

# ArAS News

NEWSLETTER OF THE  
ARMENIAN ASTRONOMICAL SOCIETY (ArAS)

No. 29 (February 12, 2009)

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The ArAS Newsletter in the INTERNET: <http://www.aras.am/arasnews.html>

## INTERNATIONAL YEAR OF ASTRONOMY NEWS



The Opening ceremony of the International Year of Astronomy (IYA-2009) was held in Paris, January 15-16, 2009, under the aegis of the UN, the UNESCO (United Nations Educational, Scientific and Cultural Organization), the IAU (International Astronomical Union). It was also supported by a number of sponsors including French and international organizations and institutions. About 800 persons participated, among them eminent scientists (including Nobel Prize winners), and also about 100 young students from over 100 countries, participating to the International Year IYA2009.

A number of events and activities will be organized in Armenia as well, including the active work for advertisement of the astronomy by mass media (newspapers, radio, TV, Internet), publication of astronomical materials (including calendars and DVDs), One of the activities is the Internet series of the “**Outstanding Armenian astronomers**” (see corresponding section of this Newsletter), which is already open. Later in February, professional and student journalists will gather in Byurakan and the IYA-2009 tasks and details will be presented. One of the intensions is to prepare specialists for the scientific journalism, which is at present absent in Armenia.

The IYA webpage is available at <http://www.astronomy2009.org/> and the IYA-2009 Armenian webpage, at [http://www.aras.am/IYA\\_2009.htm](http://www.aras.am/IYA_2009.htm).

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## SCIENCE IN BYURAKAN IN 2000-2008

After the very hard years in 1990s, the Byurakan Astrophysical Observatory gradually enters a new epoch of its development and activities. The situation of the recent years have controversial influence on science in Byurakan; from one hand the funding remains at very low level and it is rather difficult to attract young people (though there are a lot of good ones), and on the other hand, possibilities for international collaboration and joint high-level research are now open. The infrastructure in Byurakan needs a lot of funding; especially the telescopes are in poor state (renovation, new equipment, and new receivers are needed), however, the Byurakan astronomers now use also foreign instruments, including space telescopes (HST, SST, etc.) and publish papers in prestigious international journals (ApJ, AJ, A&A, etc.), which before was extremely rare. One of the important changes is the possibility of doing high-level science using the Internet resources (as well as using the Virtual Observatory (VO) environment; the Armenian VO project was recently started), which significantly helps countries like Armenia where there are good scientists but no enough funding and conditions. At last, a number of grants and short-term foreign fellowships are available that give an important financial support for actively working astronomers.

One could state that during all the recent years (the years of independence in Armenia?), no detailed analysis of the situation in science in Byurakan has been made, and this will be an attempt to present the objective situation and find ways for further efficient developments. It is especially important because the science funding is now directed at the national and international programs and large projects. So based on the analysis of the efficiency of the past years, Armenian astronomy should define its science policy and develop the national program for the next decades (like the **Decadal Programs** in the USA and **ASTRONET** in Europe). And besides, one of the ways to survive is joining the large international programs and projects. This should be a state policy; however until now anything achieved has been done by individual scientists or research groups.

Compared to the Soviet times (and even to 1990s), at present the **research staff of BAO** is not very large; 51 researchers. Since 2003, **Dr. H.A. Harutyunian** is the Director, **Dr. N.D. Melikian** is the Deputy Director,

and **Dr. E.H. Nikogossian** is the Scientific Secretary. *Dr. A.M. Mickaelian* is in charge of the international relations. There is a Scientific Council chaired by the Director that discusses current problems and is advisory for the administration. The scientific departments at present do not operate, though in fact (as before) the research staff is divided into three large sections: Physics of Stars and Nebulae, Extragalactic Astronomy, and Theoretical Astrophysics. There are **three laboratories for technical developments**; the Laboratory of 2.6m telescope (headed by T.H. Movsessian), the Laboratory of 1m Schmidt telescope (headed by S.K. Balayan), and the Laboratory of Small telescopes (headed by A.S. Amirkhanian). The research staff of BAO is rather old; the average age is 51.6 year. There are only 7 astronomers younger than 30 (1 is a Ph.D. student, and 4 are still students and work part-time), 6 are between 30 and 40, 4 – between 40 and 50, 19 – between 50 and 60, 6 – between 60 and 70, and 9 are between 70 and 80. This pattern appeared due to a long absence of young scientists in 1990s, and now the situation is being gradually improved. There are 27 Ph.D.s (43-77 years old, average age is 58!) and 6 Doctors of Science (D.Sci.) (55-80 years old, average age is 69.5).

The **2.6m telescope** is in fact the only instrument that gives scientific results. The famous **1m Schmidt telescope** is under renovation and a project in collaboration with Russian colleagues is active. However, it is not yet clear when the scientific results will come. A few other **small telescopes** are in use as well and may be used for study of Solar system bodies, variable stars, bright galaxies, etc. The **Byurakan plate archive** is very rich (some 30,000 plates), and there are plans for digitization and creation of an electronic database for further possible projects. The famous First Byurakan Survey (FBS, Markarian survey) has been digitized and now is available as the Digitized FBS (**DFBS**). A part of the Second Byurakan Survey (SBS) has been also scanned and upon collection of the missing plates will be fully digitized. Leaving the description of telescopes and databases for another article, I would like here to focus on the research projects, obtained results, publications, international collaboration, and grants, as well as other topics and events in the Byurakan's science will be discussed.

To have full information about science in Byurakan, for the first time a complete analysis of all activities in 2000-2008 has been carried out and as a result we have created and published a database of current science projects, international collaboration, received grants, obtained scientific results and achievements, and publications by the Byurakan astronomers during 2000-2008, as well as the scientific meetings and other activities. This database is available at the ArAS webpage under the menu *Byurakan Astrophysical Observatory* (see also the section “ArAS new webpage” of this Newsletter, p. 18).

**Current Projects** is a complete reference, where one can find submenus to view the projects by subjects, by principal investigators (PI), by collaborating countries, by received grants, or by number of publications. You are able to view, for example, projects that are devoted to studies of non-stable stars or AGN (as well as by sub-subjects in these fields), projects that are led by T.Yu. Magakian or A.R. Petrosian, projects that are being developed in collaboration with French or US astronomers, or those projects that have been awarded ANSEF or PICS (travel) grants. It is amazing that even at this difficult time for BAO our astronomers maintain several dozens of projects, many of which have international collaboration and have awarded grants from various science funds. But what is their productivity? We will see later.

For each project, title, main topics, the team, collaborations, number of publications in 2000-2008 (and link to the publications), grants, and contact person (typically the PI) are given. Altogether, Byurakan astronomers have 97 large and small projects, which are divided to the following general subjects: Sun and Solar System (4 projects), Physics of Stars and Nebulae (33), Extragalactic Astronomy (39), Surveys (3), Multiwavelength Astronomy (6), Cosmology and Theoretical Astrophysics (5), Databases (3), and Instrumentation (4). 33 PIs lead these projects, in some cases the PI is conditional as the PI is a foreign scientist for some collaborative projects or some astronomers develop a project without funding and without having an official project.

Let us present a few of the **largest projects** having many publications, collaborations, and grants:

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**Spectroscopic Study of Young Stellar Objects** (T.Yu. Magakian (PI), T.H. Movsessian, E.H. Nikogossian, et al.). Collaboration with France, Germany, Japan, Russia, UK, and USA. ANSEF, two INTAS, and NFSAT research grants, PICS and DAAD travel grants. 15 publications in 2000-2008.

**The FBS Late-Type Stars** (K.S. Gigoyan (PI), et al.). Collaboration with France, Germany, and UK. PICS and DAAD travel grants. 15 publications.

**The FBS Blue Stellar Objects** (A.M. Mickaelian (PI), P.K. Sinamyan). Collaboration with France and Italy. PICS and Roma University travel grants. 14 publications.

**Radiative Transfer in Inhomogeneous Atmospheres** (A.G. Nikoghossian). Collaboration with France. PICS travel grants. 12 publications.

**Optical Identification and Study of IRAS Sources** (A.M. Mickaelian (PI), K.S. Gigoyan, L.A. Sargsyan). 12 publications.

**Spectroscopic Study of BIG Objects** (A.M. Mickaelian (PI), S.A. Hakopian, S.K. Balayan, L.A. Sargsyan). Collaboration with France and Russia. ANSEF research grant and PICS travel grants. 11 publications.

**The Digitized First Byurakan Survey (DFBS)** (A.M. Mickaelian (PI), L.A. Sargsyan, et al.). Collaboration with Italy, USA, Germany, and IIAP (Armenia). ANSEF and CRDF research grants, PICS, NSF/NASA, and Rome University travel grants. 10 publications.

**Search and Study of Carbon Stars in the Galactic Halo** (K.S. Gigoyan (PI), et al.). Collaboration with France, Germany, Italy, and UK. PICS and DAAD travel grants. 10 publications.

**Studies of Local Starburst Galaxies** (A.R. Petrosian (PI), et al.). Collaboration with France and USA. STScI fellowships and PICS travel grants. 10 publications.

**The Formation of Heavy Molecules in Molecular Clouds and Related Phenomena** (A.G. Yeghikyan). Collaboration with Germany, Italy, and UK. 9 publications.

**Observations of Flare Stars in Solar Neighbourhood and New Flare Stars in Galactic Dark Clouds** (N.D. Melikian (PI), A.A. Karapetian). Collaboration with Australia, France, Georgia, Russia, and Spain. PICS travel grants. 8 publications.

**Search for HH-Objects and Emission-Line Stars in Star Forming Regions** (T.Yu. Magakian (PI), T.H. Movsessian, E.H. Nikogossian). Collaboration with USA. ANSEF grant. 7 publications.

**Studies of the SBS Galaxies** (A.R. Petrosian (PI), et al.). Collaboration with USA. STScI fellowships. 7 publications.

**Spectral Study of the SBS Galaxies in the Selected Fields** (S.A. Hakopian (PI), S.K. Balayan). Collaboration with Russia. ANSEF grant. 7 publications.

**Spectral, Photometric, and Speckle Studies of Visual Binaries** (N.D. Melikian (PI), A.A. Karapetian). Collaboration with Mexico, Russia, and Spain. 6 publications.

**Supernovae in Active and Star Forming Galaxies** (A.R. Petrosian (PI), A.A. Hakobyan). Collaboration with France, Italy, and USA. STScI fellowships and PICS travel grants. 6 publications.

