




## Curriculum Vitae

### PERSONAL INFORMATION

Andrea Comastri

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[Redacted]

### WORK EXPERIENCE

2015 – present

**Dirigente di Ricerca**

INAF-Istituto Nazionale di Astrofisica  
Osservatorio di Astrofisica e Scienza dello Spazio di Bologna (OAS)  
Via Gobetti 93/3 (Room 4E3), 40129 Bologna (Italy)

2018 – January 2024

**Director**

INAF–Osservatorio di Astrofisica e Scienza dello Spazio di Bologna (OAS)

2017 (May and June)

**Director in chief**

INAF–Istituto di Radioastronomia (IRA)

2015 – 2018

**Director**

INAF–Osservatorio Astronomico di Bologna (OABO)

2003 – 2015

**Associate Astronomer**

INAF–Osservatorio Astronomico di Bologna (OABO)

1994 – 2003

**Astronomer**

INAF–Osservatorio Astronomico di Bologna (OABO)

1992 – 1994

**Postdoctoral Fellow**

Max Planck Institut für Extraterrestrische Physik, Garching bei München, Germany

1987 – 1988

**Secondary School Teacher**

Physics and Mathematics

1986 – 1987

**Civilian Service**

Alternative to Military Service (20 months)

## EDUCATION AND TRAINING

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- 1988 – 1992 **PhD in Astronomy** Supervisor: Prof. G. Setti  
Alma Mater Studiorum, Università degli Studi di Bologna  
Thesis Title: *"Spectral properties of active galactic nuclei and the cosmic X-ray background"*
- 1981 – 1986 **Master Degree in Astronomy (Laurea)** undergraduate Supervisor: Prof. R. Bergamini  
Alma Mater Studiorum, Università degli Studi di Bologna  
Thesis Title: *"Studio delle metriche di corpi collassati in spazi-tempi cosmologici"*,  
Summa cum Laude (110/110 e Lode)

## RESEARCH EXPERIENCES AND ACTIVITIES

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- Publications & Impact**
- Co-author of > 378 papers in peer review refereed Journals (26 of them as first author)  
Citations (refereed papers): > 31500 (ADS); > 42000 (Google Scholar)  
Citations (all papers): > 33000 (ADS)  
**Hirscher index = 90 (ADS) / 104 (Google Scholar)**  
(considering all publications, with 7 first author publications with > 90 citations)
- Presentations & Seminars**
- **More than 100 presentations** of the results of his research at international/national conferences and collaboration meetings  
**About 40 invited or review talks, or Institute seminars** in the past 15 years.
- Commissions of trust**
- **Regular referee** ( ~ 1 – 2 papers per year) for professional, high impact journals: e.g. Astronomy & Astrophysics, The Astrophysical Journal, The Astrophysical Journal Letters, and Monthly Notices of the Royal Astronomical Society, among others;
  - **Chair and membership of Observing Programs Time Allocation Committee (XMM-Newton, Chandra, ESO, Suzaku among others)**
  - Reviewer for **European Community Grants** within the FP7 and H2020 programs (ERC and Marie Curie Actions) and for the **Italian Research Minister**.
  - **Chair of the Scientific Organizing committee** for several international and national conferences and workshops in the past 20 years.
  - Member of the **XMM-Newton User Group** (2002-2005)
- Leadership and Membership in research projects**
- Principle Investigator of the **XMM-CDFS** project;  
co-Principle Investigator of the **HELLAS** project and of the **Hellas2XMM** project.
  - Member of the **COSMOS** collaboration (> 150 team members)  
**Chair of the AGN Working Group**  
**Core team member** of the XMM-COSMOS (PI: G. Hasinger) and C-COSMOS collaborations (PI: M. Elvis);
  - Member / key co-I of the CDFS Chandra collaboration (PI: N. Brandt); and the **Stripe82-XMM and Chandra** collaboration (PI: M. Urry).
  - Member of the **NASA/NuStar Science Team**.

