

# NINO PANAGIA

*Curriculum Vitae (as of August 6, 2008)*

|                           |  |
|---------------------------|--|
| <b>Citizenship:</b>       | Italian; US Permanent Resident   |
| <b>Languages:</b>         | Italian, English, basic French, basic Spanish  |
| <b>Education:</b>         | Doctor of Physics – University of Rome, Italy – November 14, 1966  |
| <b>Research Interests</b> | <ul style="list-style-type: none"><li>• Interstellar medium and related topics (mostly theory and interpretation of observations), with special emphasis on:<ul style="list-style-type: none"><li>- HII regions</li><li>- Star forming regions and young stellar populations</li><li>- Galactic infrared background</li><li>- Planetary nebulae</li><li>- Stellar winds</li></ul></li><br/><li>• Supernovae and supernova remnants</li><br/><li>• Cosmology:<ul style="list-style-type: none"><li>- Distance Scale, Expansion, and Acceleration of the Universe,</li><li>- Primordial Galaxies</li><li>- Reionization of the IGM</li></ul></li></ul> |
| <b>Publications</b>       | 229 Papers in international refereed journals  |
|                           | 95 Invited review papers   |
|                           | 229 Papers and abstracts presented at scientific conferences   |
|                           | 58 IAU Circulars   |
|                           | 5 Books  |
|                           | 16317 Citations (ADS)  |
|                           | 56 h-factor  |

## Professional Career and Positions Held

|           |  |
|-----------|--|
| 2005-     | Astronomer Emeritus, STScI   |
| 2005-     | Senior Astronomer associated with the Italian Institute of Astrophysics (INAF) |
| 2004-     | Chairman, Supernova Ltd., BVI  |
| 1999-2005 | JWST Science Policies Scientist, STScI   |
| 1995-1999 | Head, Visiting Scientist Program, STScI  |
| 1993-1995 | Head, University Programs Division, STScI                                      |
| 1991-1992 | Head, Academic Affairs Division, STScI   |
| 1989-1992 | Head, Hubble Fellow Program, STScI   |
| 1988-1990 | Head, Visiting Scientist Program, STScI  |
| 1986-1995 | Professor of Astronomy, University of Catania                                  |
| 1984-1988 | GOSB Astronomer (FOC, GTO Cat., Archival Research)                             |
| 1984-2005 | ESA Senior Astronomer at STScI   |
| 1981-1982 | Adjunct Professor, University of Florence                                      |
| 1979-1986 | Senior Scientist, Radioastronomy Institute CNR, Bologna                        |
| 1975-1981 | Visiting Fellow, MPI für Radioastronomie, Bonn, Germany                        |
| 1973-1978 | Scientist, Radioastronomy Institute CNR, Bologna                               |
| 1972-1973 | ESRO Fellow, Research Associate, Cornell University                            |
| 1970-1973 | Scientist, Space Astrophysics Institute CNR, Frascati                          |
| 1968-1970 | Assistant Scientist, Astrophysics Laboratory, Frascati                         |
| 1966-1967 | Postdoctoral Fellow, Astrophysics Laboratory, Frascati                         |

## Membership

|        |   |
|--------|---|
| 1995   | Astronomical Society of Pacific                 |
| 1990 - | European Astronomical Society (Founding Member) |
| 1988 - | Italian Astronomical Society                    |
| 1985 - | American Astronomical Society                   |
| 1979 - | IAU Commission No. 34                           |
| 1973   | International Astronomical Union (IAU)          |

## Honors and Awards

**2008** Annual NRL Berman Publication Award for the paper “*Long-Term Radio Monitoring of SN 1993J*”, 2007, *ApJ* 671, 1959.

**2007** Copernicus Visiting Scientist, IUSS - University of Ferrara, Italy.

**2007** Gruber Prize for Cosmology 2007.

**2006** Recipient of the Motta “Coppa del Nonno” (the “*Grandfather’s Cup*”) in recognition of lifetime achievements in Astronomy.

**2006** Silver Medal of the *Chopped Liver Society* for a substained achievement of *secundus inter pares* rank in all endeavours.