**Radiation of Coronal Supra-Thermal Steams** (A.G. Nikoghossian). Collaboration with France. PICS travel grants. 5 publications.

**Detailed Study of the T Tau Star AA Tau and New T Tau Stars** (T.Yu. Magakian (PI), T.H. Movsessian, E.H. Nikogossian). Collaboration with France, Japan, and Kazakhstan. 5 publications.

**Galactic Molecular Clouds and Star Forming Regions** (A.L. Gyulbudaghian). Collaboration with Chile. 5 publications.

**Statistical Studies of Radio Pulsars** (V.H. Malumian (PI), A.N. Harutyunyan). 5 publications.

**Search and Study of Dark Globules** (A.L. Gyulbudaghian). Collaboration with Chile. 4 publications.

It is necessary to note that very few projects are being supported by the Armenian government (in fact at very low funding level). At present there are only **6 projects having state (thematic) funding**; these are groups headed by E.Ye. Khachikian, T.Yu. Magakian, A.P. Mahtessian, A.G. Nikoghossian, E.S. Parsamian, and A.R. Petrosian. In addition, N.D. Melikian and A.M. Mickaelian have their research groups.

But I would like to focus on the real research groups and their efficiency. In fact, there are very few people in Byurakan working together and having joint publications. The best (the only?) example is T.Yu. Magakian's group, namely T.Yu. Magakian, T.H. Movsessian and E.H. Nikogossian; they started working together in 2003 and since then have 13 joint publications (10 refereed ones), which is the maximum in Byurakan. There are no other groups (three or more people) having even 5 refereed publications! The next one was the group of A.M. Mickaelian, S.A. Hakopian and S.K. Balayan working together in 2000-2004 which

produced 8 publications (but only 4 refereed). If taking pairs of researchers, T.Yu. Magakian and T.H. Movsessian have 27 joint publications (20 refereed) (including also those with E.H. Nikogossian), N.D. Melikian and A.A. Karapetian – 18 (15), S.A. Hakopian and S.K. Balayan – 15 (10) (including those with A.M. Mickaelian), A.M. Mickaelian and K.S. Gigoyan – 12 (7), K.S. Gigoyan and H.V. Abrahamian – 12 (7), A.M. Mickaelian and L.A. Sargsyan – 11 (7), and A.M. Mickaelian and S.K. Balayan – 11 (5) (including those with S.A. Hakopian). In addition, some of these pairs published papers on different subjects and no definite project can be mentioned. This is the situation, which is not typical of the situation in modern science, where most of the strong projects have stable teams working together for some period and producing dozens of papers. It may be stated that this way large projects are not possible in Byurakan, which is really so; this is one of the main problems and the reason for so many (small) projects and numerous subjects. The research staff of 51 persons have 97 projects, but only 10 of them produced 9 or more publications during 2000-2008, i. e. at least one paper per year! If we take only refereed papers, then the situation is even worse.

May be then (some of) the Byurakan scientists prefer working alone? If taking papers by single authors (individually working researchers), the situation is completely different. It appears that most of the productive authors have 1-2 or even no individual papers. If taking only refereed papers, most productive have been A.M. Mickaelian (11), A.G. Nikoghossian (10), L.K. Erastova (5), and H.A. Harutyunian (4).

Let us combine the projects to have larger ones and list those having at least 10 publications in 2000-2008; we will have only the following 8 projects (it's better to say 'research fields'):

***Search and studies of young stellar objects*** (T.Yu. Magakian, et al.), 33 publications (23 refereed).

***Studies of AGN, starbursts, and Supernovae*** (A.R. Petrosian, et al.), 30 (22).

***Late-type (including carbon) stars*** (K.S. Gigoyan, et al.), 25 (18).

***Optical identification and studies of IR sources*** (A.M. Mickaelian, et al.), 27 (17).

***FBS blue stellar objects, DFBS, and ArVO*** (A.M. Mickaelian, et al.), 28 (15).

***Study of star formation regions and late-type stars*** (N.D. Melikian, et al.), 18 (15).

***Radiative transfer in inhomogeneous atmospheres*** (A.G. Nikoghossian), 12 (12).

***Galactic star forming regions and dark globules*** (A.L. Gyulbudaghian), 11 (11).

We must note that the DFBS is in fact a large project, which itself produced only 10 publications because of its scientific-technical nature, and the main result came after several years of hard work (many papers are expected from science projects based on the DFBS). Some of other projects also promise a good number of publications in the nearest future.

In frame of these projects, a number of **important results** have been obtained in 2000-2008, namely:

***Observational discoveries:***

**2000-2001**, Discovery of new bright QSOs in the FBS and estimation of their surface density (0.012 deg<sup>-2</sup> for objects with B<16.1) (**A.M. Mickaelian**, in collaboration with astronomers from France).

**2000-2004**, Discovery of new Seyferts, LINERs, and starbursts among the SBS galaxies (**S.A. Hakopian**, **S.K. Balayan**, in collaboration with astronomers from SAO, Russia).

**2000-2004**, Optical identifications and studies of 1577 IRAS infrared sources; discovery of new AGN and ULIRGs (**A.M. Mickaelian**, **K.S. Gigoyan**, **L.A. Sargsyan**).

**2000-2008**, Detailed studies of young stellar objects: discovery of new jets (**T.Yu. Magakian**, **T.H. Movsessian**, **E.H. Nikogossian**, **E.R. Hovhannessian**, in collaboration with astronomers from Russia, USA, and UK).

**2000-2006**, Discovery of new dark globules in the star forming regions and rotation of some of them (**A.L. Gyulbudaghian**, in collaboration with astronomers from Spain and Chile).

**2001**, Discovery of gas-dust shells around 34 early type stars with IR excess (**R.Kh. Hovhannessian**, **E.R. Hovhannessian**).

**2001-2008**, Discovery of new flare stars in Galactic Dark Clouds (**N.D. Melikian**, **A.A. Karapetian**, in collaboration with J.A. Docobo and V.S. Tamazian, Spain).

- 2002-2004**, Optical identifications and studies of ROSAT X-ray sources; discovery of 42 new AGN (**A.M. Mickaelian, S.K. Balayan, et al.**, in collaboration with D. Engels, et al., Hamburger Sternwarte, Germany).
- 2002-2008**, Many-sided studies of Local Starburst Galaxies (**A.R. Petrosian**, in collaboration with Space Telescope Science Institute, USA).
- 2003-2008**, Search for Herbig-Haro objects and emission-line stars in star formation regions; discovery of several dozens of new HH objects and emission stars (**T.Yu. Magakian, T.H. Movsessian, E.H. Nikogossian**).
- 2004-2007**, New survey of cool carbon stars in the halo based on 2MASS. Discovery of very red and distant objects (**K.S. Gigoyan**, in collaboration with astronomers from France and UK).
- 2004-2008**, Discovery of new white dwarfs, hot subdwarfs, cataclysmic variables, and planetary nebula among the FBS blue stellar objects (**A.M. Mickaelian, P.K. Sinamyant**).
- 2004-2008**, Studies of the Southern Galactic molecular clouds and star forming regions. Discovery of new Herbig-Haro objects and outflows (**A.L. Gyulbudaghian**, in collaboration with J. May, et al., Chile).
- 2007**, Discovery of 28 highest IR/optical flux ratio extragalactic objects (**A.M. Mickaelian, L.A. Sargsyan**, in collaboration with D.W. Weedman and J.R. Houck, Cornell University, USA).

#### **Theoretical and statistical results:**

- 2000-2001**, Determination of the radio luminosities of pulsars and the distribution of interstellar electron density (**R.R. Andreevyan, T.G. Arshakian**).
- 2000-2002**, Study of the magnetic fields of extragalactic radio sources; mechanism of formation of a dipole magnetic field, etc. (**R.R. Andreevyan**, in collaboration with astronomers from France).
- 2001-2002**, Interpretation of the radiation of the coronal supra-thermal streams by the effect of Compton scattering of the photospheric radiation on fast electrons (**A.G. Nikoghossian**, in collaboration with S. Koutchmy, France).
- 2001-2008**, Statistical studies of Supernovae in active and star forming galaxies (**A.R. Petrosian, et al.**, in collaboration with astronomers from France, Italy, and USA).
- 2001-2008**, Derivation of the frequency distribution function of stellar flares (**A.A. Akopian**).
- 2003**, Obtaining accurate BV<sub>I</sub>JHK period-luminosity relations for classical Cepheids in the Galaxy and Magellanic clouds (**H.V. Abrahamian**).
- 2003-2008**, Suggestion that cD galaxies are generators of the clusters in which they occur (**H.A. Harutyunian**).
- 2004**, A new approach was proposed for solution of the simplest one-dimensional problem of diffuse reflection and transmission of radiation in inhomogeneous atmospheres (**A.G. Nikoghossian**).
- 2004**, The hypothesis of possible anomalous redshift in spectra of young objects based on counts of faint blue objects (**H.A. Harutyunian**).
- 2005-2007**, Study of the structure and substructures of Coma cluster of galaxies (**A.T. Kalloghlian**, in collaboration with N.G. Kogoshvili and T.M. Borchkhadze, Georgia).

#### **Publication of catalogs, databases, and atlases:**

- 2003**, Merged catalogue of reflection nebulae (**T.Yu. Magakian**).
- 2004**, Catalog of 216 stars with probable circular polarization (**M.H. Eritsian**).
- 2005**, The Byurakan/Hamburg/ROSAT Catalogue (BHRC) (**A.M. Mickaelian, L.R. Hovhannisyan**, in collaboration with D. Engels, et al., Hamburger Sternwarte, Germany).
- 2006**, Revised and updated catalog of 276 Byurakan-IRAS Stars (BIS) (**A.M. Mickaelian, K.S. Gigoyan**).
- 2007**, Digitized First Byurakan Survey (DFBS) database (**A.M. Mickaelian, L.A. Sargsyan, et al.**, in collaboration with "La Sapienza" Università di Roma, Italy and Cornell University, USA).
- 2007**, Optical Database and Atlas of Markarian galaxies (**A.R. Petrosian**, in collaboration with Space Telescope Science Institute, USA).
- 2007**, Catalog of the FBS late-type stars (**H.V. Abrahamian**).
- 2008**, Revised and updated catalog of 1103 FBS blue stellar objects (**A.M. Mickaelian**).

