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Byurakan Astrophysical Observatory (BAO): 80 years of outstanding achievements

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Abstract

The Byurakan Astrophysical Observatory (BAO) is one of the most famous observatories of the Former Soviet Union, Middle East, as well as of the whole world. It was founded in 1946 by the outstanding scientist Viktor Ambartsumian (1908-1996) and became the leader of studies on instability phenomena in the Universe. Many discoveries have been carried out at BAO related to stars, star clusters and other systems, nebulae, galaxies and systems of galaxies. BAO has two major instruments; 1m Schmidt and 2.6m classical telescopes. Together with V. Ambartsumian, outstanding scientists Beniamin Markarian, Grigor Gurzadyan, Marat Arakelian and others have worked at BAO. Many important international meetings and schools for young astronomers have been held. Many important people, including State authorities, Nobel Prize Winners and others have visited BAO. BAO has statuses of RA National Value (since 2013), IAU South West and Central Asia Regional Astronomical Centre (since 2015), IAU Outstanding Astronomical Heritage (OAH, since 2021), it has UNESCO Documentary Heritage item (since 2011), its garden is recognized as Arboretum (2017), and there is RA National Hero Viktor Ambartsumian's house-museum (since 1998). BAO is also Scientific (Astro) Tourism centre recognized by the IAU and Armenian Institute of Tourism (AIT).

Keywords: *Viktor Ambartsumian, Byurakan Astrophysical Observatory, telescopes, history of science, instability phenomena*

1. Introduction: History of the Byurakan Astrophysical Observatory

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1.1. The Author Checklist



V. Ambartsumian Byurakan Astrophysical Observatory (BAO) celebrates its 80th anniversary. It is notable that it was founded just after the Second World War in 1946; this emphasizes the importance of the development of astronomy in Armenia by our great scientist **Viktor Ambartsumian (1908-1996)** who moved from the Leningrad (present Saint Petersburg) State University (LSU) to Armenia to establish the Armenian SSR Academy of Sciences together with Hovsep Orbeli (1887-1961) and other famous scientists. Orbeli was elected the President and Ambartsumian, the first Vice-President of the Academy of Sciences. However, very soon in 1947, Ambartsumian was elected the President and stayed at this position till 1993.

Though the decision at the Academy of Sciences to found an observatory and the selection of the location were made in 1946, the construction works and first observations (with small telescopes without any building or dome) started in spring of 1947. Samvel Safaryan was appointed as the chief architect and a

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beautiful ensemble was designed near Byurakan village, at an average altitude of 1405m, including administrative buildings, laboratories, telescope towers with domes, Viktor Ambartsumian house and some auxiliary buildings. The first observations were carried out under the leadership of two experienced astronomers; Hayk Badalian (1908-1972) and Beniamin Markarian (1913-1985). The first scientific staff members were 8 researchers: Viktor Ambartsumian (Director), Hayk Badalian (Deputy Director), Beniamin Markarian, Pargev Gevorgyan, Levon Vatyan, Ruben Sahakian, Vagharshak Sanamian and Nina Ivanova. Very soon, Lyudwik Mirzoyan joined in 1947 and Grigor Gurzadian in 1948 (he was Ambartsumian's PhD student since 1944), who were not even astronomers.

The Chair of Astrophysics was formally established in Yerevan State University (YSU) Physics Faculty in 1944, and the first graduates (as astronomy specialists) to work at BAO appeared in 1951 (Marat Arakelian, Carlos Grigorian and Edward Khachikian). In a few years, Hrant Tovmassian, Romela Shahbazian, Arsen Kalloghlian, Elma Parsamian, Vigen Malumian and many others joined the Observatory research staff.

In 1946, *the Communications of the Byurakan Astrophysical Observatory (ComBAO)* were founded as the main journal for Byurakan astronomers. Ambartsumian became its first Editor-in-Chief.

It is notable that the first scientific results came immediately after the foundation of BAO. In 1947 stellar systems of new type, **Stellar Associations**, groups of hot (OB) giants and T Tauri stars, were discovered by V. A. Ambartsumian (Ambartsumian, 1948, 1949). It was shown for the first time that the star formation process continues at all stages of the evolution of our Galaxy, including the present one and that the star formation is a permanent process (the maximum ages of stellar associations were estimated at 107 yr compared to 1010 yr of the age of the Galaxy). A conclusion was drawn that stars are formed not individually, but in groups, in stellar associations, together with gas and dust but not from them.

In November 1951, the first scientific meeting was held in BAO. Stellar Associations were the subject of the conference. The Observatory was not entirely built yet, but the investigations of Byurakan astronomers became well-known to the international astronomical community. On September 19, 1956, the **official opening of BAO** was celebrated by holding a conference on Non-stable stars. J. Greenstein, G. Herbig, G. Haro, E. Schatzman, P. L. Kapitsa, B. V. Kukarkin, V. V. Sobolev and other prominent scientists were among the guests.

In the mid-1950s, V. A. Ambartsumian offered a new explanation for the radiation emitted by radio galaxies and proposed a new interpretation of galactic nuclear activity (Ambartsumian, 1956a,b). The idea that galactic nuclei can be active gradually gained broad acceptance, and **active galactic nuclei (AGN)** became a major area of research at many observatories. The discovery of stellar associations, Ambartsumian's ideas on galactic nuclear activity, and studies of radiative transfer based on his principle of invariance (Ambartsumian, 1941, 1942) shaped the subsequent research programme at BAO.