## Membership in instrument projects

- Member of **Athena** (Advanced Telescope for High ENERGY Astrophysics).  
**Chair** of the Athena Science Working Group on *X-ray Surveys and high-z AGN*.  
**co-lead** of the *high-z AGN Athena supporting paper* (Aird, Comastri et al. 2013).
- Member of the Athena **Wide Field Instrument (WFI) Science Team and Consortium Board**. Italian representative in the WFI consortium.

## GRANTS AND AWARDS

### Fundings ID record

PI of a large number of successful funding projects and research grants:

- Italian Research Minister (PRIN MIUR), Minister of Foreign Affairs and INAF: **total funding of approximately 300.000 euro**;
- Italian Space Agency (ASI): **~ 10 contracts** to support archival data analysis, proprietary data analysis, future space missions, for a total funding of about 300.000 euro over the last 10 years.
- European Community: IEF Marie Curie action and SPACE Cooperation Grant **~ 500.000 euro**

Co-I of > 10 funded programs within PRIN-INAF, PRIN-MIUR, ASI.

### Telescope Time

- Large observational experience with essentially all the X-ray observatories in the last two decades: **ROSAT, ASCA, BeppoSAX, Chandra, XMM, Suzaku, NuSTAR**.

PI of **~3Ms of XMM-Newton time** (XMM-CDFS Large Program; November 2009); *First PI able to get the largest amount of XMM time (~3 Ms) in a single proposal*

Co-Investigator of **most of the largest X-ray surveys projects**, notably: the 1.5 Ms XMM-Newton (PI: G. Hasinger) and 4.6 Ms Chandra (PI: M. Elvis and F. Civano) observations of the COSMOS field; the 7 Ms Chandra (PI: N. Brandt) observations of the CDFS; the 1.5 Ms observations of Stripe82X (PI: M. Urry); the 4.5 Ms observations of XXL (PI: M. Pierre).

- Principal Investigator of observing proposals at various ground-based telescopes (i.e. **TNG, ESO 3.6 m & VLT**) as well as with the infrared **Spitzer** satellite.

Co-Investigator of **many (> 60) optical, NIR, MIR and mm/radio programs of follow-up sources at different telescopes worldwide**, including: Keck/Deimos, Keck/NIRSPEC, Magellan/IMACS, Subaru/FMOS, VLT/SINFONI, VLT/ISAAC, VLT/SOFI, VLT/VIMOS, LBT/LUCI, TNG, PdBI, ALMA, (J)VLA.

### Visiting Researcher in International Institutes (funded visits)

- **2014-2015**: Kingsley Visiting Professor at California Institute for Technology, USA
- **2015**: Visiting Scientist at the New York University of Abu Dhabi (United Arab Emirates)
- **2012**: Visiting Scientist at the Institute for the Physics and the Mathematics of the Universe, University of Tokyo (Japan), and at the
- **2003**: Visiting Scientist at the Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE), in Tonantzintla (Puebla, Mexico),
- **2000**: Visiting Scientist at the Center for Astrophysics (Cambridge, USA)
- **1995**: Visiting Scientist at the Radiation Cosmic Laboratory - RIKEN (Tokyo, Japan)
- **1994-1998**: Visiting Scientist at Max Planck Institut für Extraterrestrische Physik (Garching, Germany)

### Awards

**2016, NASA Group Achievement Award** to the *NUSTAR Extragalactic Survey Team* "for exceptional achievement in executing the *NUSTAR* extragalactic survey program, and thereby resolving a significant fraction of the cosmic X-ray background"

**2014, Accademia dei Lincei**: "*Maria Teresa Messori Roncaglia ed Eugenio Mari*" Prize, "for his studies on the physics and evolution of cosmic X-ray sources and their contribution to the X-ray background"



## ACADEMIC EXPERIENCES AND RESPONSIBILITIES

### Teaching

- Contract Professor of **High Energy Astrophysics**, Physics Department, Ferrara University, Italy (2005-2011)
- Contract Professor of **Space Physics** at the Astronomy Department, Bologna University, Italy (2000-2002)
- **High Energy Astrophysics Lecturer** at several PhD and undergraduate schools (since 1994)

### Mentoring, PhD and Master Thesis Supervision

- Supervisor of many (> 20) **Master Thesis students** and several (> 10) **Ph.D. candidates** at the Astronomy Department of Bologna University. Co-Supervisor of one **Ph.D. student** at Caltech University.