Altogether during 2000-2008, according to the ADS database the Byurakan astronomers have **400 publications** (265 refereed papers, 66 in proceedings of meetings, 24 electronic catalogs, 8 books, etc.). A full database has been compiled and is available at ArAS webpage, where one can view the publications by year (2000, ..., 2008), by subject, by author, by type (refereed journals, proceedings, electronic catalogs, books, e-prints, etc.), or by journal. The distribution of publications by years is the following: **2000** – 38 (29 refereed), **2001** – 46 (31), **2002** – 50 (30), **2003** – 40 (27), **2004** – 53 (40), **2005** – 40 (24), **2006** – 46 (27), **2007** – 38 (25), and **2008** – 49 (32). Thus the year 2004 was the most productive both for the total number and refereed publications, and 2008 is the second one, hence hopefully there may be a further progress.

If taking the **publications by subjects**, most of them relate to radiogalaxies (36), other active galactic nuclei (AGN; 35), young stellar objects (YSOs; 31), flare and T Tau stars (24), groups and clusters of galaxies (19), FBS late-type stars (18), theoretical astrophysics (18), FBS blue stellar objects (16), IR galaxies (16), IR sources (16), starburst galaxies (15), SBS galaxies (14), nebulae (13), Markarian galaxies (12), DFBS and ArVO (12), general studies of galaxies (11), carbon stars (10), and interstellar medium (10). All these are traditional Byurakan subjects, however some new directions are now active, like studies of IR, radio, and X-ray sources.

The **265 refereed papers** have been published in 21 journals: 6 are in *Astrophys. J. (ApJ)*, 10 in *Astron. J. (AJ)*, 45 in *Astron. Astrophys. (A&A)*, 6 in *Monthly Notices of RAS (MNRAS)*, 5 in *Astrophys. Space Sci. (ApSS)*, 1 in *PASP*, 1 in *Astron. Nachrichten (AN)*, 163 in *Astrophysics (Acmopuzuka)*, 2 in *Astronomy Reports (AJ)*, 1 in *Astronomy Letters (ПAЖ)*, 6 in *Astron. Astrophys. Transactions*, 5 in *Baltic Astronomy*, 3 in *Rev. Mex. Astron. Astrofis.*, 5 in *IBVS*, 2 in *Bulletin of SAO*, and 4 in other journals (*PASJ*, *ChJAA*, *RomAJ*, *AnnGPh*). Most of all refereed publications have A.M. Mickaelian (37), T.H. Movsessian (29), K.S. Gigoyan (25), T.Yu. Magakian (23), A.R. Petrosian (22), N.D. Melikian (21), A.A. Karapetian (16), A.G. Nikoghossian (16), E.H. Nikoghossian (16), and S.K. Balayan (15). Among the young researchers, L.A. Sargsyan is the most productive (12 refereed papers). 67 papers have been published in the most important international journals (*ApJ*, *AJ*, *A&A*, and *MNRAS*), which is of course a very small number for 9 years for our whole staff. These publications are supported by the **Isaac Newton Institute (INI)** in Chile (President: Prof. Goncalo Alcaino); an Armenian branch of INI has been created in 2000 based on BAO, and authors who publish papers in the mentioned four journals get bonuses. However, in fact only 25 Byurakan astronomers have published in these journals; most productive are A.R. Petrosian (17 papers), T.Yu. Magakian (10), K.S. Gigoyan (8), A.M. Mickaelian (8), T.H. Movsessian (8), and N.D. Melikian (6).

As it is obvious, most of the papers are in our **Astrophysics**, which before was considered as an All-Union (Soviet) journal and now is considered as international one. However, we still have to do a lot to increase its rating. Anyway, publications in *Astrofizika* also give bonuses from the *Springer* publishing company, which organizes the translation, publication, and distribution of the *Astrophysics* (the English version) abroad. The **Editorial board of Astrofizika** consists of D.M. Sedrakian (*Editor-in-Chief*), V.V. Ivanov (Russia) and E.Ye. Khachikian (*Deputy Editors-in-Chief*), A.T. Kaloghlian (*Secretary-in-Chief*), G.S. Bisnovaty-Kogan (Russia), A.A. Boyarchuk (Russia), A.M. Cherepashchuk (Russia), Yu.N. Gnedin (Russia), V.P. Grinin (Russia), I.D. Karachentsev (Russia), D. Kunth (France), A.G. Nikoghossian, E.S. Parsamian, G.N. Salukvadze (Georgia), and Ye. Terzian (USA).

The **66 papers in proceedings of 41 meetings** have been published, including 27 IAU symposia and colloquia (however, 16 are in IAU Col. #184, held in 2001 in Byurakan). In addition, **14 abstracts** are listed in ADS, which have been published only in abstract books (others that later appeared in proceedings were removed). Out of **24 electronic catalogs** in *VizieR*, 7 are individual catalogs (having official numbers, these are in fact those listed above as important publications) and others are tables from published papers. To be complete, other Byurakan publications are **17 e-prints** (in *astro-ph* and elsewhere), **8 books and booklets** (including textbooks), and **6 information materials**.

As mentioned, for the present situation (and perhaps always) an active **international collaboration** is very crucial. There are some 100 scientists from 21 countries that collaborate with Byurakan astronomers. Most of the collaborations are with France, USA, Russia, Germany, and Italy. The largest collaboration is the International Program of Scientific Cooperation between Armenia and France (**Jumelage** in 2000-2003,

Coordinator: Daniel Kunth; and **PICS** in 2007-2009, Coordinator: Georges Alecian), which supports travels of the Armenian scientists to France and vice versa. During 2000-2008, some 40 missions have been accomplished to various French observatories and institutes by R.R. Andreatsyan, K.S. Gigoyan, A.A. Hakobyan, S.A. Hakopian, N.D. Melikian, A.M. Mickaelian, T.H. Movsessian, A.G. Nikoghossian, E.H. Nikoghossian, A.R. Petrosian, L.A. Sargsyan, and G.T. Ter-Kazarian (as well as D.M. Sedrakian from the YSU). These missions and collaborative research resulted in many joint publications, particularly in *A&A*. A **French-Armenian colloquium** is planned for September 2009 in Byurakan to discuss the achieved results and possibilities of further collaboration.

Due to the international contacts, several **collaborative research grants** have been received, like large grants from the European **INTAS** (T.Yu. Magakian, H.A. Harutyunian), US **CRDF** (A.M. Mickaelian), and the US **NFSAT** (T.Yu. Magakian), which support a research group typically for two years (individual financial support, equipment, travels, etc.). There is a large collaboration with "**La Sapienza**" **Universita di Roma** (Italy; Enrico Massaro, et al.) for the DFBS (PI: A.M. Mickaelian), which supported 15 missions to Rome during 2001-2007; including 2 short-term stays of L.A. Sargsyan for joint research. A.R. Petrosian collaborates with the **Space Telescope Science Institute** (STScI, Baltimore, USA; John MacKenty, Brian McLean, Ron Allen, et al.) on Markarian galaxies, Local starbursts, and Supernovae, and gets fellowships for joint research, typically 3-6 months annually. Collaboration with the **Cornell University** (Ithaca, NY, USA; Jim Houck, Dan Weedman, et al.) is in frame of the DFBS and studies with Spitzer Space Telescope (SST); several 1-2 months missions have been accomplished in 2003-2008 by A.M. Mickaelian, L.A. Sargsyan, and L.R. Hovhannisyan. Other collaboration (mainly on studies of ROSAT sources) is with **Hamburger Sternwarte** (HS, Germany; Dieter Engels, et al.); several missions have been supported by DFG grants for A.M. Mickaelian, S.K. Balayan, and L.R. Hovhannisyan. In frame of the Armenian Virtual Observatory (ArVO) and its science projects, A.M. Mickaelian collaborates with the **French VO** team (based in Paris, Lyon-HyperLEDA, and Strasbourg-CDS) and has been awarded ANR fellowships in 2006-2007. K.S. Gigoyan (2006) and T.H. Movsessian (2008) were awarded **DAAD fellowships** to visit and work in Germany for 2 months each. A.A. Hakobyan has three times visited Institut d'Astrophysique de Paris (IAP, France) in 2006-2008 for 3 months each time as a joint French-Armenian post-graduate student supported by the **French Embassy in Yerevan** (supervisors: A.R. Petrosian and D. Kunth).

Collaboration with the **Special Astrophysical Observatory** (SAO, Russia; S.N. Dodonov, V.R. Amirkhanian) supports the project of renovation of the Byurakan 1m Schmidt telescope (Head of the Laboratory: S.K. Balayan). This project is also supported by the sponsorship from the **VivaCell** telephone company. This sponsorship has been also used for the 2.6m telescope and small telescopes in Byurakan. New collaboration between BAO and the **Institute of Informatics and Automation Problems** (Armenian National Acad. Sci., Yerevan; Yu.H. Shukurian, V.S. Sahakyan, H.V. Astsatryan, et al.) on the ArVO and Grid led to two grants from the International Scientific and Technology Center (ISTC), one with Georgian colleagues.

In addition to the international collaboration and resulting support, since 2001 there are regular **ANSEF grants**. The **Armenian National Science and Education Fund (ANSEF)** was established in 1999. **Prof. Yervant Terzian** was one of the organizers and since the beginning is the Chair of ANSEF Research Council. These grants may be used for individual support, equipment, travels, etc. and are extremely useful for encouraging and supporting small projects. During 2001-2009, 13 PIs from Byurakan have been awarded 18 ANSEF grants, USD 5000 each; R.R. Andreatsyan (2), S.K. Balayan, S.A. Hakopian, M.A. Hovhannisyan, E.Ye. Khachikian, T.Yu. Magakian, A.P. Mahtessian, A.M. Mickaelian (3), T.H. Movsessian, E.H. Nikoghossian (2), G.A. Ohanian, G.T. Ter-Kazarian (2), and V.P. Zalinian. Along with pure research projects, some grants supported technical developments at the 2.6m and 1m Schmidt telescopes, and the DFBS. Several dozens of publications have appeared in frame of the projects supported by ANSEF. Though this article is devoted to research in Byurakan, anyway let us mention that 6 more ANSEF grants in astrophysics have been awarded to A.A. Sadoyan, A.A. Saharian (2), D.M. Sedrakian, K.M. Shahabasian, and Yu.L. Vartanian from the Yerevan State University (YSU), where astronomy is rather active (we would like to have another article on astronomy at the YSU).