**2004** STScI 20 Years Service Award.

**2003** *Bough Gold* for Innovative Reporting in Astronomy.

**2001-2002** ESA Merit Recognition and Reward Premium.

**2002** Named by *ISI* (Institute for Scientific Information) as one of the 100 most highly cited astronomers in the world.

**1999** *Golden Dry Fig* Award for Excellence in Managing the STScI Visiting Scientist Program as an essential service to the astronomical community (1994-1999).

**1999** STScI 15 Years Service Award.

**1995** *Golden Dry Fig* Award for Excellence in Managing the STScI Academic Affairs - University Program Division (1991-1995).

**1994** STScI 10 Years Service Award.

**1994** NASA/Goddard Space Flight Center Certificate of Recognition of contribution to the HST First Servicing Mission.

**1993** *Golden Dry Fig* Award for Establishing the Hubble Fellow Program and making it a success (1989-1992).

**1992** NASA/Marshall Space Flight Center Certificate of Recognition of contribution to the HST Launch on April 24, 1990.

**1989** STScI 5 Years Service Award.

## Discoveries and Achievements

- Discovery of Accretion Luminosity from the late-type White Dwarfs in the Hyades (1971, Castellani & Panagia, ApSS, 10, 122)
- Fundamental calibration of the observable parameters of Early type stars (1973, Panagia, AJ 78, 929)
- First self-consistent models of the IR emission from HII regions (1974, Panagia, ApJ, 192, 221)
- Developed the theory of Radio and IR Emission from Stellar Winds: A new and accurate diagnostic to measure mass loss rates from early type stars (1975, Panagia & Felli, A&A 39, 1)
- Invented the word “plerion” to denote the class of filled-center supernova remnants similar to the Crab Nebula (1978, Weiler & Panagia, A&A, 70, 419)
- First coordinated multifrequency study of Supernovae (SNe) from radio to  $\gamma$ -rays: SN 1979C - A case for a complete characterization of the supernova explosion (1980, Panagia *et al.*, MNRAS, 192, 861)
- Radio observations of SNe: A new tool to determine the pre-explosion nature and properties of the progenitor stars (1981, Weiler *et al.*, ApJ, 243, L151, and many more papers afterwards; see *e.g.*, Weiler *et al.* 2002, ARAA, 40, 387)
- First study of resonance line multiple scattering as the most effective process for the acceleration of winds from early type stars (1982, Panagia & Macchetto, A&A, 106, 266).
- Classical models of the FIR and sub-mm diffuse emission of the Milky Way (1982, Mezger, Mathis & Panagia, A&A, 105, 372, and 1983, Mathis, Mezger, & Panagia, A&A, 128, 212).
- First model calculations of population synthesis based on UV and optical spectra. They were used to clarify the nature of the X-ray emission from the dwarf galaxies in the M101 group (1983, Fabbiano & Panagia, ApJ, 266, 568).
- Discovery of the new class of supernovae – SNIb – 1983N: evidence for a separate class of “type I” SNe (Panagia 1985, LNP, 224, 14)
- Devised the first plan (through a scheme of logarithmic time intervals, later adopted by all other teams) to minimize the number of HST observations required to accurately determine the light curves of extragalactic Cepheids with periods between 3 and 30 days (Cycle 1 proposal, PI: Sandage).
- First identification of the progenitor B3 supergiant of SN 1987A (1987, Panagia *et al.*, A&A, 177, L25, and Gilmozzi *et al.*, Nature, 328, 318)
- Geometric determination of the distance to SN 1987A and the LMC to an accuracy of 2% (1991, Panagia *et al.*, ApJ, 380, L23, & refinements in subsequent papers).
- Discovery of a systematic difference in absolute magnitude between SNIa occurring in spiral galaxies and those in elliptical galaxies (brighter in the former class by about 0.3 magnitudes than the latter one) suggesting systematic differences in their progenitors (1992, Della Valle & Panagia, AJ, 104, 696).