V. A. Ambartsumian and R. K. Shahbazian identified concentrations of young stars in nearby galaxies, which they called *superassociations*. They also identified blue companions around some galaxies and suggested that the companions might have been ejected from those galaxies. Shahbazian later identified

compact groups of compact galaxies, now known as Shahbazian groups. These groups continue to be studied (Baier et al., 1974, and references therein).

In the early 1960s, V. A. Ambartsumian and G. S. Sahakian of Yerevan State University (YSU) investigated possible states of superdense matter. They showed that **baryonic and hyperionic configurations** could exist at densities comparable to nuclear density and with masses of several solar masses (Ambartsumian & Saakyan, 1960, 1962a,b).

In 1960, a new Schmidt telescope with a 40-inch (102 cm) correcting lens and a 52-inch (132 cm) mirror was installed at Byurakan. In 1965, B. E. Markarian began a survey to identify ultraviolet-excess galaxies (Markarian, 1967). The project became known as the **First Byurakan Survey (FBS)** and was carried out with V. A. Lipovetski and J. A. Stepanian (Markarian et al., 1989). The survey continued for 15 years and became one of the best-known surveys in modern astronomy. It led to the discovery of 1515 ultraviolet-excess galaxies, now known as Markarian galaxies. The Byurakan Schmidt remains one of the largest and most efficient Schmidt telescopes in the world. The Markarian survey was the first systematic survey for active galactic nuclei (AGN) and is the largest spectroscopic survey in the world.

Follow-up observations at Byurakan and other observatories revealed many objects of interest. E. Ye. Khachikian and D. Weedman (USA) discovered many new Seyfert galaxies and proposed the first classification of these AGN (Weedman & Khachikyan, 1968). H. M. Tovmassian and colleagues detected and studied radio emission from many Markarian galaxies.

Additional active galaxies were identified among the 621 **galaxies with high surface brightness** catalogued by M. A. Arakelian (Arakelian, 1975). K. A. Sahakian, A. R. Petrosian, and their colleagues later carried out further studies of Markarian galaxies.

Conferences on extraterrestrial civilizations were held in 1964 and 1971. The 1971 meeting was the first international symposium on extraterrestrial civilizations and communication with them. It brought together prominent astronomers, physicists, chemists, biologists, philosophers, and specialists in related fields.

In 1965, the all-Union astrophysical journal **Astrofizika** was founded. Its English translation is published under the title *Astrophysics*. Byurakan astronomers began publishing most of their papers in *Astrofizika*, which became the principal astrophysical journal of the Soviet Union.

IAU Symposium No. 29, *Non-Stable Phenomena in Galaxies*, was held in May 1966 and was a notable event in the history of the Observatory. The participants included J. Oort, F. Zwicky, G. Burbidge, E. Burbidge, M. Schmidt, and many other prominent scientists.

In 1960, H. S. Badalian classified cometary nebulae. E. S. Parsamian discovered many new cometary nebulae and published catalogues of these objects (Parsamian, 1965, Parsamian & Petrosian, 1979). A. L. Gyulbudaghian and T. Yu. Magakian later detected and studied variability in several cometary nebulae (Giulbudagian et al., 1977). Together with their colleagues, they went on to discover and study many other young stellar objects and stellar jets.

In 1967, the Byurakan Astrophysical Observatory (BAO) received the Order of Lenin, the highest award of the Soviet Union, in recognition of its contributions to science.

A conference was held in 1968, devoted to V. A. Ambartsumian's 60-years anniversary. He presented a new work on **statistical investigation of are stars**, estimating the real number of these objects, and predicted that all dwarf stars pass through the stage of are activity (Ambartsumian, 1969). Beginning with the late 1960s, the investigation of are stars became one of the main subjects of BAO. Hundreds of are stars in star clusters and associations (Pleiades, Orion, Hyades, Praesepe, Cygnus, Coma, etc.) were discovered by L. V. Mirzoyan, E. S. Parsamian, H. S. Chavushian, L. K. Erastova, et al. Early stages of evolution of dwarf non-stable stars were investigated (Mirzoyan et al., 1981).

A project on Space Astronomy studied in Byurakan in late 1960s. Under the supervision of G. A. Gurzadyan, Byurakan scientists designed and built 2 ultraviolet "Orion" space observatories that operated onboard Soviet spacecrafts in 1971 and 1973. Later on, H. M. Tovmassian designed and built "Glazar" space observatory, which operated in 1987 onboard Soviet space station "Mir" (Tovmassian et al., 1988).

A. G. Nikoghossian, M. A. Mnatsakanian, and N. B. Yengibarian in late 1960s and 1970s obtained new solutions in Radiation Transfer Theory (RTT) with application of principle of invariance for finite thickness layers and plain-parallel medium (e.g. Nikoghossian, 1995, 2016). They also obtained new results in various fields of mathematical physics. Important contributions in theoretical astrophysics (RTT and other fields) were also made by E. Kh. Danielian, H. A. Harutyunian, G. T. Ter-Kazarian, H. V. Pikichian, R. R. Andreasyan and others.

The installation of the **2.6 m telescope** (one of the largest telescopes in the world at that time) in 1975 was rather important event in the Observatory's life. The opening of the telescope in October 1976

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was accompanied by a symposium on Flare Stars. Scientific meetings on these and related objects were held in 1979 and 1984, too. The 2.6m telescope is the largest at BAO; its operations were stopped in 1991-1996 and it is again operational since 1996, when a new digital equipment was installed due to French-Armenian collaboration.