During 2000-2008, the Byurakan astronomers have organized several **scientific meetings** that also supported our research and helped establishing new collaborations. 13 meetings were held in Byurakan and one at YSU, among them the IAU Col. #184 (*AGN Surveys*) in 2001, the Joint European and National Astronomical Meeting (JENAM-2007) in 2007 at YSU, the *Astrofizika* journal 40<sup>th</sup> anniversary (in 2005), Byurakan Observatory 60<sup>th</sup> anniversary (in 2006) and Ambartsumian's 100<sup>th</sup> anniversary (in 2008) meetings, two international summer schools in 2006 and 2008, the XIII Joint Colloquium between BAO and the Abastumani Observatory (Georgia), individual ArAS annual meetings in 2002, 2004, and 2005 (others were combined with the abovementioned meetings), and some small meetings. **JENAM-2007** was the largest scientific event ever organized in Armenia; there were 6 plenary sessions, 8 EAS Symposia, 5 Special Sessions, and EAS General Meeting, 256 participants from 31 countries, 358 contributions were made, including 79 invited talks. The Byurakan astronomers had 3 invited and 18 contributed talks, and 14 posters. **IAU Col. #184** was another important meeting: 92 participants from 16 countries, 87 contributions, including 27 invited talks; 2 invited talks and 14 posters by the Byurakan scientists. **BAO-60** and **Ambartsumian-100** meetings also were enough representative; 72 and 89 participants from 14 and 12 countries, and 26 and 44 contributions, respectively. In 2006, we started the **Byurakan International Summer Schools (BISS)**, and two high-level schools were organized: First BISS in 2006 and Second BISS in 2008. In each school there were 20-25 foreign participants (lecturers and students), as well as they were rather useful for our students who got in contact with foreign scientists and students. In addition, a school for YSU students was organized in 2005, and the next one is going to be organized this year in July (see section "*Future meetings*" of this Newsletter, p. 19). The Byurakan Observatory is the host for the final stage of the **astronomical school Olympiads**, which are being held annually typically in April (Chair of the Jury is *Dr. A.A. Akopian*).

The Byurakan meetings have been supported by the international organizations (IAU, EAS, ESA) and funds (INTAS, NFSAT, ISTC) and local organizations (Armenian National Acad. Sci.) and companies (Apaven, Unicom, Web, Antares, Editprint, Aray, HSBC, Armenpress, etc.), as well as Embassies of Germany, Italy, and UK in Yerevan.

During these years, mainly due to the meetings, many **famous scientists and other important guests** have visited Byurakan: Felix Aharonian (Ireland), Georges Alecian (France), Danielle Alloin (France), Robert Antonucci (USA), Cesare Barbieri (Italy), Thierry Courvoisier (Switzerland), Roc Cutri (USA), Michel Dennefeld (France), Dieter Engels (Germany), Francoise Genova (France), Richard Green (USA), Luis Ho (USA), John Hutchings (Canada), Vsevolod Ivanov (Russia), Igor Karachentsev (Russia), Joachim Krautter (Germany), Ralph Krikorian (France), Daniel Kunth (France), Andrew Lawrence (UK), Richard Lovelace (USA), John Mather (USA; Nobel prize winner 2006), Michel Mayor (Switzerland), Joseph Mazarella (USA), Guy Monnet (Germany), Jayant Narlikar (India), Paolo Padovani (Germany), Jean-Claude Pecker (France), Vahé Petrosian (USA), Bo Reipurth (USA), David Sanders (USA), Yervant Terzian (USA), Gerard Vauclair (France), Sylvain Veilleux (USA), Wolfgang Voges (Germany), Dan Weedman (USA), Lutz Wisotzki (Germany), and many others.

Byurakan astronomers have also **participated in other international meetings**, including the IAU General Assemblies in 2000, Manchester, UK (R.R. Andreasyan, E.Ye. Khachikian, A.M. Mickaelian), in 2003, Sydney, Australia (E.Ye. Khachikian, A.M. Mickaelian), and in 2006, Prague, Czech Republic (H.A. Harutyunian, A.M. Mickaelian), IAU Symposia and Colloquia (not counting IAU C184 in Byurakan; A.A. Akopian, R.R. Andreasyan, E.Ye. Khachikian, T.Yu. Magakian, N.D. Melikian, A.M. Mickaelian, and E.H. Nikogossian), JENAMs in 2000-2008 (not counting JENAM-2007 in Yerevan; R.R. Andreasyan, A.N. Harutyunyan, M.A. Hovhannisyan, T.Yu. Magakian, A.M. Mickaelian, T.H. Movsessian, and V.H. Movsisyan), and many other meetings, as well as summer schools (S.A. Ghazaryan, E.R. Hovhannessian, L.R. Hovhannosyan, L.A. Sargsyan, P.K. Sinamyan). Some of our scientists have been invited for seminars at European and American astronomical centers.

Many Byurakan astronomers are part-time **lecturers at the YSU** teaching important subjects of astronomy and astrophysics: A.A. Akopian, R.R. Andreasyan, A.L. Gyulbudaghian, H.A. Harutyunian, T.Yu. Magakian, V.H. Malumian, A.M. Mickaelian, T.H. Movsessian, A.G. Nikoghossian, A.R. Petrosian, H.V. Pikichian, and A.G. Yeghikian. Many students have defended diploma theses under the supervision of these scientists. The YSU students regularly visit Byurakan for summer practice and acquaintance with the research of our

scientists (for many years, the YSU Department of Astrophysics was chaired by *Prof. M.A. Kazarian*, and during the recent two years, by *Prof. A.K. Avetisyan*).

The **Council for Scientific Degrees** has been active in Byurakan during all these years (*Prof. E.S. Parsamian* is the Chair, and A.G. Gyulbudaghian, E.Ye. Khachikian, T.Yu. Magakian, V.H. Malumian, and A.G. Nikoghossian, are members from BAO). During 2000-2008, their PhD degrees received: G.H. Broutian (2000), E.H. Nikoghossian (2002), S.A. Hakopian (2002), and S.K. Balayan (2004), and Doctor of Science degrees, A.L. Gyulbudaghian (2000) and T.Yu. Magakian (2001).

The **Armenian Astronomical Society (ArAS)** was created in 2001 (formally established in 1999) and supported many activities in Byurakan, including organization of meetings, summer schools, etc. Out of 51 BAO researchers, 26 are ArAS members, who are among the most active scientists. Byurakan astronomers are members of other astronomical societies and international organizations as well; 15 are IAU members, 17 are EAS members, and 7 are EAAS members. Members of all these three organizations are: T.Yu. Magakian, N.D. Melikian, A.M. Mickaelian, E.S. Parsamian, and A.R. Petrosian. All they are ArAS members as well.

At present a full database of all publications, scientific results and achievements by the Armenian astronomers is being created, which will enter the *“Encyclopedia of the Armenian astronomy”* DVD to be released this year.

*Areg Mickaelian*

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## DATABASE OF ARMENIAN ASTRONOMERS

Since the beginning, one of the ArAS activities was the collection of information about *Armenian astronomers* all over the world and creation of a database. It was created in 1999 and increased every year, both because new astronomers were “discovered” and young people joined. Until recently, the database contained 204 names. We have updated and complemented the database, which now contains **255 individuals**, including all astronomers of Armenian origin, astronomers of any nationality who have worked in Byurakan, and all ArAS members. There are also physicists in the list who actively work on astronomical subjects.

The database is being maintained at the ArAS webpage at <http://www.aras.am/armastronomers.htm> and now gives **e-mail addresses of 183 astronomers** and links to the **personal home pages of 136 personalities**. These are almost all ArAS members and all actively working Armenian astronomers. 74 home pages have been created by us and are being maintained at ArAS web server, other links are given to the personal home pages at the institutions, the IAU, or the Armenian National Acad. Sci.

We give **standard personal pages**: photo, title, name, relation to ArAS (member, administrative position, Editor of the Newsletter, ArAS prize winner), main position and affiliation, other positions and responsibilities, previous important positions, birth date and place, education, start of work at BAO (or other institution), Ph.D. and Doctor of Science degrees, membership, research fields, a general info on publications and link to all publications during 2000-2008, address, phone/fax, and e-mail address.

Our database is rather representative; together with astronomers of the Armenian origin there are famous American astronomers **Jim Houck** and **Dan Weedman** (ArAS members), famous Russian astronomers who started their professional career in Byurakan **Viktor Afanasiev**, **Igor Karachentsev**, and **Valery Terebizh**, famous Armenian astronomers who live and work abroad **Georges Alecian** (France), **Mikhail Babajaniants** (Russia), **Richard Belian** (USA), **Elizabeth Bozyan** (USA), **Grant Kocharov** (Russia), **Ralph (Ara) Krikorian** (France), **Fabio Mardirossian** (Italy), **Zadig Mouradian** (France), **Rudolf Muradian** (Brazil), **Vahé Petrosian** (USA), **Arnold Stepanian** (Ukraine), **Agop Terzan** (France), **Yervant Terzian** (USA), **Hrant Tovmassian** (Mexico), and others. Among the actively working foreign Armenian astronomers who

have an annual average of more than 2 papers in refereed journals I would like to mention **Felix Aharonian** (Ireland; his annual average is 19 papers!), **Alex Lazarian** (USA; 10), **Razmick Mirzoyan** (Germany; 8), **Garik Israelian** (Spain; 6), **Vahram Chavushian** (Mexico; 6), **Dmitri Pogosyants** (Canada), **Gagik Tovmassian** (Mexico), **David Mkrtychian** (South Korea), **Kevork Abazajian** (USA), **Levon Pogosian** (Canada), **Armen Sedrakian** (Germany), **Leon Kocharov** (Finland), **Hrant Tovmassian** (Mexico), **Vahé Petrosian** (USA), **John Sarkissian** (Australia), **Arsen Hajian** (Canada), **Vakhtang Tamazian** (Spain), **Kirill Kuzanyan** (Russia), **Emmanuel Momjian** (USA), **Varoujan Gorjian** (USA), **Zaven Arzoumanian** (USA), **Valeri Hambaryan** (Germany), and **Evelyine Alecian** (France). Among the famous scientists who live in Armenia, I would like to mention **Grigor Gurzadyan**, **Davit Sedrakian**, **Edward Khachikian**, **Elma Parsamian**, **Edward Chubarian**, **Yuri Vartanian**, **Misha Kazarian**, and **Romela Shahbazian**. Most productive during the recent years are **Ashot Chilingarian** (YerPhI), **Areg Mickaelian** (BAO), **Davit Sedrakian** (YSU), **Tigran Movsessian** (BAO), **Kamo Gigoyan** (BAO), **Tigran Magakian** (BAO), **Artashes Petrosian** (BAO), **Norair Melikian** (BAO), and **Vahagn Gurzadyan** (YerPhI).