- First determination of the mass loss from early type stars exploiting the full information (total intensity, equivalent width, and detailed profile) of their H $\alpha$  line emission, thus achieving accurate (better than 20%) and reliable results (1992, Scuderi *et al.* , ApJ, 392, 301).
- First determination of the Hubble constant using Cepheid calibration of SNIa absolute luminosities (1992 Sandage *et al.* , ApJ, 401, L7, and 11 more papers in subsequent years)
- First discovery of Pre-Main-Sequence stars outside the Milky Way: 1-2M $_{\odot}$  PMS stars in NGC 1850 in the Large Magellanic Cloud (1994, Gilmozzi *et al.* , ApJ 435, L43)
- First STScI astronomer to obtain more than 1,000 citations with a one author paper (since 1998; Panagia 1973, AJ 78, 929)
- First discovery (Senior member of the Supernova Cosmology Project) of a cosmological constant using SNIa at high redshifts (1997, Perlmutter *et al.* , BAAS, 29, 1351; 1998, Nature, 391, 51; 1999, ApJ, 517, 565; and more)
- One of the first three STScI astronomers (mid-2002 with Hauser and Livio) included in the Most Cited list for the Space Sciences discipline compiled by the Institute for Scientific Information (ISI)
- First determination of mass accretion rates in PMS stars outside the Milky Way: PMS stars in the star cluster hosting SN 1987A (2004, Romaniello, Robberto & Panagia, ApJ 608, 220)
- First STScI astronomer to obtain more than 10,000 citations (since 2004)
- Seminal studies on the sources of reionization of the intergalactic medium in the early Universe and possible identification of actual sources (2004 Stiavelli, Fall, & Panagia, ApJ, 600, 508, and 610, L1; 2005, Panagia *et al.* , 633, L1)
- First determination of supernova rates, for all SN types, per unit mass of their parent galaxies, showing much higher rates (up to a factor of 30) of SNIa in spirals and irregulars than in ellipticals. This result indicates that a substantial fraction of SNIa originate from relatively massive stars ( $>5.5$  up to 8 M $_{\odot}$ ) stars that explode within a few hundred million years after their birth. Because of this one may expect systematic differences for SNIa at different redshifts, that could spoil their accuracy and reliability as standardizable candles for cosmological uses (2005, Mannucci *et al.* , A&A, 433, 807; 2006, Mannucci, Della Valle & Panagia, MNRAS, 370, 773; 2007, Mannucci, Della Valle & Panagia, MNRAS, 377, 1229).

## Scientific Committees

|           |  |
|-----------|--|
| 2005-2006 | SOC Conference “Mass Loss from Stars and Stellar Clusters”, Lunteren, Holland                    |
| 2002-2003 | SOC STScI Symposium “The Local Group as an Astrophysical Laboratory”                             |
| 2001      | Italian Science Team for Phase-A study of the WSO/UV mission                                     |
| 2000-     | Science Team for UVISS telescope on the International Space Station                              |
| 2001-2002 | SOC NASA Origins 2002 Conference “The Heavy Element Trail from Galaxies to Habitable Worlds”     |
| 1998-1999 | SOC STScI Symposium “The Largest Explosions since the Big Bang: Supernovae and Gamma-Ray Bursts” |
| 1997-1998 | SOC STScI Symposium “Unsolved Problems in Stellar Evolution”                                     |
| 1995-1996 | SOC STScI Symposium “The Cosmological Distance Scale”  |
| 1994-1995 | SOC ASP Symposium “Clusters, Lensing and the Future of the Universe”                             |
| 1993-1994 | SOC STScI Symposium “The Analysis of Emission Lines”   |
| 1992-1993 | SOC STScI Symposium “Extragalactic Background Radiation”   |
| 1992-1996 | ESA Team for IUE observations of Supernovae  |
| 1991-1992 | SOC STScI Symposium “Astrophysical Jets”   |
| 1990-1993 | Chairman of the Scientific Committee of the Service d’Astrophysique, Saclay, France              |
| 1990-     | Scientific Committee of the Soviet-Italian Spectrum UV Telescope Project (SUVT)                  |
| 1989-1993 | Scientific Committee of the Service d’Astrophysique, Saclay, France                              |
| 1988-1990 | SOC NATO Advanced Study Institute “Star Forming Regions”   |
| 1987-1995 | Scientific Advisory Committee of the Catania Observatory   |
| 1986-1987 | SOC STScI Workshop “QSO Absorption Lines”  |
| 1986-1987 | SOC NATO Advanced Study Institute “Galactic and Extragalactic Star Formation”                    |
| 1985-1986 | SOC STScI Workshop “Stellar Populations”   |
| 1985-1991 | STScI representative at the ISM Nomenclature WG, IAU Commission No. 34                           |