Since 1977, a Specialized Council for theses defenses functions. Ambartsumian was its chairman in 1977-96. The council accepts theses on astronomy, astrophysics and theoretical physics. More than 50 scientists have defended Ph.D. (Candidate) and Doctoral theses during these years.





In 1978, B. E. Markarian, J. A. Stepanian, and their colleagues launched the **Second Byurakan Survey (SBS)**. Its main goal was to assemble a homogeneous sample of quasars, emission-line galaxies, and ultraviolet-excess galaxies for cosmological studies. Over 15 years, the team obtained more than 600 deep photographic plates and identified about 3600 objects of interest (Markarian et al., 1983, Stepanian, 2005).

In October 1981, the symposium *Principle of Invariance and Its Applications* marked the 40th anniversary of Ambartsumian's principle of invariance, which had found applications in several fields of science. Byurakan also hosted two IAU symposia in the 1980s. IAU Symposium No. 121, *Observational Evidence of Activity in Galaxies*, was held in June 1986 and brought together astrophysicists from 17 countries. Participants discussed several aspects of Ambartsumian's hypothesis and the classical theory of active galactic nuclei (AGN). IAU Symposium No. 137, *Flare Stars in Star Clusters, Associations and the Solar Vicinity*, was held in October 1989 and brought together researchers working on flare stars. By then, BAO was recognised as one of the world's leading centres for flare-star research.

In 1987, H. V. Abrahamian, A. M. Mickaelian, and K. S. Gigoyan began the second part of the First Byurakan Survey (FBS), which focused on identifying and studying blue objects with ultraviolet excess and red late-type stars. The work identified 1103 blue stellar objects (BSOs), including bright quasars, Seyfert galaxies, white dwarfs, and cataclysmic variables (Mickaelian, 2008), as well as 1471 red stars of late M type or carbon stars (Gigoyan et al., 2019). A. M. Mickaelian later used low-dispersion FBS spectra to identify optical counterparts of IRAS sources. This work led to the catalogues of Byurakan–IRAS Galaxies (BIG Mickaelian, 1995) and Byurakan–IRAS Stars (BIS Mickaelian & Gigoyan, 2006).

In 1986 the Research Departments were abolished and small research groups were formed for more efficient scientific work. The Departments were re-established in 2017; at present 9 Research Departments exist like small groups, each involving a few scientists.

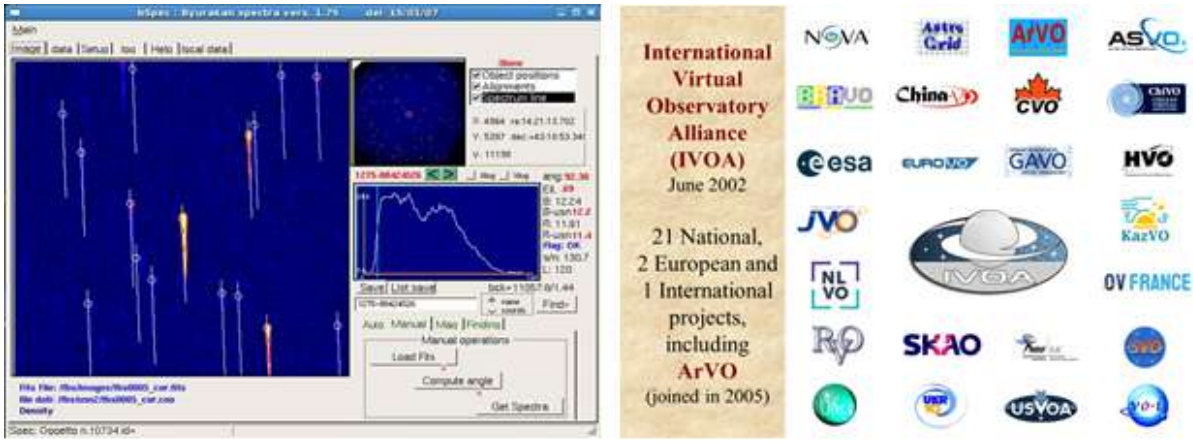
In 1988 V. A. Ambartsumian retired from the position of the director of the observatory, and E. Ye. Khachikian occupied it. Ambartsumian remained the honorary director of BAO until his death in 1996. In 1993-1994 H. A. Harutyunian was the acting director, in 1994-1999, the director was A. R. Petrosian, and in 1999-2003, E. Ye. Khachikian became the director for the second term, then H. A. Harutyunian was the director in 2004-2017. Since 2017, A. M. Mickaelian is the director of BAO.

After the disintegration of the Soviet Union, the Byurakan astronomers underwent difficult situation in economy and science, however, in a few years a new activity began in mid-1990s with some re-organizational

process and new international collaborations. Due to French astronomers, the 2.6 m telescope was equipped with new instrumentation and started to give in 1996 new interesting results. Two meetings (French-Armenian Astronomical Colloquium in 1995 and an International Symposium, devoted to the 50th anniversary of BAO in October 1996) showed that astronomers of the Observatory continue to develop Ambartsumian's ideas and have achieved new interesting results. In August 1998, the IAU Symposium 194 on Activity in Galaxies and Related Phenomena, dedicated to Ambartsumian's 90th anniversary, was held in Byurakan. More than 100 astronomers – the most known specialists of the field from 24 countries, presented and discussed their results and prospects in this area. A new important meeting, IAU Colloquium 184 on AGN Surveys was organized in Byurakan in June 2001. 95 scientists from 20 countries took part. The meeting was devoted to B. E. Markarian, the scientist who carried out the first systematic survey for active galaxies and opened a new era of investigations.

