

CURRICULUM VITAE

Giovanni Fabrizio BIGNAMI (b. 1944, Italy)

1. Milestones

- 1968: Laurea in Physics Milan U. with G. Occhialini (part of thesis at Imperial College, London)
- 1971-1990: Research Scientist at the Italian Consiglio Nazionale delle Ricerche, Milan**
- 1973-1978: ESRO fellowship and U.S. Academy of Sciences Senior Fellowships, NASA/GSFC
- 1974-1975: Assistant Professor at the **Catholic University** of America (Wash. D.C., USA)
- 1979: Visiting scientist at the **Max-Planck** Institut fuer Kernphysik, Heidelberg, Germany
- 1981: "Doctorat d'Etat es Sciences", Université Paris VII (mention: "très honorable")
- 1989: Visiting Professor at the Université de Paris VII
- 1990-96: Full Professor of General Physics, University of Cassino
- 1997-present Full Professor of Astronomy, University of Pavia, since 2005 at IUSS, Pavia**
- 1997-2002: Director of Science at ASI, the Italian Space Agency, Rome**
- 2003- 2006 Director of the Centre d'Etude Spatiale des Rayonnements, CNRS, Toulouse, France**
- 2007- 2008 President, ASI, Italian Space Agency, Rome**
- 2009-present President, Scientific Council, "Groupement d'Interet Scientifique P2I", Paris**
- 2009-present Coordinator, Classe Interdisciplinaire di Scienze e Tecnologia, IUSS, Pavia**
- 2010-present President (first Italian), COSPAR (world-wide "Committee on Space Research")**
- 2010-present Président, Comité d'évaluation du CNES de l'Agence d'Evaluation de la Recherche et de l'Enseignement Supérieur (AERES)**

2. Selected Space Astronomy Project Contributions

- 1970-1984 **ESRO/ESA COS-B experiment** (γ -ray astronomy). **Data Reduction Group Coordinator**
- 1973-1975 **NASA SAS-2 experiment** (γ -ray astronomy). Prototype calibration. Flight data analysis.
- 1979-1985 NASA Einstein Obs. NASA SAS-3, ESA EXOSAT, NASA/ESA IUE. Flight data analysis.
- 1981-1995 **CNES/IKI : Gamma-1 mission**, Italian coordinator. SIGMA mission, "Observateur Invité"
- 1989-2002 NASA/ESA Hubble Space Telescope: P.I. of several proposals.
- 1990-1991: P. I. of the ESO Key Programme on Optical Identification of High Energy Sources.
- 1996-1997 ESA Hipparcos (astrometry): Flight data analysis.
- 1988-1998 **Principal Investigator on the EPIC (European Photon Imaging Camera) on XMM-Newton, ESA cornerstone mission. Scientific and managerial responsibility towards ESA and towards the European Collaboration of 13 institutes in four nations.**
- 1997-2002 **Initiator at ASI of the Italian gamma-ray astronomy mission AGILE**
- 2002-present **NASA GLAST (now "FERMI") gamma-ray astronomy mission. Associate scientist**
- 2006-present **ESA INTEGRAL (gamma-ray astronomy): Flight data analysis and interpretation**

3. Coordinating, Advisory and Evaluation Appointments

- 1984-1988 ESA Astronomy Working Group (European planning and *evaluation*)
- 1988-1999 NASA's Gamma Ray Observatory Users' Committee (U.S. proposal *evaluation*)**
- 1994-1995 Science Committee, Italian Space Agency (Italian proposal *evaluation*)
- 1994-1998 ESA's Space Science Advisory Committee (European mission planning and *evaluation*)
- 1995 Chairman, ESA INTEGRAL Science *Evaluation* Committee**
- 1995 Chairman, INTEGRAL Review Team for CNES (French Instrument *evaluation*)
- 1998-2002 Italian Delegate, ESA's Science Programme Committee- elected Vice-Chair**
- 1998-2002: Board of Trustees, International Space University, Strasbourg, France
- 2001-2003 Scientific Council, CNRS (France) (interdisciplinary research *evaluation*)**
- 2002-2007 Scientific Council, "Federation de Recherche" APC, Université de Paris VII.
- 2003-2006 Scientific Council, International Space Science Institute (ISSI), Berne, Switzerland
- 2004-2006 Chairman, ESA's Space Science Advisory Committee (1st Italian after E.Amaldi)**
- 2004- 2006 Member, CERES (Comité d'Evaluation de la Recherche et l'Exploration Spatiale), CNES **2005-2006 Coordinator, ESA new Decadal Plan "Cosmic Vision 2015-2025"**
- 2007-2009 Scientific Council, P2I, Université Paris/Tolbiac (France)
- 2007- 2008 President, ELV (European Launch Vehicles, an Italian public-private company)

