1987 – 1992

## POSITIONS

<i>ESO ALMA Postdoctoral Fellow</i>	ESO & IRAM	2009 – 2011
<i>Postdoctoral Assistant</i>	ISDC & Observatoire de Genève	2008 – 2009
<i>ARC-Postdoctoral Fellow</i>	INAF-Istituto di Radioastronomia	2007 – 2008
<i>Postdoctoral Researcher</i>	INAF-Istituto di Radioastronomia	2005 – 2007
<i>Short-term Collaborator</i>	INAF-Osservatorio Astrofisico di Arcetri	may 2004 – oct. 2004
<i>PhD student</i>	University of Florence	2001 – 2004

## AWARDS & FELLOWSHIPS

<i>ESO ALMA Fellowship (COFUND Marie Curie)</i>	ESO ALMA fellowships programme	2009 – 2012
<i>Borsa post-dottorato INAF</i>	INAF National fellowships programme	2005 – 2007

## SCIENTIFIC INTERESTS

My research is focused on the very early stages of the high-mass ( $M \geq 8M_{\odot}$ ) star and stellar cluster formation process. More precisely, two of the main purposes of my previous and current research are: (1) the study of the main properties of the so-called *High-Mass Protostellar Objects* (HMPOs), luminous infrared sources embedded inside massive molecular cores and still in the main accretion phase; (2) the *initial conditions in the massive star and stellar cluster formation process*.

## PARTICIPATION IN COMPETITIVE RESEARCH PROJECTS

(Financing entity)	(Project title)	(Duration)
<i>Fondation Ernest Boninchi</i>	La formation des étoiles en astronomie millimétrique	2009 – 2010
<i>Swiss National Science Foundation</i>	Disks around young stellar objects	2006 – 2010
<i>Istituto Nazionale di Astrofisica</i>	Interstellar masers: a critical probe for star formation	2006 – 2009
<i>Istituto Nazionale di Astrofisica</i>	Preparation for ALMA: dust, gas, and star formation in galactic and extra-galactic environments	2006 – 2008

## COMPUTING SKILLS

<i>Operating Systems</i>	Linux (very good), Unix (very good), Mac OS (very good), Microsoft Windows (very good)
<i>Programming</i>	Fortran 77 (good), HTML (basic)
<i>Text processing</i>	LaTeX (very good), Emacs (very good), Microsoft Word (very good)
<i>Graphics</i>	SuperMONGO (excellent)
<i>Packages and softwares</i>	GILDAS (excellent), AIPS (very good), JObserve (very good), CASA (good), Leopard-Spitzer (good), JCMT OT (good), Xspec (good), Newstar (good)

## OBSERVING EXPERIENCE

- I have been involved in the Science Operations Group (SOG) of the IRAM Plateau de Bure Interferometer. The members of the SOG perform the observations at the IRAM PdBI, and help the PIs of successful PdBI proposals to prepare the observations and calibrate the data;
- I have experience of spectral line observations with the Sub-millimeter Array (SMA) in Mauna Kea (Hawaii, USA);
- I performed spectral line observations with the Australia Telescope Compact Array (ATCA) in Narrabri (NSW, Australia);
- I took part of several observing runs at the IRAM-30m telescope in Pico Veleta (Granada, Spain), learning how to use the telescope to make spectral line observations with different techniques (wobler switching, position switching, on-the-fly mapping);
- I have experience of spectral line observations with the Effelsberg-100m telescope (Germany);
- I have been Scientist on duty for several weeks at the ISDC for the observations of the X-/ $\gamma$ -ray satellite INTEGRAL (Versoix, Switzerland);
- I have written proposals for observations with infrared, millimeter and radio instruments. Specifically, I am the P.I. on successful proposals for the (sub-)mm and cm interferometers PdBI, SMA, CARMA, VLA and ATCA, for the mm/cm single-dish telescopes APEX, IRAM-30m, NRO-45m, Effelsberg-100m and for the optical/IR telescope NOT. For the complete list, see the Appendix;

