

## **Global Astronomy Survey for Lebanon**

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Updated : Roger Hajjar (SPoC) [see human resources section] Added a small paragraph to the self-evaluation of part 1 on professional astronomy  
21 August 2009

SPoC Approved : Yes

### **1. Professional (Research) Astronomy:**

#### **(i) Number of universities offering Astronomy (and their names):**

Astronomy is offered as part of the Physics Curriculum in some Lebanese universities or as General Education Requirements (GER):

(a) Notre Dame University-Louaize (NDU), a private university, offers one optional GER course since 2001 and 4 courses within the Physics curriculum, one of which is a mandatory courses and the three others form a concentration in astrophysics. NDU and USJ have recently designed an MS in astrophysics that is awaiting final approval from the appropriate authorities in the Lebanese government.

(b) Universite St-Joseph (USJ), a private university, offers one introductory course at the senior level of the physics curriculum (Licence) and is part in the proposal for an MS in astrophysics (see NDU above).

(c) The Lebanese University (LU), the public university, introduced an optional introductory course at the senior level of the physics curriculum. The course, introduced in Fall 2007, ended as the most popular course amongst students.

(d) The American University of Beirut (AUB), a private university, offers one optional GER course. They have also started a PhD in Theoretical Physics where one could opt to take two courses in astrophysics and complete a thesis in the field.

(e) The Beirut Arab University (BAU), a public university, offers one optional GER course.

## **(ii) Number of universities offering Physics (and their names):**

A number of university have physics on their catalogs. Not all actually have students enrolled in their programs or graduated students. Only those having students enrolled and/or who graduated at least one class in physics will be listed. They are listed chronological from oldest physics program to newest:

(a) AUB: offers a B.Sc, M.Sc, and a PhD

(b) LU: Offers a B.Sc and a M.Sc

(c) BAU: Offers a B.Sc and a M.Sc

(d) USJ: Offers a B.Sc and a M.Sc

(e) NDU: Offers a B.Sc

(f) Lebanese International University (LIU): Offers a B.Sc

**(iii) Number of academics who have been trained in Astronomy (ideally with their names and levels of qualification):**

Five astrophysicists:

(a) Jamal Bittar, PhD, currently principal of the Tripoli Evangelical School and part-time instructor at USJ, NDU and the Faculty of Sciences III of the LU in Tripoli (North-Lebanon)

(b) Mounib El-Eid, PhD, Professor at AUB

(c) Roger Hajjar, PhD, Assistant Professor at NDU

(d) Bassem Sabra, PhD, Assistant Professor at NDU

(e) Jihad Touma, PhD, Associate Professor at AUB

Other persons:

(f) Ahmed Shaalan, PhD in atomic and molecular spectroscopy, Professor the Faculty of Sciences V, LU, is currently teaching the introductory astronomy course in that Faculty in Nabatieh (South-Lebanon). Self taught.

(g) Katie Chedid, M.Sc. in physics with a Masters thesis in astronomy, is currently teaching Grades 8 and 9 in a school

**(iv) Number of astronomical facilities (observatories, telescopes, etc) and as much detail about each as possible (websites/contact details):**

There are no fully functional observatories in Lebanon. Some universities have equipped themselves with instrumentation to develop teaching and research:

(a) The BAU has built a few years ago an observatory on the premises of their new campus in Dibbiyeh (35 27 59 E, 33 40 28 N), equipped with a 16 inch MEADE LX-200 SMT, Schmidt-Cassegrain telescope on an alt-azimuthal mount with an SBIG STV. They moved the Faculty of Sciences to the new campus this year. The Physics Department now in charge of the observatory is building a collaboration with NDU's Department of Sciences to work on the development of the observatory and are planning to purchase equipment suitable for teaching and research projects.

(b) NDU has purchased a telescope and science instruments:

- A 14-in MEADE LX-200 GPS telescope;
- An SBIG ST-2000 XM CCD Camera
- An SBIG CFW8 filter wheel with UBVRI research grade filters, and an H $\alpha$  filter with a 4-Å FWHM
- A LHIRES III with a 2400 lines/mm reflection grating

This set of instruments is probably the most used in Lebanon today. It is used in teaching, training and in some research projects. The equipment is not fixed in a dome but is set-up and unmounted when needed.

(c) USJ has a set of equipment identical to NDU's, but it remains unused for lack of qualified full-time personnel. USJ has plans to hire a full-time faculty member with a PhD in astronomy starting Fall 2009.

**(v) Self evaluation (according to the different phases above, how would you rate your country in terms of Professional Astronomy? Please include any other relevant information to motivate your choice.)**

To start with, some additional information is in order to justify a ranking.