2008- 2010 Member, **Max-Planck Evaluation Committee** for the Institute Director, MPE Garching
 2009- present **Aerospace Coordinator, Italian National Programme for Research, MIUR**
 2010- present **Ministerial Expert for INAF, the Italian National Institute for Astrophysics, MIUR**

4. Prizes and Honours

1993: **Bruno Rossi Prize of the HEAD, American Astronomical Society (1st Italian)**
 2000: **Officier de l'Ordre National du Mérite de la République Française**
 2002: **Royal Society/COSPAR Massey Award (1st Italian)**
 2004: **Astronomy Prize, Italian Culture Ministry (prize given every four years)**
 2006: **“Premio Lacchini” (Italy) for the furthering of Astronomical Culture**
 2006: **Officier de la Légion d'Honneur de la République Française**
 2010 **“Blaise Pascal Medal” for Astrophysics, European Academy of Sciences**
 2010 **“Von Karman Award”, International Academy of Astronautics**

5. Academies

1997: Member (Corresponding), **Accademia dei Lincei**
 2000: **Member, International Astronautics Academy**
 2004: Member, European Academy of Sciences
 2005: **Member, Academia Europaea**
 2008: Corresponding Member of the « Istituto Veneto di Scienze, Lettere ed Arti », Venice, Italy
 2008: Membre Titulaire, Académie de l'Air et de l'Espace, Toulouse, France
 2009: **Associé étranger , Académie des Sciences, France**

Publications

(complete list: <http://www.iasf-milano.inaf.it/~gfb/personal.html>)
 (Citations:7486, source ADS, h index = 43)

-Papers in international refereed journals: 190
 -Invited papers 64
 -Other scientific papers 163
 -Books (in English, French and Italian) 5
 -Newspaper (including 7 IHT op-eds) and other articles (book chapters, encyclopaedias,...)>300

SUMMARY OF GFB'S CONTRIBUTIONS TO SPACE ASTROPHYSICS

GFB was instrumental in developing gamma-ray astronomy as a new space-age discipline. He contributed to every European mission (and most U.S. missions) in high-energy astrophysics, and was active in promoting and directing space research in Italy, France and Europe in general. (For his career achievements in space science, he was first given (2002) the Royal Society Massey Award and, more recently (2010), the Von Karman Award of the IAA (1st Italian recipient after Luigi Broglio). After taking part, during the early seventies, in the understanding of the diffuse gamma-ray emission from our Galaxy from cosmic-rays interacting with interstellar gas, and in the first detection of a gamma-ray pulsar (the Crab), he later (1981) led the discovery of the first extragalactic gamma-ray source, 3C273. He took part, during the eighties, in the original discovery of the population of gamma-ray sources in our Galaxy. His 1993 American Astronomical Society “Rossi Prize” research on the identification and understanding of Geminga (which he named) as the first of a new class of gamma-ray neutron stars remains a template today. He led the X-ray/optical observations and their interpretation.

GFB created a new school on the phenomenology and theory for the physics of neutron stars
 Combining, over the last 15 years, gamma- and X-ray astronomy (using the NEWTON and Chandra missions), optical and other types of data, the work of GFB' group has yielded a number of important new results: first in situ measurement of an isolated neutron star magnetic field (1E1207), first evidence of particle acceleration by a gamma-ray pulsar, tracking the star rotation from its thermal surface emission, first optical parallax of a neutron star (Geminga), optical (HST) proper motion determination neutron stars, discovery and study of the uniqueness of the RCW 103 object. (For these works, he received the

Astronomy Prize, given every 4 years by the Italian Ministry of Culture).