1985-1986      SOC Workshop “Polycyclic Molecules and Astrophysics”, Les Houches, France

1985            Supernova Sub-Working Group for the definition of HST Key Projects

1984-1985      SOC of the Supernova Working Group for the IAU General Assembly

1984            Ad-hoc ESA Committee for the selection of ideas for observations with the HST-FOC

1983-1985      Co-chairman of the ESA IUE Allocation Committee

1983-1984      Scientific Team for the ESA project FIRST

1982-           Committee of the CNR Center for Infrared Astronomy, Florence

1981-1982      SOC of IAU Symposium No. 103

1979-1992      Convenor of the ESA Team for IUE observations of Supernovae

1978-1981      Effelsberg Radiotelescope Progr. Com., Max-Planck-Inst. für Radioastronomie, Bonn

1978-1985      ESA IUE Allocation Committee

## COLLOQUIA AND INVITED TALKS 1995-2008

### 1995

- 1995 March 9** - Colloquium “SN 1987A: The unusual explosion of a normal supernova”, Harvard-Smithsonian Center for Astrophysics, Cambridge (MA, USA).
- 1995 March 16** - Colloquium “SN 1987A: The unusual explosion of a normal supernova”, Northern Case Reserve University, Cleveland (OH, USA).
- 1995 March 17** - Public Lecture “The Universe as seen through the eyes of the Hubble Space Telescope”, Cleveland (OH, USA).
- 1995 March 29** - Colloquium “Probing the Universe with the Hubble Space Telescope”, University of Catania.
- 1995 September 1** - Invited Talk “Supernovae”, 24th International “Cosmic Ray Conference”, Rome, Italy.

### 1996

- 1996 May 27** - Invited Talk “The Hubble Constant: Expansion and Age of the Universe”, Vulcano Workshop 1996 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (Messina, Italy).
- 1996 May 31** - Invited Talk “Probing the Universe with the Hubble Space Telescope”, Vulcano Workshop 1996 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (Messina, Italy).
- 1996 June 5** - Colloquium “Probing the Universe with the Hubble Space Telescope”, Osservatorio Astronomico di Capodimonte (Naples, Italy).
- 1996 June 7** - Colloquium “Probing the Universe with the Hubble Space Telescope”, Istituto di Astrofisica Spaziale CNR (Frascati, RM, Italy).

### 1997

- 1997 February 26** - Invited Talk “HST Study of the Stellar Population within 30 pc of SN 1987A” at ESO/CTIO/LCO Workshop *SN 1987A: Ten Years After*, La Serena (Chile).
- 1997 April 10** - Colloquium “SN 1987A: Ten Years After”, Cornell University, Ithaca (NY, USA).