In recent years, the astrophysicists in Lebanon have succeed in receiving funds for two research projects from the main governmental science funding agency in Lebanon, the Lebanese National Council for Scientific Research (L-CNRS). This should be mentioned since, to this day, astronomy & astrophysics are not yet identified as priorities in the science policies of the L-CNRS. One of them is about spectroscopic and theoretical studies of AGB and Be Stars, while the other concerns an initial survey to identify a potential site for a national observatory. A commitment to launch a national observatory has been taken by the General Secretary of the L-CNRS and the Minister of Education during the Opening Ceremony of the IYA 09 in Lebanon on February 20th 2009.

Astrophysicists in Lebanon and interested scientists have regrouped in the Task-Force Astronomy and Astrophysics, a consultative body to the L-CNRS, since 2004. The Task-Force organized in September 2005, at NDU, a first Summer School in Astronomy in

Lebanon that regrouped students from Lebanon, Syria and Jordan. The second such school is planned for Summer 2009 with, possibly, a larger regional attendance and will be devoted to astrophysical spectroscopy. A mini-course on star formation was also organized by the Center for Advanced Mathematical Sciences (AUB) in Spring 2005. The observational astrophysicists are also developing Pro-Am collaborations. They have formed a group of amateurs on spectroscopic observational procedure. They now serve as expert telescope and instrument operators for one of their research projects.

Lebanese Astrophysicists also engage in research in different directions not necessarily being funded by the L-CNRS. Dr. Mounib El-Eid works on stellar evolution and nucleosynthesis. Dr. Bassem Sabra is interested in the central engine on AGNs and uses UV and X-Ray data for his studies. Dr. Jihad Touma works on different astrophysicals topics

whose common theme is dynamics such as the central part of the galaxy, galaxy disks, etc.

Drs. Jamal Bitar and Roger Hajjar are interested in different aspects of Be stars and other

young stars. They have most recently used archival data for this work.

In April 2009, Lebanon witnessed the 1st Lebanese Astrophysics Meeting regrouping

astronomers of Lebanese descent working abroad, local astronomers and some of their

friends and collaborators. The meeting ran from April 14 to 17 and included contributed and

invited presentations under the broad theme "From Stars to Galaxies". The meeting

produced a set of recommendation to serve as guideposts for the continued development of

astrophysics in Lebanon. It was also agreed to hold the Lebanese Astrophysics Meeting on a

regular basis and to extend invitations for the second meeting on a wider basis.

Another important development is Lebanon's interim membership to the IAU since 2006.

Lebanon's application was approved during the General Assembly in Prague during the July



war.

Based on all what precedes, I would rank Lebanon, in Professional Astronomy, as very close to Phase 2. Reaching Phase 1 would require hiring more full-time faculty members to reach about 12 professional astronomers, having a graduate program in astrophysics and possibly founding a national observatory.

## **1. Public Understanding of Astronomy:**

**(i) What governmental astronomy/science outreach programmes for the public take place (co-ordinated either by government departments or national facilities)**

None to date. The National committee for IYA 09 has established contacts with the ministry of education to promote the creation of astronomy clubs in the public school systems.

**(ii) What non-governmental astronomy/science outreach programmes for the**

**public take place (NGO activities or international programmes that your country is involved in)**

Activities have been organized by various groups during major astronomy events of the last decade. An Arabic science magazine, “3elem wa 3alam” (Science and world), organized public events for solar eclipses, the closest approach of Mars, and Venus Transit . The IYA 09 has provided opportunities to begin the creation of astronomy clubs in schools and municipalities. At least two private schools have dynamic and active clubs, a club was created in one of Lebanon main cities and another one is planned in one of the mountain villages. A group of university astronomy clubs and other amateurs started celebrating the International Astronomy Day every year by organizing sidewalk observations in Beirut. They have formed a Lebanese astronomy association which is in the process of being officially recognized in Lebanon. One of its main goals is the organization of such outreach programs. An astronomy magazine called “Ooloom Al Falk”, Arabic for “Astronomical Sciences” is now being published quarterly by the National Committee for the IYA 09. Its main public are school students and the general public. It is distributed to all public schools through the Ministry of Education and to all public libraries through the Ministry of Culture.