One of the important activities in Byurakan is the organization of Summer Schools and astronomical Olympiads (competitions for pupils and students). A number of such events were organized in 1995-2026, and the first "Byurakan International Summer School (BISS)" was held in August-September 2006, where 8 foreign lecturers and some 30 students participated. The next school was organized in September 2008. The 3rd one was combined with the IAU International School for Young Astronomers (ISYA) in 2010, where 18 lecturers from 7 countries and 49 students from 19 countries participated. Seven more schools were organized in 2012, 2016, 2018, 2020, 2022, 2024 and 2026. BISS are being held regularly once in each two years. 7BISS was the last one.

In 2002-2007, in collaboration with Università di Roma "La Sapienza" (Italy) and Cornell University (USA) teams, the Markarian survey (First Byurakan Survey) plates were digitized and the **Digitized First Byurakan Survey** (**DFBS**; Mickaelian et al., 2007) database was created under the supervision of A. M. Mickaelian. It is one of the largest spectroscopic databases in the world and the largest astronomical database in Armenia. DFBS was the first digitization project in Armenia in all spheres. Since 2011, Markarian Survey and its Digitized version (DFBS) have been included in UNESCO *"Memory of the World"* International Register.



Please convert the text to Latex style "Based on the DFBS and other related projects, **Armenian Virtual Observatory (ArVO)** was created in 2005 and was involved in International Virtual Observatories Alliance (IVOA).

In August 2007, BAO, together with the European and Armenian astronomical societies and Yerevan State Univ. (YSU), was one of the organizers of the **Joint European and National Astronomy Meeting (JENAM-2007)** in Yerevan. It was the largest scientific event ever organized in Armenia; 8 parallel EAS symposia and 5 special sessions were organized. 248 scientists from 31 countries participated, and 358 Plenary, invited, oral, and poster contributions were presented.

In October 2013, IAU Symposium 304 on Multiwavelength AGN Surveys and Studies, dedicated to B. E. Markarian's 100th anniversary was held at NAS RA in Yerevan. It was the largest astronomical symposium by the number of participants (141) and represented countries (28) held in Armenia. Another large meeting, International Conference on Astronomical Heritage of the Middle East sponsored by UNESCO, was organized in Nov 2017 at NAS RA in Yerevan. This was a unique meeting representing archaeoastronomical and cultural astronomy research and results from the regional countries.

A Russian-Armenian space safety **project on the monitoring of Space Debris** was started in 2014 between BAO and Astronomical Scientific Centre related to Roskosmos, the Russian Space Agency. Three

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small telescopes were installed in Saravand (former Radioastronomy and Applied Astronomy departments location) and BAO astronomers are engaged to carry out observations led by Haik Harutyunian.

Due to obtained results the Byurakan Astrophysical Observatory is recognized by the scientific community as one of the main centres for astrophysical research. In 2013 it was recognized by the Armenian Government as **National Value**. The conceptions and ideas proposed in Byurakan have found their further elaboration in many observatories, a few thousands of new objects discovered in Byurakan are observed worldwide by famous astrophysicists.

In 2015, BAO was recognized by IAU as one of its regional centres of astronomy for development, namely for the South-West and Central Asia. Byurakan astronomers have participated in all large international astronomical meetings: International Astronomical Union (IAU) General Assemblies, Symposia, and Colloquia. Many of them are members of various IAU Commissions. V. A. Ambartsumian was the IAU President in 1961-64 and Vice-President in 1948-55, B. E. Markarian and E. Ye. Khachikian have been the Presidents of the IAU Commission No. 28 (Galaxies), each for 3 years. Since 2002, A. M. Mickaelian was a member of the Council of the Euro-Asian Astronomical Society (EAAS), and since 2015, he is its Vice-Chair.

In 2001, BAO astronomers founded the **Armenian Astronomical Society (ArAS)** to bring together Armenian astronomers worldwide. The Society has 100 members from 20 countries, including Armenian astronomers and their international colleagues. ArAS holds annual meetings, publishes a monthly electronic newsletter, and awards the Yervant Terzian Prize annually to young astronomers. It also takes an active part in events at Byurakan and maintains a website on Armenian astronomy, including an online directory of Armenian astronomers worldwide.

BAO initiated collaborations in archaeoastronomy with the NAS RA Institute of History, the NAS RA Institute of Archaeology and Ethnography, and the Matenadaran. In 2012, an archaeoastronomy meeting marked the 1400th anniversary of the birth of the Armenian medieval scholar Anania Shirakatsi. In October 2014, BAO and ArAS jointly organised the meeting *Relation of Astronomy to Other Sciences, Culture and Society*. The meeting covered archaeoastronomy, the role of astronomy in culture, and related fields such as astrochemistry, astrobiology, and astroinformatics.

BAO fostered collaboration between astronomers and computer scientists through its partnership with the NAS RA Institute of Informatics and Automation Problems (IIAP) and through cooperation between ArVO and the IVOA. BAO organised three international symposia on *Astronomical Surveys and Big Data* in 2015, 2020, and 2025, known as ASBD, ASBD-2, and ASBD-3, respectively. The symposia covered astronomical surveys, big data, computer science, and astroinformatics.

Over its 80-year history, BAO has built an international reputation through its research and the many scientific meetings held at Byurakan. Dozens of institutions worldwide collaborate with BAO, including observatories and astronomical institutes in Australia, Chile, China, France, Georgia, Germany, Greece, India, Iran, Italy, Japan, Kazakhstan, Latvia, Mexico, Poland, Portugal, Russia, South Africa, Spain, the United Kingdom, the United States, and Uzbekistan.