The **255 scientists** work or stay in **26 countries**; if considering Armenia and Georgia in Asia (these countries are often attributed to Europe), then the distribution by continents is: Europe (74 persons in 13 countries), Asia (135, 8), North America (44, 3), South America (1), Australia (1). The **geographical distribution** by countries is as follows

126	Armenia
33	USA
31	Russia
14	France
8	Germany
7	Mexico
5	Ukraine
4	Canada, Italy
3	UK
2	Iran, Kazakhstan, Netherlands, Spain
1	Australia, Belgium, Brazil, Bulgaria, Finland, Georgia, Ireland, Israel, Jordan, Portugal, South Korea, Uzbekistan

Out of the **126 scientists in Armenia**, 51 currently work at **BAO**, 18 at **Yerevan State University** (YSU, theoreticians), 10 at **Yerevan Physics Institute** (YerPhI, cosmologists and cosmic ray specialists), 14 at other research institutes, and 33 are not active in astronomy (a few of them are retired). Among the foreign Armenian scientists, 9 more are not active in astronomy; all these people are professional astronomers and mostly former BAO associates, however they work at present in other fields. An indication of this is seen from their affiliation, where either their current institutions are given or just "*Former BAO associate*". Thus, out of the 255 persons, **213 at present are active in science**.

More than 100 Armenian astronomers are **members of professional societies and international organizations**. Now we have a membership list, where all members of **IAU**, **EAS**, **AAS** (American Astronomical Society), and **EAAS** (Euro-Asian Astronomical Society) are listed, altogether 81 individuals, as well as 3 foreign ArAS members. We have 55 IAU members, 25 – EAS, 14 – AAS, and 19 – EAAS. A number of Armenian astronomers are members of other astronomical societies and international organizations, like "**Euroscience**", **Royal Astronomical Society** (RAS, UK), **Astronomical Society of the Pacific** (ASP), **European Physical Society** (EPS), etc.

At the end, I would like to note that 11 scientists in our list have Armenian names (...*ian*), however we are not sure if they have Armenian origin or not. So any additional information will be appreciated.

*Areg Mickaelian*

## OUTSTANDING ARMENIAN ASTRONOMERS



One of the keystone projects of the IYA-2009 is the “*Cosmic Diary*”, which intends to advertise astronomers’ life and activity, and the way how they reach their discoveries and achievements. In Armenia, a few people are acquainted to the famous Armenian astronomers (of course, beside V.A. Ambartsumian), which is of course our fault. This year we have started a series of activities to correct the situation. One of these activities is the joint effort of **ArAS** and the “**Armenpress**” news agency, an Internet publication “*Outstanding Armenian astronomers*”. Typically every 15-20 days a webpage with information about one of the famous Armenian astronomers appears at the “Armenpress” web site (<http://www.armenpress.am>), thus giving possibility to broad mass of people to read these texts and know our scientists. On occasion with his 80<sup>th</sup> anniversary, the first page was about *Prof. Marat Arakelian*, and at present the second page appeared about *Prof. Yervant Terzian*. Thus, during this year, some 20 famous Armenian astronomers will be presented (Pishmish, Shahbazian, Mirzoyan, Aghegian, Tovmassian, Oskanian, Mouradian, Petrosian, Ambartsumian, Gurzadyan, Terzan, Ambartsumian, Markarian, Kojoian, Parsamian, et al.).

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## ANNIVERSARIES



**MARAT ARAKELIAN – 80.** *Prof. Arakelian* is one of the prominent Byurakan astronomers, the author of famous **Arakelian galaxies**, which at present are target for many-sided studies with ground-based and space telescopes. Arakelian is known as a distinguished specialist in the theoretical astrophysics and extragalactic astronomy.

Marat Arsen Arakelian was born on January 15, 1929, in Goris, Armenia, USSR. He studied at the Physical-Mathematical Department of the Yerevan State University (YSU) and graduated from it in 1951, among the first students specialized on *Astrophysics*. He was directed to the Byurakan Astrophysical Observatory (BAO), where he worked first as assistant astronomer, and later as junior research associate. Soon he became a postgraduate student at the Leningrad State University (LSU, presently, St. Petersburg), finished the studies in 1955, and in 1956 successfully passed his **Ph.D. thesis “Spectrophotometric investigation of Algol”** under the supervision of *Prof. O.A. Melnikov* at the LSU.

In 1957-1959 Arakelian combines his work with senior teacher position at the Department of Astrophysics of the YSU. From 1960 to 1966 he was a junior researcher and lectured at the LSU. He was awarded the title of Associate Professor. Later on, since 1966 Arakelian again works at BAO and combines his research with a position of a lecturer at the Department of Astrophysics of the YSU. In 1967, he became a senior researcher at BAO and headed an important direction in the extragalactic astronomy.

Since 1967, Arakelian completely devoted himself to the research work and during a short period performed a fantastic productivity for those times, publishing 62 papers in 1968-1983, and giving important scientific results in almost each of these works! Let us give the list of his results and achievements:

**1968, Study of the luminosity function and the stellar space density in the solar neighbourhood.** The results were published in *Astrophysics*.

**1968-1969, Study of the luminosity evolution of quasars** based on the evolutionary effects associated with them. The results were published in *Astrophysics* (*Астрофизика*, 2 papers in 1969-1970), in *Soviet Astronomical Circular* (*Астрономический циркуляр*), and a summary of these works was published in the prestigious journal *Nature* in 1970 (vol. 225, p. 358-359).

**1969-1970, Statistical study of flare stars in the solar vicinity.** The results were published in Communications of the Konkoly Observatory, Communications of BAO, and were reported at the conference "Non-periodic phenomena in variable stars" in 1969.

**1970, Derivation of the luminosity function of field galaxies** (together with A.T. Kalloghlian). The results were published in *Soviet Astronomy* (*Астрономический журнал*).

**1970-1971, The proof of the extragalactic origin of quasars.** The results were published in *Astrophysics* and *Вестник АН СССР* (*Bulletin of the USSR Acad. Sci.*).

**1970-1973, Spectroscopic observations and studies of a few hundred Markarian galaxies and discovery of more than 40 new Seyferts** among them (together with Russian astronomers E.A. Dibai and V.F. Esipov). The results were published in series of 8 papers in *Astrophysics* and 5 papers in the *Soviet Astronomical Circular*.

**1972-1974, Analysis of the surface brightness of emission-line galaxies** (including Seyfert and Markarian ones) and development of **method for revealing galaxies with high surface brightness.** The results were published in 3 papers in *Astrophysics*.

**1973, Suggestion of a new method for definition of space density of extragalactic objects** and estimation of the **mean density of matter in the Metagalaxy.** The results were published in *Astrophysics*.

**1975, Compilation and publication of the catalogue of "Galaxies of high surface brightness"** (named **Arakelian galaxies**), a list of 621 objects with surface brightness at least 22.0 magnitudes from an area of 1 sq. arcsec. The sample contained 4% of all galaxies in an area of with  $\delta > -3^\circ$  and  $|b| > 20^\circ$ . Arakelian catalog became a source for many new AGN (*Communications of BAO*, No. 47, p. 3-42, 1975).

**1975, Classification of the central regions of 711 galaxies.** The results were published in *Comm. BAO*.

**1975, Derivations of the luminosity function and space density of galaxies with UV continuum** (**Markarian** galaxies). The results were published in *Soviet Astronomy*.

**1975-1976, Spectroscopic observations and studies of Arakelian galaxies** (galaxies with high surface brightness) and **discovery of new Seyferts** among them (together with E.A. Dibai and V.F. Esipov). The results were published in a series of 4 papers in *Astrophysics*, a paper in the *Soviet Astronomical Circular*, and were reported in the meeting "Stars and galaxies from observational points of view" in 1975.

**1976-1977, Study of the dependence of the emission-line intensities of Markarian and Seyfert galaxies on their color index.** The results were published in 2 papers in *Astrophysics*.

**1977, Study of the distribution of the mean surface brightness of galaxies in the Coma cluster.** The results were published in *Astrophysics*.

**1977-1980, Study of the relation between the mean surface brightness and radio emission of galaxies,** including Seyfert galaxies (together with R.A. Kandalyan). The results were published in 2 papers in *Astrophysics*.

**1981, Study of the estimations of the kinetic energies of clusters of galaxies;** the extent to which a kinetic energy estimate would be affected by a possible mass dependence of the velocity dispersion of galaxies in clusters was considered. It was concluded that in some cases the kinetic energy might be underestimated (together with A.G. Kritsuk). The results were published in *Astrophysics*.

**1980-1981, Radio (6cm) observations of Arakelian galaxies and publication of their accurate positions** (together with US astronomers G. Kojoian, D.F. Dickinson, R. Elliott, M.D. Bicay). The results were published in the *Astronomical Journal*.

**1981-1982, Comparative study and statistics of the surface brightness and morphological types of isolated and double galaxies** (together with A.P. Mahtessian). The results were published in 2 papers in *Astrophysics*.

**1981-1982, Study of Seyfert galaxies in clusters and Seyfert properties of the cluster galaxies** (together with V.Yu. Terebizh). The results were published in the *Soviet Astronomical Circular* and *Soviet Astronomy Letters* (*Письма в Астрономический журнал*).

**1983**, Proposing a **method for construction of the luminosity function of the components of double galaxies** on the basis of an arbitrary sample of pairs of galaxies. The results were applied to the data of *Karachentsev's* Catalog of Isolated Pairs. The presence of a correlation between the absolute magnitudes of the components of pairs was confirmed. The results were published in *Astrophysics*.

**1986**, A method for the **determination of the bivariate luminosity function** utilizing an incomplete sample with an application to Seyfert galaxies. It was shown that the results of incomplete radio and X-ray surveys could be used for the determination of the bivariate luminosity functions, having both the distribution of luminosities of objects in the detected subsample and the distribution of apparent magnitudes in the surveyed sample. A paper was published in *Astrophysical Journal* after Arakelian's death.