- 1997 May 12** - Invited Talk “The Hubble Constant: Expansion and Age of the Universe”, Frascati Workshop 1997 “Multifrequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (Messina, Italy).
- 1997 May 16** - Invited Talk “Probing the Universe with HST” at Frascati Workshop 1997 “Multifrequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (Messina, Italy).
- 1997 May 22** - Colloquium “The Hubble Constant: Expansion and Age of the Universe”, Scuola Normale Superiore (Pisa, Italy).
- 1997 May 23** - Colloquium “Probing the Universe with HST” Scuola Normale Superiore (Pisa, Italy).
- 1997 September 2** - Invited Talk “New Determination of the Distance to the LMC”, at the OAC Workshop *Views on Distance Indicators*, Sant’Agata sui Due Golfi (Naples, Italy).
- 1997 September 4** - Public Lecture “L’Universo visto con gli occhi dello Hubble Space Telescope”, Massa Lubrense (Naples, Italy).
- 1997 October 10** - Colloquium “SN 1987A: A lesson learned”, NRL (VA, USA).
- 1997 December 2** - STScI Open Night at the Institute: Public Lecture “Supernovae: you can’t live with them, you can’t live without them”, STScI (Baltimore, MD, USA).
- 1998**
- 1998 April 27** - Colloquium “The Hubble Constant: Expansion and Age of the Universe”, Bologna Astronomical Observatory (Italy).
- 1998 May 20** - STScI Colloquium “Probing the Universe with SNIa: Clues to  $H_0$  and  $q_0$ ”, STScI (Baltimore, MD, USA).
- 1998 May 25** - Invited Talk “News from HST”, Vulcano Workshop 1998 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (Messina, Italy).
- 1998 May 30** - Invited Talk “The Next Generation Space Telescope”, Vulcano Workshop 1998 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (Messina, Italy).
- 1998 June 8** - Invited Talk “Probing the Universe with the Hubble Space Telescope” at 2nd Catania Relativistic Ion Studies “Measuring the Size of Things in the Universe: HBT Interferometry and Heavy Ion Physics” Acicastello (Catania, Italy).
- 1998 July 17** - Invited Talk “Distance to SN 1987A and the LMC” at IAU Symposium #190 *New Views of the Magellanic Clouds*, Victoria, BC, Canada.
- 1998 September 29** - Invited Talk “Radio Studies of SNe”, Laboratori Nazionali del Gran Sasso, Assergi (Italy).
- 1998 October 2** - Invited Talk “SNe at high redshifts: observations and rates”, Laboratori Nazionali del Gran Sasso, Assergi (Italy).

- 1998 October 9** - Colloquium “Una supernova per ogni stagione (A SN a day keeps the doctor away)”, Arcetri Astrophysical Observatory (Italy).
- 1998 October 26** - Colloquium “Pre-Main-Sequence Evolution” Astronomical Institute, University of Utrecht (Holland).
- 1998 October 28** - Colloquium “Probing the Universe with the Hubble Space Telescope”, Astronomical Institute, University of Utrecht (Holland).
- 1998 November 24** - Mini-Colloquium “Clues to the Expansion and the Acceleration of the Universe”, JHU, (Baltimore, MD, USA).

## 1999

- 1999 May 4** - Invited Talk “Pre-Supernova Evolution of Massive Stars”, STScI Symposium “The Largest Explosions since the Big Bang: Supernovae and Gamma Ray Bursts”, STScI, (Baltimore, MD, USA).
- 1999 May 24** - Invited Talk “Highlights from HST”, Frascati Workshop 1999 “Multifrequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (Messina, Italy).
- 1999 May 29** - Invited Talk “The Next Generation Space Telescope”, Frascati Workshop 1999 “Multifrequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (Messina, Italy).
- 1999 June 1** - Colloquium “Space Telescopes of Today and Tomorrow: HST and NGST”, Osservatorio Astrofisico di Catania (Catania, Italy).
- 1999 June 4** - Colloquium “Space Telescopes of Today and Tomorrow: HST and NGST”, Osservatorio Astronomico di Roma (Monteporzio Catone, RM, Italy).
- 1999 July 14** - Invited Talk “Photometric Studies of Stars and Stellar Systems”, STScI, WFC3 Filter Selection Workshop.
- 1999 September 13** - Invited Lecture “Supernovae” at the the International Summer School on “Experimental Physics of Gravitational Waves”, Urbino (Italy).
- 1999 September 23** - Invited Talk “Observational Constraints on the Evolution of Massive Stars”, Roma-Trieste Workshop 1999 “Chemical Evolution of the Milky Way”, Vulcano Island (Messina, Italy).

## 2000

- 2000 April 11** - Invited Introductory Talk “The Local Group of Galaxies”, 44th Meeting of the Italian Astronomical Society, Monte Porzio Catone (Rome, Italy).
- 2000 April 12** - Colloquium “SNe Ia and Cosmology”, IAS-CNR, Rome (Italy).