Among the visitors to BAO were Nobel laureates Pablo Neruda, Subrahmanyan Chandrasekhar, Charles Townes, Francis Crick, Sin-Itiro Tomonaga, Vitaly Ginzburg, John Mather, Michel Mayor, and Kip Thorne. Other distinguished scientists who visited BAO included Freeman Dyson, J. Oort, F. Zwicky, J. Greenstein, G. Herbig, G. Haro, H. Arp, B. Bok, E. Burbidge, G. Burbidge, M. Schmidt, P. L. Kapitza, M. V. Keldysh, Y. B. Zeldovich, and J. Narlikar. Visiting scientists learned about the Observatory's research programme, discussed scientific questions with Byurakan astronomers, and took part in joint research. BAO also received Soviet leaders, including Nikita Khrushchev in 1961, as well as all Armenian presidents, several prime ministers, numerous government ministers, and foreign ambassadors to Armenia.

Since 1998 BAO bears the name of V. A. Ambartsumian – its founder and scientific leader. It is 80 years that BAO is among the world astronomical centers and successfully continues its new discoveries and high-level research. Thousands of celestial objects bear Armenian names: Armenian astronomers, Byurakan, Armenia, etc. There are Markarian, Arakelian and Kazarian galaxies, Shahbazian compact groups of compact galaxies, Parsamian cometary nebulae, Gyulbudaghian-Magakian objects, First and Second Byurakan Survey objects (stars, galaxies and quasars), Byurakan-IRAS Stars (BIS) and Byurakan-IRAS Galaxies (BIG), Byurakan-Hamburg X-ray (ROSAT) Catalogue sources (BHRC), etc.

We give here a list of the most important events in the history of BAO.

2. Most important events in the history of BAO and Armenian Astronomy

1946 Foundation of the **Byurakan Astrophysical Observatory** (BAO) under the Academy of Sciences of the Armenian SSR. Viktor Ambartsumian became its first director.

1946 Foundation of the journal ***Communications of the Byurakan Astrophysical Observatory* (ComBAO)**.

1947 Discovery of **stellar associations** by Viktor Ambartsumian.

1947 Viktor Ambartsumian was elected president of the Academy of Sciences of the Armenian SSR.

1948–1955 Viktor Ambartsumian served as vice-president of the International Astronomical Union (IAU).

1950 Viktor Ambartsumian and Beniamin Markarian received the USSR State Prize.

1951 First conference at BAO, *Stellar Associations and the Distribution of Hot Giants*.

1953 Viktor Ambartsumian was elected a full member of the USSR Academy of Sciences.

1954 Commissioning of the **0.5 m Schmidt telescope** at BAO.

1954–1955 Viktor Ambartsumian proposed his hypothesis on the **activity of galactic nuclei**.

1956 Official opening of BAO.

1958 Viktor Ambartsumian received the Order of Lenin.

1960 Commissioning of the **1 m Schmidt telescope** at BAO.

1961–1964 Viktor Ambartsumian served as **president of the International Astronomical Union (IAU)**.

1962 Meeting of the IAU Executive Council in Byurakan.

1964 All-Union Conference on *Communication with Extraterrestrial Intelligence* (CETI).

1964 Foundation of the journal ***Astrophysics*** (*Astrofizika*, Afz/Ap).

1965–1980 The **First Byurakan Survey (FBS, Markarian Survey)**, led by Beniamin Markarian and colleagues.

1966 IAU Symposium No. 29, *Instability Phenomena in Galaxies*.

1967 BAO became the first Soviet observatory to receive the **Order of Lenin**, the highest order in the USSR.

1968 Viktor Ambartsumian was awarded the title of Hero of Socialist Labour.

1968–1972 Viktor Ambartsumian served as **president of the International Council of Scientific Unions (ICSU)**.

1971 First International Conference on *Communication with Extraterrestrial Intelligence* (CETI), organised by Carl Sagan and Viktor Ambartsumian.

1971 Launch of the *Orion* ultraviolet space observatory, built at BAO by Grigor Gurzadian.

1971 Viktor Ambartsumian received the M. V. Lomonosov Gold Medal, the highest award of the USSR Academy of Sciences.

1973 Launch of the *Orion-2* ultraviolet space observatory, built at BAO by Grigor Gurzadian.

1974 Viktor Ambartsumian and Eugene Kharadze established the joint Armenian–Georgian (Byurakan–Abastumani) astronomical colloquia.

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1974 Viktor Ambartsumian received the Order of Lenin.

1975 Commissioning of the **2.6 m telescope** at BAO.

1977 Establishment of the **Specialized Council for Candidate and Doctoral Theses** at BAO.

1978 Viktor Ambartsumian was awarded the title of Hero of Socialist Labour for the second time.

1978–1991 The **Second Byurakan Survey (SBS)**, led by Beniamin Markarian, Jivan Stepanyan, and colleagues.

1986 The research departments were dissolved and replaced by groups focused on specific research topics.

1986 IAU Symposium No. 121, *Observational Evidence of Activity in Galaxies*.

1987 Joint Summer School for Young Astronomers, organised by BAO and the European Southern Observatory (ESO).

1988 Edward Khachikian became director of BAO and served until 1993.

1988 Viktor Ambartsumian was named honorary director of BAO.

1989 IAU Symposium No. 137, *Flare Stars in Star Clusters, Associations and the Solar Vicinity*.

1992 Grigor Gurzadian founded the Garni Space Astronomy Institute.

1993 Viktor Ambartsumian was named honorary president of the Armenian National Academy of Sciences.

1994 Armenia joined the IAU as a National Member.

1994 Artashes Petrosian became director of BAO and served until 1998.

1994 Viktor Ambartsumian received the annual national prize of the Hayastan All-Armenian Foundation for his contributions to science and culture.