*Ten former students got a permanent position in various Universities and Research Institutes both in Italy and abroad. Four of them are now Associate Professors or equivalent. Two of them are Full Professor or equivalent*

## RESEARCH INTERESTS

### Research Topics

During my career I have mainly worked on **high energy observations** of a wide range of **Active Galactic Nuclei (AGN)**, including Quasars and Seyfert galaxies, blazars and radio galaxies, narrow line Seyfert 1, and many flavours of obscured AGN. The scientific investigation was never limited to the data analysis, but also to the **theoretical interpretation and modelling**.

My most relevant achievements concern the **role of obscured and heavily obscured Supermassive Black Holes** in the framework of AGN demography and in particular their contribution to the X-ray background and to the joint growth of Black Holes and their host galaxies. My most significant and world-wide recognised contribution to high-energy astrophysics and AGN studies in general is the construction of the **first population Synthesis models for the X-ray background**.

Since then, I have been deeply involved and a key player in most of the **extragalactic X-ray surveys** carried over by several X-ray missions and the follow up multiwavelength observations performed with both ground and space-based observatories. The results were obtained thanks to a massive exploitation of major surveys data obtained first with BeppoSAX (the HELLAS survey), later with XMM-Newton (pioneered by the HellasS2XMM survey, then XMM-COSMOS, XMM-CDFS, Stripe82X) and Chandra (COSMOS Legacy and CDFS) and, most recently, with NuSTAR.

The **light up and early evolution of high redshift ( $z > 3$ ) quasars** was pioneered by my group about a decade ago, highlighting the need of combining deep and large area X-ray surveys to trace their cosmic history since the very early phases in the reionization era ( $z \sim 6$ ). *The strong scientific case on the surveys of the first accreting black holes in the Universe of the ESA X-ray mission Athena was built upon the scientific heritage obtained mainly by my group.*

Among other important contributions on the **interpretation of high energy observations of AGN**, I recall:

- at the end of the 1990s, I have significantly contributed to the papers describing the so called "**Blazar sequence**" which was received as a standard paradigm, and still is an important reference, for the modeling of **Blazars emission mechanisms over the entire electromagnetic spectrum**.
- I reported the discovery of **relativistic broadening of the iron line in distant ( $z \sim 1$ ) AGN**, that could be considered the first attempt to probe the effects of General Relativity, in its strong field limit, beyond the local Universe. It also stimulated the **search for and the study of relativistic lines using stacking techniques** in survey fields.

My present scientific activities are concentrated on the **search for and the characterization of the most obscured accreting sources and the nature of the first supermassive black holes in the early Universe**.

The selected 20 publications listed below highlight my impact, contribution and involvement in the development of the field of high energy astrophysics (and in particular the characterization of X-ray spectral properties of AGN from extragalactic surveys) in the past 30 years.