Summarizing, Arakelian has compiled and published the catalog of 621 high-surface-brightness galaxies, has proved the extragalactic origin of quasars, has determined the space density of extragalactic objects, has proposed several methods for study of properties of extragalactic objects, has made a comparative analysis of properties of different types of galaxies, has classified the central regions of 711 galaxies, and with his Russian colleagues spectroscopically has observed and studied some 800 faint galaxies and quasars. *Arakelian* galaxies have been observed in many observatories in the USA, UK, USSR, and elsewhere in optical wavelengths, radio and X-rays. Especially interesting objects are **Akn 120** and **Akn 564** (both are strongly variable AGN in X-ray and optical wavelengths; Akn 564 is a Narrow-Line Seyfert 1 galaxy that strongly changes the intensities of its emission lines).

In 1977, Arakelian defended his second **Doctoral Degree thesis "Spectral observations and statistics of galaxies with active nuclei"** at the Moscow State University (MSU) and became a Doctor of Sciences.

Arakelian combined his scientific work with pedagogical one as well. In 1982 he was elected the Chair of the Department of Astrophysics and Theoretical Physics of the Armenian State Pedagogical Institute after Kh. Abovian. Together with *L.V. Mirzoyan*, *A.T. Kaloghlian*, and *H.M. Tovmassian*, he was the co-author of the textbook "*Astronomy*" for secondary schools (three editions in 1970, 1971, and 1973). Arakelian has written an extended review on *Clusters of galaxies* in the book "*Problems of extragalactic astronomy*" (1981).

Arakelian has published about 80 papers in various astrophysical journals, including such prestigious journals, as *Nature*, *Astronomical Journal*, and *Astrophysical Journal* (one of the rare Byurakan astronomers to publish a paper in *Nature*), as well as in proceedings of several international conferences. He was the editor of the two proceedings books of the Byurakan meetings: "*The Non-Stable Stars*" (1956) and the IAU Symp. #29 "*Non-Stable Phenomena in Galaxies*" (1966).

Since 1973, Arakelian was a member of the International Astronomical Union (IAU), Commission #28 "*Galaxies*".

M.A. Arakelian passed away very early, at the age of 54 years on February 1, 1983, in Moscow, when he was at the period of prosperity of his scientific activity.

An information about *Prof. Arakelian* is available at the BAO and ArAS webpages, as well as in the series of articles about outstanding Armenian astronomers at the Armenpress webpage (<http://www.armenpress.am>, in Armenian), and an article will appear in the journal "*Gitutyun Ashkharhuni*" ("*In the World of Science*", 2009, Issue 2, in Armenian).

*Areg Mickaelian*



**YERVANT TERZIAN – 70.** *Prof. Terzian*, the **David C. Duncan Professor in the Physical Sciences**, Department of Astronomy, Cornell University, is one of the prominent modern astronomers, known in the fields of physics of the interstellar medium, planetary nebulae, galaxies, radio astronomy, and others. He is one of the **ArAS Co-Presidents** and the **Chairman of the Research Council of ANSEF**.

Yervant Terzian was born on February 9, 1939, in Alexandria, Egypt. His father was an Armenian and his mother, a Greek; hence, having Armenian-Greek origin, Terzian is considered both as a great Armenian and Greek astronomer. He finished the Kalousdian Armenian School

in Cairo, then studied at the American University also in Cairo, and in 1960, he received the B.Sc. from the Physics/Mathematics Department of this University. Then he moved to the USA and in 1963 he received his M.Sc. and later on, in **1965, his Ph.D. degrees in Astronomy from the Indiana University.**

Since 1965, Terzian's research and teaching is connected to the Cornell University, Ithaca, NY. In 1965-1967, he was a research associate at the Arecibo Observatory, Puerto Rico; in 1967-1972: Assistant Professor of Astronomy; in 1968-1974: Assistant Director of the Center for Radiophysics and Space Research of the same University; in 1972-1977: Associate Professor of Astronomy; in 1973-1974: Visiting Professor of Astronomy at the University of Montreal, Canada; in 1974 (Feb-July): Visiting Professor of Astronomy at the University of Thessaloniki, Greece; in 1974-1979: Graduate Faculty Representative, Astronomy and Space Sciences, Cornell University; and since 1977 he is **Professor of Astronomy at Cornell University.**

*Prof. Terzian's scientific fields* are quite broad: from planetary nebulae (PNe) and pulsars to galaxy pairs and quasars. His studies have been carried out mainly in radio, however many papers are devoted to IR, optical, and UV observations as well. Among his **largest studies and most important results** one would mention:

**1965-1988, Radio observations of PNe** (*together with a few other colleagues*). Observations at various radio wavelengths were carried out, as well as radio spectra were taken. Radio recombination lines from PNe were studied. 13 papers were published in *Astrophysical Journal (ApJ)*, *Astronomical Journal (AJ)*, *Astronomy & Astrophysics (A&A)*, and other journals.

**1965-1994, Radio observations of Galactic emission nebula / HII regions** (*with a few other colleagues*). Study of the electron temperatures of the Orion Nebula and some other Galactic nebulae. High resolution observations of fine structures, etc. 25 papers were published in *ApJ*, *AJ*, *A&A*, *Astrophysics & Space Science (ApSS)*, *Publications of the Astronomical Society of the Pacific (PASP)*, and *Vistas in Astronomy*.

**1967-1986, Study of the radio emission of normal spiral galaxies**, including radio observations of M31 and M33 (*with a few other colleagues, including H.M. Tovmassian*). 10 publications in *ApJ*, *AJ*, and *PASP*.

**1969-1995, Radio observations and studies of pulsars** (*with K. Davidson and other colleagues*). An analysis of the pulsar dispersion measures was made to investigate the distribution of pulsar and interstellar electron densities. Another paper (*together with D.M. Sedrakian, et al.*) was devoted to the superfluid core rotation in pulsars. 6 papers were published in *ApJ*, *AJ*, *A&A*, *ApSS*, and *Nature*.

**1969-1997, Optical studies of PNe** (*with B. Balick, A.R. Hajian, S.E. Schneider, et al.*). Many-sided optical studies of PNe, including their reddening curves, radial velocities, etc. 10 papers were published in *ApJ*, *AJ*, *A&A*, and *ApSS*.

**1970-1990, Study of the neutral hydrogen (HI) and molecular clouds** (*with J.M. Dickey, E.E. Salpeter, H.E. Payne, S.W.J. Colgan, et al.*). Radio observations of interstellar and intergalactic HI, CO, and OH clouds. 22 publications in *ApJ*, *ApJ Supplement Series (ApJSS)*, *AJ*, *A&A*, *PASP*, and *Radio Science*.

**1972, Expected infrared spectra from planetary nebulae** (*with D.B. Sanders*). Based on the analysis of the radiation of PNe, their expected IR spectra were discussed. A paper was published in *AJ*.

**1973, Optical Atlas of Galactic Supernova Remnants** (*with S. van den Bergh and A.P. Marscher*). Published in *ApJSS (vol. 26, p. 19)*.

**1974, Detection of radio emission from some Markarian galaxies at 430 MHz** (*with H.M. Tovmassian*). The results were published in *PASP*.

**1974-1984, High resolution radio observations of PNe** (*with B. Balick and others*). Radio synthesis and Arecibo interferometer observations were carried out for search for sub-arcsecond structure in compact PNe. Three papers were published in *ApJ* and *AJ*.

**1977-1979, Radio observations of globular clusters** and radio sources in the direction of globular clusters (*with a few other colleagues*). Two papers were published in *AJ*.

**1979-2000, Study of galaxy pairs** (*with T.E. Nordgren, J.N. Chengalur, E.E. Salpeter, et al.*). HI observations; the distribution of galaxy pair redshifts; close and wide galaxy pairs in the North and South.

Compilation of the 1 Mpc Galaxy Pair Sample in low-density regions. 8 papers published in *ApJ*, *ApJSS*, *ApSS*, and *Journal of the Royal Astronomical Society of Canada (JRASC)*.

**1981-1982, VLBI observations of galactic nuclei** (with *D.L. Jones and R.A. Sramek*). 6cm VLBI observations of 15 galactic nuclei. Spectra of compact radio sources in the galactic nuclei. 2 publications in *ApJ*.

**1982, Detection of radio emission from cometary nebulae** (with *K.C. Turner*). An investigation of cometary nebulae at radio wavelengths was conducted: 48 objects in the declination range of the Arecibo telescope were observed at 12cm and 21cm, and 10 of them showed detectable radio emission. The results were published in *ApJ*.

**1986-2004, Search and study of OH/IR stars** (with *B.M. Lewis, J. Eder, et al.*). The Arecibo OH survey (1612 MHz observations) of 571 OH/IR stars identified by IRAS colors; 132 were detected. 2MASS counterparts for OH/IR stars were identified. 12 publications in *ApJ*, *ApJSS*, *ApSS*, *Monthly Notices of the Royal Astronomical Society (MNRAS)*, *PASP*, and *Nature*.

**1988, Detection of continuum radio emission from Virgo galaxies** (with *K.C. Turner and G. Helou*). Single-antenna measurements of radio emission from 120 galaxies in the Virgo cluster at 2380 MHz, as well as interferometric measurements at the same frequency for 48 galaxies with  $\leq 1''$  resolution. It was found that the disk emission dominates in most cases. Indications that the flux concentration was greater in E/S0 than in S. The results were published in *PASP*.

**1991, Two-component velocity system model of PNe** (with *G.A. Gurzadyan*). Phenomena were discussed in the behavior of the expansion velocities of PNe and a possible explanation was suggested, namely that PNe originate from two distinct types of progenitor stars. A paper was published in *AJ*.

**1993-1996, Study of the dynamics of binary galaxies** (with *J.N. Chengalur and E.E. Salpeter*). Study of high resolution HI synthesis data (radio maps) and CCD images of wide and close pairs; galaxy pairs, redshift catalogs, and the cosmic peculiar velocity. 4 papers published in *ApJ* and *AJ*.

**1993-1998, Fast, low-ionization emission regions (FLIERs) and other microstructures in PNe** (with *B. Balick, A.R. Hajian, M. Perinotto, et al.*). High spatial resolution Palomar Observatory 5m telescope long-slit observations and Hubble Space Telescope (HST) Wide Field Planetary Camera 2 imaging studies of "FLIERs" and other microstructures in a number of bright PNe were performed. Four papers were published in *ApJ* and *AJ*.