1994 Viktor Ambartsumian received the Order of the Motherland and the title of National Hero of Armenia.

1994–1996 French–Armenian astronomy programme *PICS*, led by Daniel Kunth and Artashes Petrosian.

1995 Viktor Ambartsumian received the State Prize of the Russian Federation.

1997–2003 French–Armenian astronomy programme *Jumelage*, led by Daniel Kunth, Artashes Petrosian, and Artur Nikoghossian.

1998 BAO was named after Viktor Ambartsumian.

1998 Foundation of the Viktor Ambartsumian House-Museum.

1998 IAU Symposium No. 194, *Activity in Galaxies and Related Phenomena*.

1999 Edward Khachikian began his second term as director of BAO and served until 2003.

1999 Foundation of the **Armenian Astronomical Society (ArAS)**.

1999 Astronomy olympiads were incorporated into the programme of the Ministry of Education and Science.

2001 IAU Colloquium No. 184, *AGN Surveys*.

2001 ArAS was officially registered and joined the European Astronomical Society (EAS) as an affiliated society.

2002–2007 Digitisation of the Markarian Survey and creation of the **Digitized First Byurakan Survey (DFBS)**, Armenia's first digitisation project.

2004 Haik Harutyunian became director of BAO and served until 2017.

2005 Establishment of the **Armenian Virtual Observatory (ArVO)**, which joined the International Virtual Observatory Alliance (IVOA).

2006 Launch of the **Byurakan International Summer School (BISS)** series.

2007 Joint European and National Astronomy Meeting (JENAM-2007), *Our Non-Stable Universe*.

2007–2009 French–Armenian astronomy programme *Jumelage*, led by Georges Alecian and Artur Nikoghossian.

2008 The Government of the Republic of Armenia celebrated the centenary of Viktor Ambartsumian's birth, which was also recognised by UNESCO.

2009 Armenia took part in the **International Year of Astronomy (IYA-2009)**.

2009 Establishment of the V. Ambartsumian International Science Prize.

2010 The third Byurakan International Summer School (3BISS) was held jointly with the **IAU International School for Young Astronomers (ISYA)**.

2011 The **Markarian Survey was inscribed on UNESCO's *Memory of the World* (MOW) International Register of Documentary Heritage**.

2013 IAU Symposium No. 304, *Multiwavelength AGN Surveys and Studies*.

2013 The Government of the Republic of Armenia recognised **BAO as a National Value**.

2014 Establishment of the Byurakan Science Camps (BSC).

2014 Launch of the joint BAO–Roscosmos project on **monitoring space debris**.

2015 Establishment of the **IAU South West and Central Asian Regional Office of Astronomy for Development** (SWCA ROAD).

2015 Launch of the **IAU SWCA Regional Astronomical Workshops (RAW)** series.

2015–2021 The **BAO Plate Archive Project** digitised 37 500 photographic plates and determined their astrometric solutions.

2017 Armenia joined the European journal ***Astronomy & Astrophysics* (A&A)**.

2017 Areg Mickaelian became director of BAO, with a term running through 2027.

2017 Re-establishment of the research departments at BAO.

2017 The Armenian Ministry of Ecology recognised the BAO garden as an arboretum.

2017 UNESCO Conference on *Astronomical Heritage of the Middle East*.

2019–2020 Research projects associated with the V. Ambartsumian International Science Prize.

2019 Launch of the **IAU SWCA Regional Astronomical Summer Schools (RASS)** series.

2020 Areg Mickaelian and his research team received the **Annual Prize of the President of the Republic of Armenia** (Pogosian Prize) in Physics.

2021 BAO received the **Gold Medal of the National Academy of Sciences of the Republic of Armenia** (NAS RA).

2021 BAO was added to the IAU list of Outstanding Astronomical Heritage (OAH).

2021 Areg Mickaelian and colleagues developed a more detailed classification of active galaxies by activity type.

2021 Publication of the 75th-anniversary book *Byurakan Astrophysical Observatory – 75 Years of Outstanding Achievements* (Mickaelian, 2021a).

2022 **Annual meeting of the Board of Directors of *Astronomy & Astrophysics* (A&A)** in Yerevan.

2023 Establishment of regular Astronomy School Teacher Training Programmes (ASTTP).

2023 **IAU Symposium No. 365 in Yerevan, *Dynamics of Solar and Stellar Convection Zones and Atmospheres*.**

2024 Opening of the UNESCO Heritage Centre at BAO.

2025 Tigran Magakian and Tigran Movsessian received the **NAS RA Annual Prize** in Physics.

2025 UNESCO Regional Conference *Astronomical Heritage of the Middle East – 2*.

2026 IAU Conference *Communicating Astronomy with the Public* (CAP) in Yerevan.

2026 The BAO 2.6 m telescope joined the OPTICON Alliance.

2026 IAU Hands-on Workshop (I-HOW) in *Radio Astronomy* at Byurakan.

2026 BAO 80th-anniversary symposium *Our Unstable Universe*.

2027 (planned) *Astronomy & Astrophysics* (A&A) school on *Scientific Writing for Young Astronomers* (SWYA).