## DATA REDUCTION EXPERIENCE

- excellent experience in the data reduction and analysis of (sub-)millimeter single-dish telescopes (IRAM-30m, JCMT, SEST, APEX, FCRAO, Effelsberg, NRAO) and interferometers (SMA, PdBI) with the programs of the GILDAS package (specifically MAPPING, CLASS, GREG and ASTRO);
- very good experience with the reduction of interferometric VLA data with AIPS, both in spectral lines and continuum;
- very good experience in the calibration of the Plateau de Bure Interferometer data using the program CLIC of the GILDAS package;
- good experience in the analysis of (sub-)millimeter spectral lines with the software XCLASS;
- good experience in the use of the software OSA for the 'quick look' analysis of the X-/ $\gamma$ -ray data of the INTEGRAL satellite.
- I tested the ALMA data reduction software, CASA, in collaboration with the other members of the italian ARC-node in Bologna. I was especially involved in testing the tasks for mosaicing;
- I tested the ALMA Observing Tool in collaboration with the other members of the italian ARC-node in Bologna;
- I am testing the ALMA simulator, which is part of the GILDAS package, in collaboration with the other members of the french ARC-node at IRAM (Grenoble).

**REFEREE FOR**

<i>Astrophysical Journal</i>	ApJ
<i>Monthly Notices of the Royal Astronomical Society</i>	MNRAS
<i>Astronomy &amp; Astrophysics</i>	A&A
<i>Publications of the Astronomical Society of Japan</i>	PASJ

**PARTICIPATION AT INTERNATIONAL SCHOOLS**

<i>CASA tutorial</i>	May 2009, ESO (Garching), Germany
<i>Saas-Fee Course 2008: Millimeter astronomy</i>	Mar. 2008, Les Diablerets, Switzerland
<i>NRAO 10th summer synthesis imaging workshop</i>	Jun. 2006, Albuquerque, New Mexico, USA
<i>IRAM millimeter interferometry summer school 2002</i>	Oct. 2002, Grenoble, France
<i>IRAM millimeter observing techniques and applications</i>	Sep. 2001, Granada, Spain

**LANGUAGES**

<i>Italian</i>	native
<i>English</i>	fluent
<i>French</i>	fluent

**INVITED SEMINARS**

<i>The formation of massive stars</i>	Nov. 2009, INAF-Arcetri, Florence (Italy)
<i>The formation of massive stars</i>	Oct. 2009, Max-Planck Institut fuer Radioastronomie, Bonn (Germany)
<i>The early lifes of high-mass stars</i>	Jun. 2009, IRAM, Grenoble (France)
<i>The early lifes of high-mass stars</i>	Feb. 2009, Observatoire de Genève, Versoix (Switzerland)
<i>The early lifes of high-mass stars</i>	Sep. 2008, INAF-IFSI, Rome (Italy)
<i>The initial conditions in the massive star formation process</i>	Dec. 2007, ISDC, Versoix (Switzerland)
<i>The initial conditions in the massive star formation process</i>	Jun. 2007, CfA, Boston (USA)
<i>Searching for massive pre–stellar cores</i>	Oct. 2006, INAF-IRA, Bologna (Italy)
<i>A search for high-mass protostars</i>	Mar. 2006, INAF-OAA, Florence (Italy)

**PRESENTATIONS AT INTERNATIONAL MEETINGS (\* = INVITED)**

- 1 *”Constructive and destructive effects of massive star formation on the environment”*  
talk at the meeting ”FIR2011: star formation and feedback in galaxies as revealed by far-infrared and sub-millimeter wavelengths”, Sep. 2011, University College London (UCL), London, UK
- 2 *”Deuteration as evolutionary tracer in massive star formation”*  
poster at the ”IAU Symposium 280: The molecular universe ”, May-Jun. 2011, Universidad de Castilla-La Mancha, Toledo, Spain
- 3 *”The properties of starless condensations in intermediate-/high-mass protoclusters”*  
talk at the conference ”Great barriers in massive star formation”, Sep. 2010, James Cook University, Townsville, QLD, Australia
- 4 *”The properties of starless condensations in intermediate-/high-mass star forming regions”*  
talk at the Workshop ”Science with ALMA band-5”, May 2010, Osservatorio Astronomico di Roma, Rome, Italy
- 5 *”The properties of starless cores in intermediate-/high-mass star forming regions”*  
talk at the conference ”From Stars to Galaxies”, Apr. 2010, University of Florida, Gainesville, FL, USA
- 6 *”The initial conditions of star formation in intermediate/high-mass protoclusters”\**  
talk at the ”Leeds workshop on IRDCs”, Jul. 2009, University of Leeds, UK
- 7 *”The initial conditions of star formation in intermediate-/high-mass protoclusters*  
talk at the ”Annual meeting of the French Astronomical Society”, Jul. 2009, Besancon, France
- 8 *”The initial conditions of star formation in intermediate-/high-mass protoclusters”*  
poster at the Conference ”Millimeter and sub-millimeter astronomy at high-angular resolution”, Jun. 2009, Taipei, Taiwan
- 9 *”A search for massive pre–stellar cores through observations of  $N_2H^+$  and  $N_2D^+$ ”*  
talk at the Conference ”Massive star formation: observations confront theory” , Sep. 2007, Heidelberg, Germany
- 10 *”Searching for massive pre–stellar cores through observations of  $N_2H^+$  and  $N_2D^+$ ”*  
poster at the Conference ”Science with ALMA: a new era for Astrophysics”, Nov. 2006, Madrid, Spain
- 11 *”A search for high-mass protostars”*