**1993-2002, Planetary nebulae expansion distances** (with *A.R. Hajian, C. Bignell, et al.*). VLA 6cm two-epoch observations were carried out to measure accurate expansion parallax distances to planetary nebulae. On the other hand, HST measurements were used for the same purpose. Six papers were published in *AJ* and *PASP*.

**1995-2006, The morphology and kinematics of Markarian galaxies with double and multiple nuclei** (with *T.E. Nordgren, G. Helou, J.N. Chengalur, E.Ye. Khachikian, et al.*). Basic data and preliminary analysis for 16 Markarian galaxies observed with the Palomar Observatory 5m telescopes were given. 2 publications in *ApJSS* and *MNRAS*.

**1999, The sample of IR planetary nebulae in the NVSS** (with *J.J. Condon and D.L. Kaplan*). A cross-correlation of IRAS sources having colors characteristic of PNe with the 1.4 GHz NRAO VLA Sky Survey sources was made and 454 sources were selected as candidate PNe. 122 new PNe were revealed among them. The sample was published in the *ApJSS*.

**2007, Atlas of [NII] and [OIII] Images and Spectra of PNe** (with *A.R. Hajian, et al.*). An atlas of HST images and ground-based, long-slit, narrowband spectra centered on the [NII] 6584A and the [OIII] 5007A lines. Basic parameters for the subsample of PNe that present ellipsoidal appearances and regular kinematic patterns were derived. The Atlas was published in *ApJSS*.

Other studies related to radio observations of extragalactic sources (quasars and radiogalaxies), X-ray sources, comets, evolution of the radio luminosities of the Tycho and Kepler SNR, etc.

In 1968, Terzian was appointed the Vice-Chairman, and in 1979, the **Chairman of the Department of Astronomy at the Cornell University** and headed this large (one of the largest and most important in the



USA) department for 20 years! In 1979-80 and 1992-93 he was the Acting Director of the Center for Radiophysics and Space Research of the Cornell University.

Since 1986, Terzian is Professor in Graduate Field of History and Philosophy of Science and Technology, and since 1991, in Field of Science and Technology Studies, Cornell University. In 1988-1999 he was the Director of Pew Undergraduate Science Education Program, New York State Cluster of Colleges and Universities; in 1990-1999: James A. Weeks Professor of Physical Sciences, Cornell University. Since 1996, he is the **Director of NASA's New York State Space Grant Program** (Cornell University) to enhance science education. In 1999-2000, he was a Visiting Professor, University of California, San Diego, and since 1999, **David C. Duncan Professor in the Physical Sciences**, Cornell University.

In 2002 Terzian was elected the **Chairman of the US Consortium of Universities and Institutes** to construct the **Square Kilometer Array (SKA)** giant radio telescope. Since 2001, he is the **Chairman of the Research Council** of the **Armenian National Science and Education Fund (ANSEF)**.

*Prof.* Terzian has been the **Associate Editor and the Scientific Editor** of the *Astrophysical Journal* (1989-1999), one of the leading astronomical journals in the world. In 1982-1992 he was a member of the Editorial Advisory Board of *The Encyclopedia of Astronomy and Astrophysics*.

*Prof.* Terzian is **member** of a number of **professional societies and organizations**: International Astronomical Union (IAU, 1967), International Union of Radio Science, American Astronomical Society (AAS), Armenian Astronomical Society (ArAS, 2001), Hellenic Astronomical Society (HelAS), Sigma Xi, Scientific Research Society, Astronomical Society of New York, Historical Astronomy Division, Society for Scientific Exploration, American Association for the Advancement of Science (Fellow, 2001). In 1990, he was elected **Foreign Member of the Armenian National Academy of Sciences (NAS)**, and in 2002, **Co-President of the Armenian Astronomical Society (ArAS)**.

Terzian's **organizational activities** have been rather large: he has been chairman, vice-chairman, or member of numerous committees and commissions of the IAU Working Groups, US National Academy of Sciences, New York Astronomical Society, NASA, NSF, etc. and Scientific Organizing Committees (SOC) of a number of international (including IAU) symposia and conferences. He was the Chairman of the IAU Working Groups on *Planetary Nebulae* (1985-1994) and on *Astronomy from the Moon* (1993-1999).

For his research achievements and teaching merits *Prof.* Terzian has been awarded numerous **titles, degrees, awards, medals, and honors**, among which are: **Honorary Doctor of Science** degrees from the University of Indiana, USA (1989), the Yerevan State University, Armenia (1994), the University of Thessaloniki, Greece (1997), and the Union College, New York, USA (1999); the Clark Distinguished Award for Excellence in Teaching from Cornell University (1984); the Distinguished Alumni Award from the American University in Cairo (2004); the Dicran H. Kabakjian Award for Outstanding Achievement in Science, North American Armenian Student Association, Boston, MA (1985); Gold Medal, Ministry of Science and Education, Armenia (2008); and Viktor Ambartsumian Medal, Armenian National Academy of Sciences (2008).

*Prof.* Terzian is an author or co-author of **232 scientific publications** and the **editor of 6 books**, including "*Carl Sagan's Universe*" (1997). Out of these publications 164 are in refereed scientific journals, including papers in *Nature*, where only outstanding results are being accepted. According to the ADS database, during 1962-2008, there are altogether 315 publications by Terzian, many still possibly being missed.

We would like to mention two of the most important modern activities by *Prof.* Terzian that strongly support the development of the Armenian astronomy and science in general: his role in the creation and activities of ANSEF and ArAS.

The **Armenian National Science and Education Fund (ANSEF)** was established in 1999, in New York City, by a group of Armenian academic and other intellectuals, Yervant Terzian among them. ANSEF provides peer reviewed research awards to support scientific, technological and scholarly research. Since the beginning, **ANSEF Research Council is chaired by Prof. Terzian**. During 2001-2008, grants to about 200 projects have been awarded, USD 5000 to each. Altogether, more than 500 senior and junior scientists and scholars have benefited from this support. In the field of astronomy and astrophysics, ANSEF has supported 24 projects involving more than 60 scientists from BAO and Yerevan State University.

The **Armenian Astronomical Society (ArAS)** also was established in 1999, however officially registered in 2001. Since the beginning, *Prof.* Terzian was one of the initiators and active members of ArAS. In 2002, during the first annual meeting, there was a decision to have three Co-Presidents; *Prof.* Terzian was elected

one of them and since then is an **ArAS Co-President**. He strongly supports the existence and activities of the Society and plays an important role in contacts between astronomers living in Armenia and abroad. In 2004, Terzian established the ArAS Annual Prize for Young Astronomers and since then sponsors it. Eight young scientists have received this prize, which we could call "**Yervant Terzian prize**".

An information about *Prof. Terzian* is available in the series of articles about outstanding Armenian astronomers at the Armenpress webpage (<http://www.armenpress.am>, in Armenian), and an article will appear in the journal "*Gitutyan Ashkharhum*" ("*In the World of Science*", 2009, Issue 2, in Armenian).

Areg Mickaelian

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## FUTURE MEETINGS



**IAU GA XXVII.** The International Astronomical Union (IAU) XXVII General Assembly will be held on **August 3-14, 2009** in **Rio de Janeiro, Brazil**. The General Assembly will have 4 Invited Discourses, 6 Symposia, 16 Joint Discussions, 10 Special Sessions, the Women in Astronomy Lunch Meeting, and 2 Young Astronomers' Events.

### IAU Symposia:

**S262:** *Stellar Populations - Planning for the Next Decade*

**S263:** *Icy Bodies of the Solar System*

**S264:** *Solar and Stellar Variability - Impact on Earth and Planets*

**S265:** *Chemical Abundances in the Universe - Connecting First Stars to Planets*

**S266:** *Star Clusters - Basic Galactic Building Blocks throughout Time and Space*

**S267:** *Co-evolution of Central Black Holes and Galaxies*

### Joint Discussions:

**JD1:** *Dark Matter in Early-type Galaxies*

**JD2:** *Diffuse Light in Galaxy Clusters*

**JD3:** *Neutron Stars - Timing in Extreme Environments*

**JD4:** *Progress in Understanding the Physics of Ap and Related Stars*

**JD5:** *Modelling the Milky Way in the Era of Gaia*

**JD6:** *Tand Astronomy*

**JD7:** *Astrophysical Outflows and Associated Accretion Phenomena*

**JD8:** *Hot Interstellar Matter in Elliptical Galaxies*

**JD9:** *Are the Fundamental Constants Varying with Time?*

**JD10:** *3D Views on Cool Stellar Atmospheres - Theory Meets Observation*

**JD11:** *New Advances in Helio- and Astero-Seismology*

**JD12:** *The First Galaxies - Theoretical Predictions and Observational Clues*

**JD13:** *Eta Carinae in the Context of the Most Massive Stars*

**JD14:** *FIR2009: the ISM of Galaxies in the Far-Infrared and Sub-Millimetre*

**JD15:** *Magnetic Fields in Diffuse Media*

**JD16:** *IHY Global Campaign - Whole Heliosphere Interval*

### Special Sessions:

**SpS1:** *IR and Sub-mm Spectroscopy - a New Tool for Studying Stellar Evolution*

**SpS2:** *The International Year of Astronomy 2009*

**SpS3:** *Astronomy in Antarctica*

**SpS4:** *Astronomy Education between Past and Future*

**SpS5:** *Accelerating the Rate of Astronomical Discovery*

**SpS6:** *Planetary Systems as Potential Sites for Life*

**SpS7:** *Young Stars, Brown Dwarfs, and Protoplanetary Disks*

**SpS8:** *The Galactic Plane - in Depth and Across the Spectrum*

**SpS9:** *Marking the 400th Anniversary of Kepler's "Astronomia Nova"*

**SpS10:** *Next Generation Large Astronomical Facilities*

The **travel grant application** and the **abstract submission** will be opened until **March 1st, 2009**.

The IAU GA webpage is available under <http://www.astronomy2009.com.br/>

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**JENAM-2009.** Joint European and National Astronomical Meeting, the "European Week of Astronomy and Space Science", is the EAS meeting combined with the Royal Astronomical Society (RAS) annual meeting. It will be held on **April 20-23, 2009** in **Hatfield, University of Hertfordshire, UK**. The scientific program consists of EAS Symposia



and Special Sessions, ESO sessions, as well as the EAS and RAS General Meetings and some other additional sessions. There will also be EAS and RAS Prize Lectures and plenary lectures.