3. Official Statuses of BAO

We give here the list of Official Statuses of BAO.

Table 1. Official statuses, awards, and distinctions of the Byurakan Astrophysical Observatory (BAO).

	Awarded / Established	
BAO official statuses	**Organisation / Body**	**Year**
BAO established as a research institute of the Academy of Sciences	Academy of Sciences of the Armenian SSR	1946
BAO recognised as a National Value of the Republic of Armenia	Government of the Republic of Armenia	2013
Armenia designated as an IAU regional astronomy centre, with BAO as the host institution	International Astronomical Union (IAU)	2015
BAO's 2.6 m telescope ranked among the ten largest telescopes across Europe, Asia, Africa, and Australia and was listed among the largest scientific instruments in the USSR	USSR Academy of Sciences	1975
BAO's 1 m Schmidt telescope ranked among the ten largest Schmidt telescopes in the world	International astronomical community	1960
Markarian Survey inscribed on the *Memory of the World* International Register of Documentary Heritage	UNESCO	2011
Byurakan ranked among the ten most frequent hosts of IAU symposia and colloquia	IAU (announced at the 30th General Assembly)	2018
Byurakan International Summer Schools (BISS) ranked among the three leading astronomy schools worldwide	IAU (announced at the 30th General Assembly)	2018
BAO became the first Soviet observatory to receive the Order of Lenin, the highest Soviet order	Government of the USSR	1967
BAO became the only academic research institute to receive the NAS RA Gold Medal	NAS RA Presidium	2021
The Armenian Astronomical Society (ArAS), based at BAO, became an affiliated society of the EAS	European Astronomical Society (EAS)	2001
The Armenian Virtual Observatory (ArVO), a BAO project, joined the IVOA	International Virtual Observatory Alliance (IVOA)	2005
Establishment of the house-museum of Viktor Ambartsumian, National Hero of Armenia	Government of the Republic of Armenia	1998
BAO garden recognised as an arboretum	Ministry of Ecology of the Republic of Armenia	2017
BAO architectural ensemble included on Armenia's list of monuments	Ministry of Culture of the Republic of Armenia	1992
BAO Pantheon (cemetery) designated as a monument of local significance	Ministry of Education, Science, Culture and Sports of the Republic of Armenia	2021
BAO as an initiator and centre for scientific tourism	IAU Office of Astronomy for Development (OAD) and Armenian Institute of Tourism (AIT)	2016

4. Summary and Conclusion

Over the past 80 years, the Byurakan Astrophysical Observatory (BAO) has conducted scientific research, organised scientific meetings, built professional networks, and carried out educational and public outreach activities.

Below, we summarise the **most important facts about BAO**.

1) **BAO was founded in 1946** by Viktor Ambartsumian, a National Hero of Armenia, as a research institute of the Academy of Sciences of the Armenian SSR.

2) Viktor Ambartsumian discovered **stellar associations** at BAO in 1947. The discovery showed that stars form in groups and that star formation is still taking place in the Galaxy.

3) In the mid-1950s, Viktor Ambartsumian proposed the **hypothesis of galactic nuclear activity**, which opened a new area of astrophysical research.

4) Beniamin Markarian and his colleagues conducted the **First Byurakan Survey (FBS)** at BAO from 1965 to 1980. The largest spectroscopic survey of the northern sky, it introduced a new method for finding active galaxies and is regarded as one of the major achievements of twentieth-century astrophysics.

5) At BAO, Grigor Gurzadyan designed and built the **first Soviet space telescopes**, *Orion* (1971) and *Orion-2* (1973), which operated at ultraviolet wavelengths.

6) Astronomers at BAO discovered many new celestial objects. Approximately 14 500 celestial objects carry names or catalogue designations associated with Armenia.

7) The **1 m Schmidt telescope**, installed at BAO in 1960, ranks among the ten largest wide-field telescopes in the world.

8) The **ZTA-2.6 telescope**, installed in 1975, is BAO's largest observing instrument and ranks among the ten largest telescopes across Europe, Asia, Africa, and Australia. At the time of its installation, it was the seventh largest telescope in the world.

9) The **BAO architectural ensemble**, designed by Armenian architects Samvel Safaryan and Sargis Gurzadyan, is recognised as a modern architectural monument of the Republic of Armenia.

10) In 1971, BAO hosted the world's first international conference on the search for extraterrestrial intelligence (SETI) and communication with extraterrestrial intelligence (CETI).

11) Byurakan ranks among the ten locations that have most frequently hosted International Astronomical Union (IAU) meetings. Other locations on the list include Paris, Rome, Vienna, Beijing, Rio de Janeiro, and Honolulu.

12) The **Byurakan International Summer Schools (BISS)** have been held since 2006. In 2018, the IAU recognised BISS as one of the three leading astronomy schools in the world. Eight editions took place through 2022, in 2006, 2008, 2010, 2012, 2016, 2018, 2020, and 2022. The 2010 edition was held jointly with the IAU International School for Young Astronomers (ISYA).

13) In 1967, BAO became the first Soviet observatory to receive the **Order of Lenin**, the highest order in the USSR. On its 75th anniversary, BAO also received the Gold Medal of the National Academy of Sciences of the Republic of Armenia (NAS RA).

14) The **Viktor Ambartsumian House-Museum**, dedicated to the scientist and National Hero of Armenia, opened at BAO in 1998. In the same year, the Observatory was named after Viktor Ambartsumian.