talk in the XXXIV Young European Radio Astronomers Conference, Sep. 2004, Cork, Eire

12 “*IRAS 23385+6053: a candidate protostellar massive object*”

talk in The XXXIII Young European Radio Astronomers Conference, Sep. 2003, Bonn, Germany

13 “*IRAS 23385+6053: a candidate protostellar massive object*”

talk in the Workshop “Star Formation Near and Far: the ALMA Promise”, May 2003, Marciana Marina, Italy

14 “*The structure of molecular clumps surrounding massive YSOs: multi-line study of the molecule CH<sub>3</sub>CCH*”

talk in the Workshop “Solids and Molecules in Space II”, May 2002, S. Miniato, Italy

15 “*Density and temperature structure of molecular clumps around massive YSOs*”

talk in the Franco-Italian Colloquium on Star Formation, Feb. 2002, Lanslebourg, France

**PUBLICATIONS**

All publications are available on-line at: [http://adsabs.harvard.edu/abstract\\_service.html](http://adsabs.harvard.edu/abstract_service.html)  
unless when differently specified

**REFEREED PUBLICATIONS**

- 1 "Mapping Large-scale CO Depletion in a Filamentary Infrared Dark Cloud"  
A.K. Hernandez, J.C. Tan, P. Caselli, M.J. Butler, I. Jiménez-Serra, **F. Fontani**, P. Barnes 2011, ApJ, 738, 11
- 2 "The long-term millimeter activity of active galactic nuclei"  
S. Trippe, M. Krips, V. Piétu, R. Neri, J.M. Winters, F. Gueth, M. Bremer, P. Salomé, R. Moreno, J. Boissier, **F. Fontani** 2011, A&A, 533, 97
- 3 "Deuteration as an evolutionary tracer in massive-star formation"  
**F. Fontani**, A. Palau, P. Caselli, P., Á. Sánchez-Monge, M.J. Butler, J.C. Tan, I. Jiménez-Serra, G. Busquet, S. Leurini, M. Audard 2011, A&A, 529, L7
- 4 "Class I and Class II methanol masers in high-mass protostellar candidates"  
**F. Fontani**, R. Cesaroni, R.S. Furuya 2010, A&A, 517, 56
- 5 "Parsec-scale SiO emission in an Infrared Dark Cloud"  
I. Jiménez-Serra, P. Caselli, J.C. Tan, A.K. Hernandez, **F. Fontani**, M.J. Butler, S. van Loo 2010, MNRAS, 406, 187
- 6 "Linking pre- and proto-stellar objects in the intermediate-/high-mass star forming region IRAS 05345+3157"  
**F. Fontani**, Q. Zhang, P. Caselli, T.L. Bourke 2009, A&A, 499, 233
- 7 "Highly deuterated pre-stellar cores in a high-mass star formation region"  
**F. Fontani**, P. Caselli, T.L. Bourke, R. Cesaroni, J. Brand 2008, A&A, 477, L45
- 8 "Comparative study of complex N- and O-bearing molecules in hot molecular cores"  
**F. Fontani**, I. Pascucci, P. Caselli, F. Wyrowski, R. Cesaroni, C.M. Walmsley, 2007, A&A, 470, 639
- 9 "Searching for massive pre-stellar cores through observations of  $N_2H^+$  and  $N_2D^+$ "  
**F. Fontani**, P. Caselli, A. Crapsi, R. Cesaroni, S. Molinari, L. Testi, J. Brand, 2006, A&A, 460, 709
- 10 "Search for massive protostar candidates in the southern hemisphere II. Dust continuum emission"  
M.T. Beltrán, J. Brand, R. Cesaroni, **F. Fontani**, S. Pezzuto, L. Testi, S. Molinari, 2006, A&A, 447, 221
- 11 "Search for massive protostellar candidates in the southern hemisphere I. association with dense gas"  
**F. Fontani**, M.T. Beltrán, J. Brand, R. Cesaroni, L. Testi, S. Molinari, C.M. Walmsley, 2005, A&A, 432, 921
- 12 "Nature of two massive protostellar candidates: IRAS 21307+5049 and IRAS 22172+5549"  
**F. Fontani**, R. Cesaroni, L. Testi, S. Molinari, Q. Zhang, J. Brand, C.M. Walmsley 2004, A&A, 424, 179
- 13 "IRAS 23385+6053: a candidate protostellar massive object"  
**F. Fontani**, R. Cesaroni, L. Testi, C.M. Walmsley, S. Molinari, R. Neri, D. Shepherd, J. Brand, F. Palla, Q. Zhang 2004, A&A, 414, 299