- 2000 April 13** - Colloquium “High z SNe: Observations, Rates and Cosmological Implications”, LNF-INFN, Frascati (Italy).
- 2000 April 14** - Invited Talk “Supernovae at high redshifts”, 44th Meeting of the Italian Astronomical Society, Monte Porzio Catone (Rome, Italy).
- 2000 April 14** - Public Lecture “The Universe at the dawn of the XXIst century”, 44th Meeting of the Italian Astronomical Society, Monte Porzio Catone (Rome, Italy).
- 2000 May 22** - Invited Talk “Highlights from HST”, Vulcano Workshop 2000 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (Messina, Italy).
- 2000 May 24** - Invited Talk “Radio Supernovae”, Vulcano Workshop 2000 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (Messina, Italy).
- 2000 May 27** - Invited Talk “The Next Generation Space Telescope”, Vulcano Workshop 2000 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (Messina, Italy).
- 2000 June 2** - Invited Talk “Clues to Massive Star Formation in the Magellanic Clouds”, Volterra Workshop “High-Mass Star Formation: An Origin in Clusters?”, Volterra (Pisa, Italy).
- 2000 July 6** - Invited Talk “Radio Supernovae”, Ninth Marcel Grossmann Conference “Recent Developments in Theoretical and Experimental General Relativity, Gravitation and Relativistic Field Theories”, Rome (Italy).

## 2001

- 2001 March 14** - Colloquium “Space Telescopes of Today and Tomorrow: HST and NGST”, Observatory of Padova (Padua, Italy).
- 2001 March 16** - Public Lecture “The Universe seen with the Eyes of Hubble”, I.T.G. Rondani (Parma, Italy).
- 2001 May 10** - Invited Talk “Star Formation in the Nuclear Region of M51”, Workshop “The central kiloparsec of starbursts and AGNs: the La Palma connection”, La Palma (Spain).
- 2001 May 15** - Colloquium “The Expansion and the Acceleration of the Universe”, Dept. of Physics, University Roma-2 (Rome, Italy).
- 2001 May 16** - Colloquium “The Expansion and the Acceleration of the Universe”, Observatory of Rome (Monte Porzio Catone, Rome, Italy).
- 2001 May 21** - Invited Talk “Highlights from HST and NGST”, Frascati Workshop 2001 “Multi-frequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (Messina, Italy).
- 2001 June 28** - STScI “Popular Talks for Everyone at the Institute”, Public Lecture “Supernovae: You can’t live with them, you can’t live without them”, STScI (Baltimore, MD, USA).
- 2001 December 12** - Public Lecture “The Rise and Fall of the Stars”, Valley Day School (Virgin Gorda, British Virgin Islands).

**2001 December 14** - Public Lecture “The Rise and Fall of the Stars”, Bregado Flax Education Center (Virgin Gorda, British Virgin Islands).

## **2002**

**2002 January 23** - Invited Talk “Highlights of HST Science 2000-2001”, STScI (Baltimore, MD, USA).

**2002 March 5** - Colloquium “Primordial Stellar Populations”, Arcetri Astrophysical Observatory (Florence, Italy).

**2002 March 26** - Colloquium “Primordial Stellar Populations”, STScI (Baltimore, MD, USA).

**2002 May 28** - Invited Review Talk “Primordial Stellar Populations”, Workshop “Origins 2002: The Heavy Element Trail from Galaxies to Habitable Worlds” (Jackson Hole, Wyoming)

**2002 June 28** - Public Lecture “The Hubble Space Telescope: Past, Present, and Future”, University of Teramo (Italy).

**2002 July 2** - Colloquium “Highlights of HST Science”, Collurania Astronomical Observatory (Teramo, Italy).

**2002 July 5** - Colloquium “Primordial Stellar Populations and the Next Generation Space Telescope”, Astronomical Observatory of Collurania (Teramo, Italy).

**2002 August 30** - Lecture “Highlights of HST Science” given at the International School of Space Physics (L’Aquila, Italy).

**2002 September 2** - Lecture “The Expansion Rate of the Universe: The Hubble Constant measured with HST” given at the International School of Space Physics (L’Aquila, Italy).

**2002 September 5** - Lecture “Primordial Stellar Populations and the Next Generation Space Telescope” given at the International School of Space Physics (L’Aquila, Italy).