- Balokovic M., Brightman M., Harrison F.A., **Comastri A.** et al., 2018, *New Spectral Model for Constraining Torus Covering Factors from Broadband X-Ray Spectra of Active Galactic Nuclei*, ApJ 854, 42 (176 cit.)
- Reynes A.E. & **Comastri A.**, 2016, *Observational Signatures of High-Redshift Quasars and Local Relics of Black Hole Seeds*, PASA 33, 54 (77 cit.)
- Civano F., Marchesi S., **Comastri A.** et al., 2016. *The Chandra COSMOS Legacy Survey: Overview and Point Source Catalog*, ApJ 819, 62 (390 cit.)
- **Comastri A.**, Gilli R., Marconi A., Risaliti G., & Salvati M., 2015, *Mass without radiation: Heavily obscured AGNs, the X-ray background, and the black hole mass density*, A&A, 574, L10 (56 cit.)
- Lusso E., **Comastri A.**, Simmons D.B. et al., 2012, *Bolometric luminosities and Eddington ratios of X-ray selected active galactic nuclei in the XMM-COSMOS survey*, MNRAS 425, 623 (337 cit.)
- Civano F., Brusa M., **Comastri A.** et al., 2011, *The Population of High-redshift Active Galactic Nuclei in the Chandra-COSMOS Survey*, ApJ, 741, 91 (88 cit.)
- **Comastri A.**, Ranalli P., Iwasawa K. et al., 2011, *The XMM Deep Survey in the CDFS I. First results on heavily obscured AGN*, A&A, 526, L9 (131 cit.)
- Brusa M., Civano F., **Comastri A.**, et al., 2010, *The XMM-Newton Wide-field Survey in the Cosmos Field (XMM-COSMOS): Demography and Multiwavelength Properties of Obscured and Unobscured Luminous Active Galactic Nuclei*, ApJ 716, 348 (280 cit.)
- Brusa M., **Comastri A.**, Gilli R., et al., 2009, *High Redshifts Quasars in the COSMOS Survey: The Space Density of X-ray Selected QSOs*, ApJ 693, 8 (104 cit.)
- Gilli R., **Comastri A.** & Hasinger G., 2007, *The synthesis of the cosmic X-ray background in the Chandra and XMM-Newton era*, A&A 463, 79 (783 cit.)
- La Franca F., Fiore F., **Comastri A.** et al., 2005, *The HELLAS2XMM Survey.VII. The Hard X-Ray Luminosity Function of AGNs up to  $z = 4$ : More Absorbed AGNs at Low Luminosities and High Redshifts*, ApJ 635, 864 (384 cit.)
- **Comastri A.**, 2004, *Compton-thick AGN: the dark side of the X-ray background*, Kluwer Academic Publishers, 308, p. 245-272 (142 cit.)
- Ranalli P., **Comastri A.**, & Setti G., 2003, *The 2-10 keV luminosity as a star formation rate indicator*, A&A 399, 39 (601 cit.)
- **Comastri A.**, Mignoli M., Ciliegi P. et al., 2002, *The HELLAS2XMM survey: II. Multiwavelength observations of P3 an X-ray bright optically inactive galaxy*, ApJ 571, 771 (146 cit.)
- **Comastri A.**, Fiore F., Vignali C. et al., 2001, *The BeppoSAX High Energy Large Area Survey (HELLAS) - III. Testing synthesis models for the X-ray background*, MNRAS 327, 781 (85 cit.)
- Fossati G., Maraschi L., Celotti A., **Comastri A.** & Ghisellini G., 1998, *A unifying view of the spectral energy distributions of blazars*, MNRAS 299, 433 (1153 cit.)
- **Comastri A.**, Fossati G., Ghisellini G. & Molendi S., 1997, *On the Soft X-Ray Spectra of  $\gamma$ -Loud Blazars* ApJ 480, 534 (108 cit.)
- Brunetti G., Setti G. & **Comastri A.**, 1997, *Inverse Compton X-rays from strong FRII radio-galaxies*, A&A 325, 898 (137 cit.)
- **Comastri A.**, Setti G., Zamorani G. & Hasinger G., 1995, *The contribution of AGN to the X-ray background*, A&A 296, 1 (582 cit.)
- **Comastri A.**, Setti G., Zamorani G. et al., 1992, *EXOSAT X-Ray Spectra of Quasars*, ApJ 384, 62 (93 cit.)

**Direction of INAF-OABO**

I was appointed Director of the Bologna Observatory (OABO) on January 1st, 2015 for a three years term. During that time I have acquired **administrative and management skills** to properly run the Observatory.