- 14 “*The structure of molecular clumps around high-mass young stellar objects*”  
**F. Fontani**, R. Cesaroni, P. Caselli, L. Olmi 2002, A&A, 389, 603

**NON REFEREED PUBLICATIONS**

- 1 "The initial conditions of star formation in intermediate-/high-mass protoclusters"  
**F. Fontani**, Q. Zhang, P. Caselli, T.L. Bourke, in "SF2A-2009: Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics", held 29 June - 4 July 2009 in Besancon, France. Eds.: M. Heydari-Malayeri, C. Reylé and R. Samadi, p. 329
- 2 "Searching for Massive Pre-Stellar Cores through Observations of  $N_2H^+$  and  $N_2D^+$ "  
**F. Fontani**, in "Massive Star Formation: Observations Confront Theory", ASP Conference Series, Proc. of the conference held 10-14 September 2007 at Heidelberg Convention Center, Heidelberg, Germany. Eds H. Beuther, H. Linz, and T. Henning. Astronomical Society of the Pacific, Vol. 387, p. 30
- 3 "GRB 081003B: a long GRB detected with INTEGRAL"  
D. Gotz, S. Mereghetti, A. Paizis, **F. Fontani**, V. Beckmann, M. Beck, J. Borkowski 2008, GCN Circular, 8317, 1
- 4 "GRB 081003: a long GRB discovered by INTEGRAL"  
S. Mereghetti, A. Paizis, D. Gotz, **F. Fontani**, V. Beckmann, M. Beck, J. Borkowski 2008, GCN Circular, 8314, 1
- 5 "Searching for massive pre-stellar cores through observations of  $N_2H^+$  and  $N_2D^+$ "  
**F. Fontani**, P. Caselli, A. Crapsi, R. Cesaroni, J. Brand, in "Science with the Atacama Large Millimeter Array: a new era for Astrophysics", Proc. of the conference held 13-17 November 2006 in Madrid, Spain. Eds. R. Bachiller, J. Chernicharo. Published in the included CDROM.
- 6 "IRAS 23385+6053: An example of Candidate Massive Protostar"  
**F. Fontani**, R. Cesaroni, L. Testi, C.M. Walmsley, IAU Symposium no. 221, held 22-25 July, 2003 in Sydney, Australia, Poster meeting abstract



**APPENDIX: SUCCESSFUL OBSERVING PROPOSALS (AS PI)****Plateau de Bure Interferometer (PdBI)**

- 1 "The relation between deuteration and evolution in massive star formation"  
F. Fontani, F. Gueth, P. Caselli, J. Tan, M. Butler, I. Jimenez-Serra, G. Busquet, A. Palau, A. Sanchez-Monge. *20 hrs awarded*
- 2 "Are there massive pre-stellar cores in IRAS 05345+3157?"  
F. Fontani, P. Caselli, A. Crapsi, R. Cesaroni, J. Brand. *16 hrs awarded*
- 3 "The temperature of high-mass protostellar cores"  
F. Fontani, M.T. Beltrán, R. Cesaroni, R. Neri. *18 hrs awarded*