### **EAS Symposia:**

*The next era in radio astronomy: the pathway to SKA*

*The standard cosmological models - successes and challenges*

*Understanding substellar populations and atmospheres: from brown dwarfs to exo-planets*

*The life cycle of dust*

*Multi-wavelength high redshift surveys*

*Three decades of gravitational lenses*

*The IYA 2009 in Europe*

### **Special Sessions:**

*UK Solar Physics (UKSP) meeting*

*Magnetosphere, Ionosphere, Solar Terrestrial (MIST) meeting*

*MHD seismology of solar, space and astrophysical plasmas (Joint with MIST and UKSP)*

*Mercury - recent insights and future goals*

*In-situ and remote characterization of minor bodies*

*Binary stars: observation and theory*

*Asteroseismology in the era of the CoRoT and Kepler missions*

*Star formation: from massive stars to brown dwarfs*

*The Galaxy and its Satellites*

*Explosive transients in distant galaxies*

*High energy non-thermal astrophysics*

*The local volume: constraints on galaxy formation and evolution*

*Galaxy clusters and their evolution*

*Epoch of reionization: First light to the earliest galaxies currently known*

*Outflows, feedback and the central engines of AGN*

*Towards the first detection of gravitational waves*

*X-ray astronomy in the next decade*

*Enabling technologies for space-based astronomy and space science*

*Europe's medium telescopes: status and prospects*

*The Virtual Observatory and distributed computing*

*Application of machine learning techniques to astronomical data analysis*

*Pro-Am session*

### **ESO sessions:**

*ALMA: status, science capabilities and the path towards science operations*

*E-ELT: the European Extremely Large Telescope*

*How to use ESO - The life-cycle of an ESO observing program*

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The **EAS grant application** deadline is **16 February 2009** (only for EAS members). **Early registration and abstract submission** deadline is **9 March 2009**. The JENAM-2009 webpage is available at <http://www.jenam2009.eu/>

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**ArAS VIII Annual Meeting.** ArAS VIII annual meeting will take place on **July 6-7, 2009 in the Byurakan Observatory**. A summer school for YSU students will be organized on July 1-7 so that the students will have possibility to attend the meeting as well. There is no deadline for registration; it may be done at the registration desk at the venue. However, contributions are welcome since now and no later than **June 15**.

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## ArAS NEW WEBPAGE

We are happy to present the ArAS new website, which is now much more professional and informative, as in connection with the IYA-2009 we wish to better present and advertise the Armenian astronomy. The address is the same: <http://www.aras.am>, however a lot of new pages have been created and a lot of new information has been added. The most important ones are:

- **International Year of Astronomy (IYA-2009)** page. The IYA-2009 Armenian page is created and will be a source for information about all events organized in Armenia. The *Armenian program* of IYA-2009 is available.
- **ArAS members.** All **66 members** are listed. Now links to almost all ArAS members (62) are given; most of the pages (47) have been created by us, where the main data about the person and links to his/her publications in 2000-2008 are given.
- Renewed pages **ArAS Newsletters**, **ArAS Annual Meetings**, and **ArAS Annual Prize**. A **reference list** for articles published in ArASNews is now given (see details in section "ArAS Newsletter in 2002-2008" of this Newsletter).
- The **Byurakan Astrophysical Observatory (BAO)** page. The reference page gives links to the (details see at items given below) *History of BAO*, *Main achievements*, *Scientific instruments and Databases*, *Research staff*, *Current projects*, *Recent results (2000-2008)*, *International collaboration*, *Scientific meetings*, *Publications (2000-2008)*, and the *Main page of BAO at Byurakan*.
- **Main achievements of BAO.** As it is well-known, the main achievements obtained at Byurakan are connected with our outstanding scientist V.A. Ambartsumian. Recently we (H.A. Harutyunian, A.M. Mickaelian) for the first time compiled the list of Ambartsumian's top 20 results (available on the DVD). Now for the first time, a list of **top 100 results** obtained at BAO has been compiled, *so any comments are welcome*.
- **Research staff of BAO.** An interactive list of **51 researchers** currently working at BAO is given: title, name, year of birth, year of work at BAO, position, PhD and DSci degrees, phone, e-mail address, number of refereed publications in 2000-2008, membership, and links to the personal webpage, current projects, and publications.
- **Current projects at BAO.** All science and technical projects in 2000-2008 are listed, altogether **97 projects**. For each project, title, main topics, the team, collaborations, number of publications in 2000-2008 (and link to the publications), grants, and contact person (typically the PI) are given. One can view the projects by subjects, PIs, collaborating countries, grants, and by the order of number of publications.

- **Recent results at BAO.** The scientific results obtained by the Byurakan astronomers in 2000-2008 are given, altogether **50 results**. Observational discoveries, new models, methods and explanations, solution of theoretical problems, large observational programs, publication of catalogs and atlases are listed.
- **International collaboration.** A table with countries (21), institutions and people involved in international collaboration is given, most of the collaborations being still active.
- **Scientific meetings.** The list of all astronomical meetings held in Armenia is presented, most of them organized in Byurakan (and some, at the YSU). Altogether, **59 meetings** are listed. There are separate links to the IAU, JENAM-2007, ArAS annual, thematic, and Byurakan-Abastumani meetings, summer schools, etc. Each meeting now has its homepage (links are given), where the main data are presented and for most of them, full lists of participants. Also, important international meetings with participation of Armenian astronomers are listed (IAU GA, IAU Symp/Coll, JENAMs).
- **Publications in 2000-2008.** A complete list of all **400 publications** (including **265 in refereed journals**, 66 in proceedings of meetings, etc.) based on the ADS database has been compiled. However, search was done by all possible name writings of our authors that appear at ADS and more publications have been added not listed in ADS. Some items have been removed (abstracts later published in proceedings). One can view the publications by year (2000, ..., 2008), by subject, by author, by type (refereed journals, proceedings, electronic catalogs, books, e-prints, etc.), or by journal.
- **Famous Armenian astronomers.** Now **12 outstanding Armenian astronomers** are presented (compared to previous 5); *Anania Shirakatsi*, *Tatevos Aghegian*, *Zadig Mouradian*, *Vahé Petrosian*, *Paris Pishmish*, *Agop Terzan*, and *Yervant Terzian* have been added to *Viktor Ambartsumian*, *Beniamin Markarian*, *Grigor Gurzadyan*, *Ludwik Mirzoyan*, and *Marat Arakelian*. Webpages for these scientists have been created (a few still being under construction). In addition, links are given to articles published in ArASNews about 18 other astronomers.
- **Armenian astronomers – members of international organizations.** More than 100 Armenian astronomers are members of various societies and organizations. We have limited our list to the most important ones, namely the IAU, EAS, EAAS (Euro-Asian Astronomical Society), and AAS. 81 are members of one of these four societies (55 IAU, 25 EAS, 14 AAS, and 19 EAAS). Those who are members of either IAU/EAS/AAS/EAAS, as well as ArAS members from outside Armenia are listed (35 scientists from Armenia and 49 from other countries). Links to this page are given from “*ArAS members*”, “*Famous Armenian astronomers*”, and “*Database of Armenian astronomers*”.
- **Database of Armenian astronomers.** Now a list of 255 astronomers compared to the previous 204 is presented (names, affiliations, e-mail addresses, and links to personal webpages if available). For more details see section “*Database of Armenian astronomers*” of this Newsletter.
- **Astronomical education in Armenia.** This is a new page, where astronomical education in ancient Armenia, popular astronomy, school astronomy, astronomical Olympiads, astronomy at the YSU, PhD studies, summer schools in Byurakan, and participation of Armenian young astronomers in international schools are presented. E.g., on the page “*International Astronomical Olympiads*”, all the Armenian winners of Olympiad prizes during 1996-2008 are listed.
- **Archaeoastronomy.** This is also a new page, where the history of Armenian astronomy is presented: Armenian archaeoastronomy (constellations, rock art, Armenian calendar, ancient observatories Karahunge, Metsamor, etc.), Armenian astronomy in the Middle ages, link to “History of the Byurakan observatory”, and modern Armenian astronomy are presented.
- **ANSEF grants.** ANSEF grants are rather important for support of modern Armenian science in general and particularly astronomy. We have created a page, where general data on ANSEF, link to its main homepage, and all grants in astronomy and astrophysics during 2001-2008 are listed. Altogether, **24 grants** have been awarded (USD 5000 each); 18 from BAO and 6 from YSU. 18 principal investigators (some have received 2 or 3 grants) and more than 60 researchers have been supported.

## ArAS NEWSLETTER IN 2002-2008

This year, because of the IYA-2009, we have decided to distribute 6 or 8 ArAS newsletters instead of the typical 4. There will of course be much more news and information to present, and in addition we would like to make the Newsletter better and more informative. As you have noticed, the design has also been improved, as well as it is much more informative (22 pages!).

ArAS Newsletters were the main source of information during all these years of the ArAS activities (2000-2008). Altogether, 28 issues have been released, typically once every 3 months. **Tigran Magakian** (2002-2004, issues #1-12), **Lusine Sargsyan** (2005, issues #13-16), and **Lilit Hovhannisyan** (2006-2007, issues #17-24) have been the editors. During 2008 (issues #25-28), the newsletter was in fact edited by **Areg Mickaelian**.

A **reference list of ArASNews publications** in 2002-2008 is given at ArAS webpage, **144 articles** in total: articles on international meetings and summer schools held in Armenia (including the ArAS annual meetings; 32 articles), participation of Armenian astronomers in international meetings and summer schools (11), ANSEF grants (announcements and awards; 8), ArAS annual prize for young scientists (announcements and awards; 13), other announcements, news, and other info (14), astronomical education matters (5), articles about Armenian astronomers and ArAS members (45), ArAS affairs (membership, ArASNews, sponsors; 10), other articles (6). Unfortunately, there was very small number of publications and contributions from others; we would like to have articles on activities of Armenian astronomers (their projects, collaboration, important results), astronomical events in different countries, articles on archaeoastronomy, astronomical education, science-popular articles on various astronomical topics, relations to other fields of science.

The ArASNews mailing list now contains 180 e-mail addresses of all ArAS members, many other Armenian astronomers and interested people and organizations. To compare, during the first years, ArAS mailing list had some 50 addresses.

We believe ArASNews is important for the contacts and exchange of information between the Armenian (and other) astronomers.

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