**(iii) Comment on the presence of astronomy in the media (TV, radio, newspapers). Is it very prominent? Are there specific programmes on astronomy? Is the media generally willing to publish news on astronomy?**

Astronomy is present in the media but not as a regular program. News are sometimes reported from major news agency. Major astronomical events such as solar eclipses have been covered extensively by local media with the presence of local Lebanese astronomers commenting live on TV. Most recently, interest in the development of astronomy have grown significantly in some newspapers. Last year, a large report about the international astronomy day activities appeared in the only Lebanese newspaper published in English (The Daily Star). A full page report was dedicated a few months ago to Lebanese astronomy and astrophysics in the major newspaper published in French (L'Orient Le Jour). The publication by the National Committee of the IYA of the first ever Astronomy Magazine was covered in some of the major newspapers published in Arabic. However, from time to time some of the hoax common on the Internet find their way to one or the other of the newspapers. From time to time, interview with some lebanese astronomers are broadcasted on various radio stations.

**(iv) Comment on the presence of astronomy/science in the general culture of the people. Are there any specific challenges or setbacks? Is astronomy a welcome subject of conversation?**

Although a subject of curiosity, science and astronomy culture is lacking in Lebanon. Astronomy and science are welcomed subjects but mixed with a lot of superstitions. Astronomy and astrology are still very much considered similar even with some of the well educated parts of the population.

**(v) Self evaluation (according to the different phases above, how would you rate your country in terms of Public Understanding of Astronomy? Please include any other relevant information to motivate your choice.)**

Although a number of clubs and associations are beginning to exist, there are no well established outreach programs. If one looks at the criteria set for classification, Lebanon is somewhere between Phases 3 and 2. On that basis, I would put it at Phase 3 with the possibility of moving to move to Phase 2 in the near future.

## **1. Astronomy in Schools:**

**(i) What governmental astronomy/science education and outreach programmes for schools take place (co-ordinated either by government departments or national facilities)**

None. Actually there are no dedicated “national facilities” in astronomy in Lebanon. A “Planet Discovery”, a kind of interactive science museum exists in Beirut. It has been created and is operated in coordination with the “Cité des Sciences” of Paris.

**(ii) What non-governmental astronomy/science education and outreach programmes for schools take place (NGO activities or international programmes that your country is involved in)**

Some programs exist in science outreach and education due to various organizations among which is the Lebanese National Commission for UNESCO. The GLOBE websites lists a local participation of a number of schools to their projects. More and more science fairs and activities are organized for schools. AUB, LAU, and USJ, three private universities, organize annual science fairs with the distribution of prizes to winning projects. An independent group of science teachers organizes a similar competition with the association of municipalities of Nabatieh in the South of Lebanon. The National Committee for the IYA 09 is planning an astronomy fair for March 2010, for the occasion of the publication of Siderius Nuncius. It will also include the distribution of prizes to winning projects.

**(iii) Comment on the presence of astronomy in the school curriculum. Is it part of the school curriculum? Is it very prominent? What age groups?**

Astronomy is indeed present in the school curriculum. It is present mostly in geography for elementary classes and is integrated to sciences and physics in secondary classes. It is totally absent in the intermediate classes. Secondary students in their second and third year are oriented towards science or humanities. Paradoxically, those in the humanities are exposed to much more astronomy than those in the sciences. Although present in the official curriculum and textbooks, it seems that it is not actual taught in the classroom.

**(iv) Comment on the status of astronomy/science in schools. Are there any specific challenges or setbacks? Sufficient number of students studying maths and science? General interest in maths/science/astronomy in schools?**

Students do not chose to study or not science and maths in schools. All students follow the same curriculum in all subjects for 10 out of 12 years. Only in the last two years do they choose specific orientations based on their previous results. A good curriculum in the first 10 grades will thus allow to provide a solid culture in astronomy and sciences.

The last major curriculum review happened in 1997. At the time, only one astronomer had been present for 2 years in Lebanon. He was not involved in the review process. No astronomer or scientist with a solid background in the science was present in any committees who worked on the new science curricula. According to the Ministry of Education, a major review is due soon. The excellent relationship between the Ministry and the National Committee for the IYA 09 will

definitely bring positive input to the process and the new curriculum.

Another problem faced has to do with the background of the science teachers. They receive no basic training and have no formal background in astronomy since no courses were yet offered in universities until a decade ago. Knowing that the major provider of science teachers is the Lebanese University, the introduction of an astronomy course last year will lead, in a decade or so, to a sizable workforce with enough background to further astronomy education in schools. In the meantime, we are starting to plan, again under the impetus of the IYA 09, the organization of Teacher Training Programs under the GTTP Cornerstone project.

**(v) Self evaluation (according to the different phases above, how would you rate your country in terms of Astronomy in Schools? Please include any other relevant information to motivate your choice.)**

In view of the above, our classification is probably close to Phase 3, tending towards Phase 2.