**Sub-millimeter Array (SMA)**

- 1 "The relation between deuteration and evolution in massive star formation"  
F. Fontani, I. Jimenez-Serra, P. Caselli, J. Tan, G. Busquet, A. Palau, A. Sanchez-Monge, R. Estalella. *12 hrs awarded*
- 2 "Deuterium fractionation in IRAS 05345+3157: where are the massive pre-stellar cores?"  
F. Fontani, P. Caselli, T.L. Bourke, A. Crapsi. *11.8 hrs awarded*

**Combined Array for Research in Millimeter-wave Astronomy (CARMA)**

- 1 "Investigating the deuteration of pre-stellar cores in massive star forming regions"  
F. Fontani, A. Palau, P. Caselli, J. Tan, M. Audard, G. Busquet, A. Sanchez-Monge, R. Estalella, A. Isella. *16 hrs awarded (24 hrs requested)*

**Very Large Array (VLA)**

- 1 "Temperature and kinematics of starless cores in massive protostellar clusters"  
F. Fontani, G. Busquet, L. Testi, P. Caselli, A. Sanchez-Monge, S. Leurini, M. Audard, A. Palau. *24 hrs awarded*
- 2 "Unveiling the nature of the deuterated cores in high-mass star forming regions"  
F. Fontani, P. Caselli, J. Brand, R. Cesaroni, Q. Zhang. *16 hrs awarded*
- 3 "Searching for infall in molecular clumps around high-mass young stellar objects"  
F. Fontani, R. Cesaroni, J. Brand. *24 hrs awarded*
- 4 "H<sub>2</sub>O maser in candidate massive YSOs"  
F. Fontani, M.T. Beltrán, R. Cesaroni, L. Testi, C.M. Walmsley. *4 hrs awarded*

**Australia Telescope Compact Array (ATCA)**

- 1 "Investigating the earliest stages of high-mass star formation"  
F. Fontani, M.T. Beltrán, J. Brand, M. Burton, R. Cesaroni, R. Dodson, S. Molinari, M. Rioja, A. Sanchez-Monge. *48 hrs awarded*
- 2 "Establishing an evolutionary sequence for high-mass star formation"  
F. Fontani, M.T. Beltrán, J. Brand, M. Burton, R. Cesaroni, S. Molinari, A. Sanchez-Monge. *24 hrs awarded (48 hrs requested)*
- 3 "Establishing an evolutionary sequence for high-mass star formation"

F. Fontani, M.T. Beltrán, J. Brand, M. Burton, R. Cesaroni, S. Molinari, A. Sanchez-Monge. *20 hrs awarded (24 hrs requested)*

**Atacama Pathfinder EXperiment (APEX)**

- 1 "The properties of high-mass prestellar cores and the initial conditions of the massive star formation process"

F. Fontani, M.T. Beltrán, J. Brand, P. Caselli. *23.4 hrs awarded (36 hrs requested)*

**IRAM-30m telescope**

- 1 "The relation between evolution and deuteration in massive star formation"

F. Fontani, P. Caselli, I. Jimenez-Serra, J. Tan, M.J. Butler, S. Leurini, M. Audard, G. Busquet, R. Estalella, A. Sanchez-Monge. *39 hrs awarded*

- 2 "The evolution of outflows in young massive (proto)stars"

F. Fontani, M.T. Beltrán, J. Brand, R. Cesaroni, S. Molinari, L. Testi, C.M. Walmsley, Q. Zhang. *55 hrs awarded*

**Effelsberg-100m telescope**

- 1 "A CH<sub>3</sub>OH maser survey at 6 GHz towards high-mass (proto)stars"

F. Fontani, R. Cesaroni, C.M. Walmsley, J. Brand, S. Molinari, F. Palla, L. Testi. *54 hrs awarded*

**NRO-45m telescope**

- 1 "Search for CH<sub>3</sub>OH 44 GHz maser emission in high-mass protostellar candidates"

F. Fontani, R. Furuya, J. Brand, R. Cesaroni, S. Molinari, C.M. Walmsley, L. Testi. *54 hrs awarded*

**Nordic Optical Telescope (NOT)**

- 1 "The IR nature and outflow of the massive protostellar core in IRAS 05345+3157"

F. Fontani, M. Audard, A. Carmona, C. Baldwin. *2.5 hrs awarded*