## **2003**

**2003 April 26** - Invited Talk “The Distance to SN 1987A and the Large Magellanic Cloud”, IAU Colloquium #192 “Supernovae” (Valencia, Spain).

**2003 April 29** - Public Lecture “Space Astronomy and the Hubble Space Telescope”, I.P.S.I.A. “Primo Levi” (Parma, Italy).

**2003 May 26** - Invited Talk “The Past and the Future of the Hubble Space Telescope (HST)”, Frascati Workshop “Multifrequency Behaviour of High Energy Cosmic Sources” (Vulcano (ME), Italy).

**2003 May 27** - Invited Talk “Primordial Stellar Populations and the James Webb Space Telescope (JWST)”, Frascati Workshop “Multifrequency Behaviour of High Energy Cosmic Sources” (Vulcano (ME), Italy).

**2003 June 4** - Colloquium “The Rise of the Universe: Dark Ages, Dark Energy, Dark Matter”, Dept. of Physics, Università Tor Vergata (Rome, Italy).

**2003 June 5** - Colloquium “The Dark Universe: Dark Ages, Dark Energy, Dark Matter”, Dept. of Physics, Università Roma-3 (Rome, Italy).

**2003 June 11** - Colloquium “The James Webb Space Telescope and the Quest for Primordial Stellar Populations”, Dept. of Physics, Università Roma-3 (Rome, Italy).

**2003 November 3-7** A series of 4 lectures on “Supernovae”: (1) “Introduction to Supernovae (SNe)”, (2) “Supernovae in the Local Universe”, (3) “Expansion and Acceleration of the Universe measured with SNIa observations”, (4) “SN rates and the Chemical Evolution of the Universe”, Scuola Normale Superiore (SNS) (Pisa, Italy).

## 2004

**2004 May 20** - Invited Talk “Detecting Primordial Stars”, International Workshop “IMF50”, Abbazia di Spineto (SI), Italy

**2004 May 24** - Invited Talk “High Redshift Supernovae: Cosmological Implications”, Vulcano Workshop 2004 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (ME), Italy.

**2004 May 29** - Invited Talk “From the Hubble Space Telescope to the James Webb Space Telescope”, Vulcano Workshop 2004 “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (ME), Italy.

**2004 June 16** - Invited Review “Supernova 1987A: The unusual explosion of a normal Type II Supernova”, International Conference “1604-2004: Supernovae as Cosmological Lighthouses”, Padua, Italy.

## 2005

**2005 January 31** - Invited Talk “Reionization of the Universe”, JHU Physics & Astronomy Department

**2005 February 23 - March 2** - A Series of 5 Lectures on Supernovae at the Graduate School, Department of Physics, University Tor Vergata - Roma-2:

- (1) Introduction to Supernovae
- (2) Supernova 1987A
- (3) Radio Supernovae
- (4) Expansion Rate of the Universe
- (5) Supernovae and Cosmology

**2005 March 2** - Public Lecture “Supernovae: Fari nell’Oscurit del Cosmo (Supernovae: Lighthouses of the Cosmos)”, Planetarium of Rome, Italy

**2005 May 20** - Invited Talk “Detecting Primordial Massive Stars”, IAU Symposium No. 227, Acireale (CT), Italy

**2005 May 23** - Invited Talk “On the Reionization of the Universe” Frascati Workshop “Multifrequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (ME), Italy.

**2005 May 28** - Invited Talk “The Impact of HST on High Energy Astrophysics”, Frascati Workshop “Multifrequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (ME), Italy.

## **2006**

**2006 May 22** - Invited Talk “Detecting the Sources of Reionization in the Early Universe”, Vulcano Workshop “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (ME), Italy.

**2006 June 5** - Colloquium “Sources of Reionization in the Early Universe”, INAF- Radioastronomy Institute, Bologna, Italy

**2006 June 8** - Colloquium “The Ultimate Hubble Constant”, INAF-Bologna Observatory, Bologna, Italy.

**2006 June 13** - Public Lecture “The Rise and Fall of Stars”, Cefalù, Sicily, Italy.

**2006 June 17** - Invited Talk “Radio Properties of Supernovae”, International Workshop “The Multicolour Landscape of Compact Objects andtheir Explosive Origins”, Cefalù, Sicily, Italy.