15) The **Armenian Astronomical Society (ArAS)**, based at BAO, brings together 100 astronomers from 20 countries. It was founded in 1999 and officially registered in 2001, when it joined the European Astronomical Society (EAS) as an affiliated society.

16) From 2002 to 2007, BAO carried out Armenia's first digitisation project. The project digitised 2 000 photographic plates from the Markarian Survey and produced the **Digitized First Byurakan Survey (DFBS)**, Armenia's largest astronomical database.

17) The **Armenian Virtual Observatory (ArVO)** was established at BAO in 2005. It is one of the 21 national projects of the International Virtual Observatory Alliance (IVOA).

18) In 2011, the Markarian Survey was inscribed on UNESCO's ***Memory of the World*** **International Register**. It is one of Armenia's 15 UNESCO-listed heritage entries and one of the relatively few scientific entries on the register.

19) In 2013, the Government of the Republic of Armenia recognised BAO as a **National Value**. BAO is one of three institutions with this designation, alongside the Matenadaran and the Armenian Genocide Museum-Institute.

20) Since 2014, a Roscosmos station at BAO has monitored space debris under a contractual agreement.

21) In 2015, the International Astronomical Union (IAU) designated BAO as the host of its **Regional Office of Astronomy for Development for South West and Central Asia**.

22) In 2016, the IAU recognised BAO as an initiator of astronomical tourism. Under a 2015 agreement with the Armenian Institute of Tourism, BAO was recognised as a centre for scientific tourism in Armenia.

23) In 2017, the Ministry of Ecology of the Republic of Armenia recognised the green grounds of BAO as an arboretum.

24) BAO organises astronomy education and public outreach activities for schoolchildren, teachers, and university students.

25) BAO is the only scientific institute in Armenia with a public relations department and a press secretary. It also maintains a website with information about the Observatory and its activities.

For further information, see Mickaelian (2016, 2021a,b, 2023) and visit the BAO website at https://www.bao.am.

References

Ambartsumian V. A., 1941, Journal of Physics, 5, 93

Ambartsumian V. A., 1942, Izvestiya Acad. Sci. USSR, Ser. Geograph. and Geophys. Sci., p. 97

Ambartsumian V. A., 1948, Evolution of Stars and Astrophysics. Acad. Sci. ArmSSR, Yerevan

Ambartsumian V. A., 1949, Doklady USSR Acad. Sci., 68, 21

Ambartsumian V. A., 1956a, in Proceedings of the Fifth Conference on Problems of Cosmogony: Radioastronomy. Acad. Sci. USSR, pp 413–416

Ambartsumian V. A., 1956b, Izvestiya Acad. Sci. ArmSSR, Ser. Phys.-Math., Nat. and Tech. Sci., 9, 23

Ambartsumian V. A., 1969, in Proceedings of the Symposium Stars, Nebulae, Galaxies. Acad. Sci. ArmSSR, pp 283–292

Ambartsumian V. A., Saakyan G. S., 1960, Soviet Astronomy, 4, 187

Ambartsumian V. A., Saakyan G. S., 1962a, Soviet Astronomy, 5, 601

Ambartsumian V. A., Saakyan G. S., 1962b, Soviet Astronomy, 5, 779

Arakelian M. A., 1975, Commun. BAO, 47, 3

Baier F. W., Petrosyan M. B., Tiersch H., Shakhbazian R. K., 1974, Astrofizika, 10, 327

Gigoyan K. S., Mickaelian A. M., Kostandyan G. R., 2019, MNRAS, 489, 2030

Giulbudagian A. L., Magakian T. Y., Amirkhanian A. S., 1977, Astronomy Letters, 3, 84

Markarian B. E., 1967, Astrophysics, 3, 55

Markarian B. E., Lipovetski V. A., Stepanian J. A., 1983, Astrophysics, 19, 29

Markarian B. E., Lipovetski V. A., Stepanian J. A., Erastova L. K., Shapovalova A. I., 1989, Communications of SAO, 62, 1

Mickaelian A. M., 1995, Astrophysics, 38, 349

Mickaelian A. M., 2008, AJ, 136, 946

Mickaelian A. M., 2016, Byurakan Astrophysical Observatory. Edit Print Publ. House, Yerevan

Mickaelian A. M., ed. 2021a, Byurakan Astrophysical Observatory – 75 years of Outstanding Achievements

Mickaelian A. M., 2021b, Communications of BAO, 68, 1

Mickaelian A. M., 2023, Communications of BAO, 70, 9

Mickaelian A. M., Gigoyan K. S., 2006, Astron. Astrophys., 455, 765

Mickaelian A. M., Nesci R., Rossi C., et al., 2007, Astron. Astrophys., 464, 1177

Mirzoyan L. V., Chavushyan O. S., Oganyan G. B., Ambaryan V. V., Garibdzhanyan A. T., Melikyan N. D., Natsvlishvili R. S., 1981, Astrophysics, 17, 38

Nikoghossian A. G., 1995, Astrophysics, 38, 577

Nikoghossian A. G., 2016, J. Quantit. Spectrosc. Radiat. Transfer, 183, 90

Parsamian E. S., 1965, Izv. Akad. Nauk Arm. SSR., Ser. Fiz.-Math, 18, 146

Parsamian E. S., Petrosian V. M., 1979, Commun. BAO, 51, 3

Stepanian J. A., 2005, Rev. Mex. Astron. Astros., 41, 155

Tovmassian H. M., Khodzhayants Y. M., Krmoyan M. N., et al., 1988, Astron. Letters, 14, 123

Weedman D. W., Khachikyan E. E., 1968, Astrophysics, 4, 243