Since 2005, GFB's *theoretical work* has been exploring quantum vacuum lensing around magnetized neutron stars, discussing the *creation of light pseudoscalar bosons and predicting their observability in a specific binary system*. Theoretical work by GFB and his Toulouse colleagues continues today on quantum vacuum friction, true values of neutron star magnetic fields and the nature of magnetars.

GFB's current observational and interpretative work on high-energy astronomy

In 2008, GFB, exploiting INTEGRAL data, contributed to another first result in high-energy astronomy: the gamma-ray evidence for the *galactic antimatter* content being traceable to neutron stars in special binary systems located in the central regions of our Galaxy. GFB is also participating in the ongoing analysis of data of the AGILE and FERMI observatories, which now shows that many of the galactic gamma-ray sources, unidentified for decades, are in fact "Geminga-like", i.e. isolated neutron stars only emitting gamma-rays. For his seminal contribution to this topic, GFB received the 2010 "Blaise Pascal" Medal of the EAS, given for the first time to astrophysics. In the context of the most recent AGILE/Fermi results, GFB has worked on the on the discovery of gamma-ray emission from the Cyg X-3 "microquasar". *This follows predictions made by GFB in 1978.*

SUMMARY OF GFB'S ACADEMIC AND RESEARCH EVALUATION EXPERIENCE

During his years (1990-1997) at the University of Cassino, GFB taught "Fisica Generale 1 e 2". During his following years at the University of Pavia, GFB gave various astronomy and astrophysics courses at the undergraduate, graduate and doctoral level, taking part in the normal thesis, course and student evaluation activities. At IUSS since 2005, he gives interdisciplinary courses in physics and astronomy, and takes also an active part in the compilation material for the IUSS Evaluation Committee, especially now as Coordinator of the "Science and Technology" Class. Over the years, GFB has been a member of several "Commissioni di Concorso" and has acted as referee for PRIN programmes.

Following his considerable experience in mission and proposal evaluation as a member of various scientific advisory bodies of ESA, NASA, CNES, COSPAR and ASI, in the five years (1997-2002) he served as Science Director of ASI (average budget 100M/year) GFB was also tasked, among other duties, with issuing research announcements and organizing at national level the proposal evaluation process. He introduced international evaluation criteria at ASI, following ESA standards.

From 2003 to 2006, GFB was Director of the "Centre d'Etude Spatiale des Rayonnements", one of the most important space research Institutes in France. As Director, he was responsible for the evaluation process of the results and of the personnel (150 people) of his Centre. He was also part of evaluation bodies for other French Institutes and Universities. His experience in the French research evaluation system had started as a member of the central CNRS Scientific Council (2001-2003) and as a member of evaluation and advisory bodies of the French Space Agency, CNES.

Currently, the Agence d'Evaluation de la Recherche et de l'Enseignement Supérieur (AERES) has nominated GFB as President of its International Evaluation Committee for CNES.

In 2007-08, as President of ASI (average budget 7-800M/year), GFB had the responsibility to plan all national and international space research in Italy (ESA and NASA), but was also in charge of internal ASI evaluation (global performance and personnel) as well as interfacing with MIUR evaluation.

In 2009-10 he acted as a MIUR expert coordinating one of the "Tavoli Tecnici" for the compilation of the PNR, the Italian National Research Programme, where national research priorities are indicated. He was later nominated as MIUR expert for the re-structuring of INAF, including its internal evaluation strategies.

The international evaluation experience of GFB also includes: 1) NASA Gamma-Ray Astronomy Users' Committee (1988-1997), tasked with evaluating of all U.S. observing and fellowship proposals

2) Scientific Council (2003-06) of the International Space Science Institute (Bern, Switzerland), tasked with worldwide research announcements and their evaluation

3) President of the Scientific Council of "P2I" (a grouping of 19 physics and astronomy Institutes in Ile-de France): planning and evaluating complex research programmes of over 1,000 French researchers

4) Max-Planck Gesellschaft evaluation committee of candidatures for the Directorship of the MPE Institute in Garching

As a Foreign Associate of the French Académie des Sciences, GFB has access to all the evaluations experience and tools available in the French University and Research System, in particular in AERES.