**2006 June 17** - Invited Talk “Type Ia Supernova Rates, Near and Far”, International Workshop “The Multicolour Landscape of Compact Objects andtheir Explosive Origins”, Cefalù, Sicily, Italy.

## **2007**

**2007 January 30** - Public Lecture for the schools “The Rise and Fall of the Stellar Empire”, Space Telescope Science Institute, Baltimore, MD.

**2007 February 21** - Invited Talk “Ultraviolet Observations of Supernovae”, International Conference “Supernova 1987A: 20 Years After - Supernovae and Gamma-Ray Bursters”, Aspen, Colorado.

**2007 March 13** - CAS Seminar “Supernova 1987A: Twenty Years After”, JHU Physics and Astronomy Department, Baltimore, MD.

**2007 May 19** - Public Lecture “The Universe as seen with the Eyes of Hubble”, Gratton Prize, Villa Mondragone, Frascati (RM), Italy.

**2007 May 24** - Colloquium “Ultraviolet Supernovae”, Osservatorio Astrofisico di Catania, Catania, Italy.

**2007 May 29** - Invited Review “Supernova 1987A: Twenty Years Later”, Frascati Workshop “Multifrequency Behaviour of High Energy Cosmic Sources”, Vulcano Island (ME), Italy.

**2007 June 4** - Colloquium “Supernova 1987A: Twenty Years Later”, ICRANet Institute, Pescara, Italy

**2007 June 7** - Colloquium “Supernova 1987A: Twenty Years Later”, Physics Department, University of Rome “La Sapienza”, Rome, Italy

**2007 October** - Lecture Series “Supernovae and Observational Cosmology”: (1) Introduction to Supernovae, (2) Supernova 1987A in the Large Magellanic Cloud, (3) Radio Supernovae, (4) Core Collapse Supernova Progenitors, (5) SNIa Rates and Progenitors, (6) The Hubble Constant, i.e. the Local Expansion Rate of the Universe, (7) An accelerating Universe, given at Department of Physics, University of Ferrara, Ferrara, Italy.

**2007 October 8** - Colloquium “Supernova Progenitors”, Observatory of Brera, Merate (LC), Italy.

**2007 October 19** - Colloquium “Supernova 1987A: Twenty Years Later”, RSSD, ESTEC, Noordwijk, The Netherlands.

**2007 October 22** - Colloquium “Radio Observations of Supernovae”, INAF Institute of Radioastronomy, Bologna, Italy.

**2007 October 23** - Colloquium “Supernova 1987A: Twenty Years Later”, INAF Observatory of Bologna, Bologna, Italy.

**2007 December 19** - Colloquium “Supernova Progenitors”, Space Telescope Science Institute, Baltimore, MD.

## **2008**

**2008 January 8** - Public Lecture “Supernovae: Lighthouses of the Cosmos”, Space Telescope Science Institute, Baltimore, MD.

**2008 May 19** - Invited Talk “Two Components For Type Ia Supernovae: Evidences and Consequences”, Arcetri Workshop “Supernova Rates”, Florence, Italy.

**2008 May 27** - Invited Talk “An Update on Supernovae and Cosmology”, Vulcano Workshop “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (ME), Italy.

**2008 May 31** - Invited Talk “HST and JWST”, Vulcano Workshop “Frontier Objects in Astrophysics and Particle Physics”, Vulcano Island (ME), Italy.

**2008 June 3** - Colloquium “Supernova Progenitors”, Osservatorio Astrofisico di Catania, Catania, Italy.

**2008 September 17** - Public Lecture “Supernovae: Fari nell’Oscurita’ del Cosmo”, Cefalù (PA), Italy.

**2008 September 19** - Invited Review “Unsolved Problems about Supernovae”, International Workshop “Probing Stellar Populations out to the Distant Universe”, Cefalù (PA), Italy.

**2008 September 24** - Colloquium “Supernovae and Cosmology”, Osservatorio Astrofisico di Catania, Catania, Italy.