In 2017 I have **supervised and managed the moving** of OABO and of the Department of Physics and Astronomy of the Bologna University to a new Campus area, under development, close to the CNR Research Area. Besides the technical issues associated to *move more than 120 people*, I took care, with the help of the Responsible of the local INAF Administration, of **the legal aspects of the sales contract and eventually the deed**.

On the scientific side, I have promoted the **first review of the research activities** within OABO and the **guidelines for the observational priorities of the Loiano 152 cm Telescope**, with a particular emphasis on the *"Space Surveillance & Tracking"* activities, which are now a relevant asset for the scientific and technological perspective of the Loiano observatory.

During these three years I also **run as Director, for two months in 2017, the Radioastronomy Institute**, while waiting the procedures to nominate a new Director.

**Direction of INAF-OAS**

On January 1st 2018, OABO and the Institute for Space Astrophysics and Cosmic Physics in Bologna (IASFBO) were merged into the Bologna Observatory for Astrophysics and Space Science (OAS). I was appointed as **first director of this new Institute, the largest within INAF**.

The Observatory is located at the crossroad of several scientific institutes in the Bologna Astrophysics Campus: OAS shares buildings and facilities with the *Bologna University "Physics and Astronomy" Department* and with the *CTAO Headquarters* (see below). OAS also has offices, meeting rooms and laboratories in the *CNR Research Area*, neighbouring the *INAF-Institute of Radioastronomy*. Altogether, the **Bologna Astrophysics Campus hosts today the largest astrophysics group in the country and among the largest in Europe**.

The first major effort I undertook as OAS director was made to **rebuild the organization chart**. In particular, with respect to the administrative and technical services, in 2019 I promoted the recruitment of two lawyers, who became experts in procurement to support the administrative load associated to the many technological projects carried out in OAS.

Since early 2018 INAF started a recruitment policy which implied a massive injection of researchers, at the starting level position, to be distributed to the various Observatories and Institutes. Over three years (2018-2021) the number of new scientists assigned to OAS counts to 30 corresponding to an increase of the order of 35%.

The management of OAS is a difficult and complex job requiring extensive efforts. On the other hand **the scientific environment is extremely lively, offering unique opportunities to foster research collaborations** within OAS and with the other Institutes in the Campus. The scientific and technological activities were reviewed at the end of 2018 and the scientific priorities established after that. The laboratory spaces were re-distributed and reassigned on the basis of a competitive call aimed to optimize the Observatory infrastructures.

A significant fraction of the Observatory research budget was dedicated to **fund two PhD positions per year and a few Post Docs**, on a competitive base. On top of that, I have established a policy to support curiosity driven research initiatives, which are often outside of the main cash flow.

A fraction of the research budget was also devoted to set up **an attractive visitor program**. Many scientists, from various countries, had the opportunity to visit OAS for a fruitful exchange of scientific ideas and projects, until the program was put on hold due to the COVID-19 pandemic situation. On the same vein, financial resources were dedicated to **an aggressive program of invited Campus lectures** – the most relevant being the Christmas Lecture – from well recognized, extremely high-profile scientists worldwide.



Activities relevant to the *Cherenkov Telescope Array*

Starting in September 2015, in collaboration with the former Director of the INAF-IASF Bologna Institute, I have prepared the **proposal to host the Headquarters of the Cherenkov Telescope Array in Bologna** (and/or the CTA Science Data Management Center), in the same University Campus hosting also the INAF Observatory. To this purpose, I was in charge of the **institutional relationships with the University Dean ( Rettore), the Bologna Major and other representatives of the local administration**. On a practical side, I have negotiated with the Bologna University a **very advantageous contract for the managements and running costs** of the building hosting INAF-OAS and the CTAO HQ.

The proposal to host the CTAO HQ was successful, and boosted the role of INAF and Astrophysics in the local area. The CTAO HQ started to be populated around the end of 2017. Since the beginning, I have **established a close collaboration with the former and current DG and the HQ administration**. The technical and administrative support of INAF-OAS was always guaranteed, and by now a close synergy has been established.

Bologna, July 10, 2024

Signature