

VATLY NEWSLETTER

Wise and competent people are the strength of the nation. This is why enlightened kings always pay much attention to the training of scholars and their selection through competitions.
Doctor's stone, 1442, Van Mieu

We wish our friends a very happy and successful New Year of the Rooster!

Mừng Xuân Đinh Dậu 2017



CONTENT

This twenty-fifth issue of the **VATLY NEWSLETTER** opens with the traditional **NEWS FROM THE LABORATORY**. Jim Cronin, who had so generously welcomed us in the Auger Collaboration, who strongly supported us and helped our small team to come of age, passed away in August. We reproduce here an article, which bac Pierre wrote in Tia Sang to pay tribute to him, **JIM CRONIN, FRIEND OF VIETNAM, OUTSTANDING PHYSICIST, EXAMPLE OF HUMAN DIGNITY**. In the past two years, we have actively been pursuing our **EXPLOITATION OF ARCHIVAL ALMA DATA**; we report about this experience and give some considerations on how we see the future in its wake. Thao has been active in **PROMOTING AND SUPPORTING OUTREACH ACTIVITIES**, which she tells us about. In December, the South-east Asia Astronomy Network hold its **ANNUAL SEAN MEETING** in Ha Noi and VNOSC was host for it. Diep and Tuan Anh report on the event. In the preceding issue of the Newsletter, we gave a brief account of the Vietnamese Space Programme; in December, the two VAST institutes dealing with space matters, STI and VNOSC, jointly organised **AN OPEN FORUM ON THE USE OF SATELLITES TO HELP WITH THE MANAGEMENT OF**

NATURAL RESOURCES, ENVIRONMENTAL PROTECTION, MITIGATION OF NATURAL DISASTERS, SOCIO-ECONOMIC DEVELOPMENT, NATIONAL SECURITY, SCIENTIFIC RESEARCH AND TRAINING. It was attended by a large audience of concerned users and Diep gives a brief summary of the event. We, and particularly Diep and Thao, helped high school students who had been selected to compete in **THE 2016 INTERNATIONAL OLYMPIADS ON ASTRONOMY AND ASTROPHYSICS** getting prepared. We have been impressed by how bright and hard-working they are, and by their success in the competition. Diep reports about the event, which illustrates how Viet Nam can be at the top when proper support is given to whom deserves it. The end of July, beginning of August was busy with **SUMMER CONFERENCES IN QUY NHON**: a conference on star formation (Tuan Anh and Phuong), followed by an astrophysics school (Phuong) and by the *Blowing in the Wind* conference organised by Pierre Lesaffre, which the whole team attended; Nhung and Tuan Anh report. Phuong will now spend four months in France, working in Bordeaux in the team of Anne Dutrey

for her PhD. In preparation, she spent **A MONTH IN FRANCE** in September-October, sharing her time between Bordeaux, Grenoble and the Plateau de Bure. She tells us about her impressions. The issue closes with the traditional **PHOTO ALBUM**.

NEWS FROM THE LABORATORY

Under this heading we review briefly the progress of the work of the team and the main events in its life.

The elapsed six months have seen the pursuit of an intense analysis activity of archival ALMA observations and participation in numerous conferences and workshops. On the analysis side, we completed two main articles, one on the high redshift galaxy RX J0911 and the other on a gas-rich debris disc, 49 Ceti; we report about it elsewhere in the issue. Diep and Phuong analyzed star formation data under Anne's guidance, mostly ALMA observations of GG Tau.

On the meeting side, there have been conferences, a school and a workshop in Quy Nhon this Summer, a SEAN meeting in Ha Noi in December, an IRAM school in Grenoble in October, all of which are the object of reports below. In addition, Diep attended a South-east Asia conference in Korea on Astronomy and Astrophysics, where he presented our work on the methodology of space reconstruction of radio-astronomy images. In February he was invited to spend a few days in Taiwan at the Institute of Astronomy and Astrophysics of Academia Sinica to report about the work of the group and foster tighter links between them and us. Tuan Anh was invited to report about our research work to the Physics in Collisions conference that took place in September in Quy Nhon; his presentation was very well appreciated. He was also invited to report on astrophysics research in Vietnam at an international general public conference in Jakarta, organised by the "Galaxy Forum", meant to "advance 21st Century Education worldwide, thereby leading to greater global awareness, capabilities and action in Galaxy science and exploration". Moreover, he took part in a "Springer Nature Online Quiz" and won their Grand Prize, a Samsung Galaxy (nothing to do with the Galaxy Forum!) Tab 3V 3G; we are very proud of him: congratulations!

End of October, the Institute of Physics organized a workshop on cosmology and general relativity, which several of us attended. Many of the presentations related to the recent observation of gravitational waves by LIGO; it was interesting to see how this community of theorists see this discovery as a new tool to study general relativity, while we rather tend to see it as a new tool to study the population of black holes and neutron stars in the nearby universe (unfortunately the high redshift universe seems out of reach). In the last issue, we reported about the *Workshop on astronomy development in Vietnam: challenges and opportunities*, which we all attended in Quy Nhon last summer. Hien was expected to write draft minutes and, together with Dinh Van Trung, to draft a proposal on possible instrumentation work but we did not get anything yet. Phan Bao Ngoc was appointed to represent the Vietnamese community at the East Asian Observatory and is expected to sign a Memorandum of Understanding in the name of all of us; it seems however that he will only be able to do so in the name of the Vietnam National University (VNU), which is unfortunate.



Official announcement poster of the Galaxy Forum; Tuan Anh and the VNSC dome in Nha Trang are visible in the lower right corner.

Hoang Anh has left us for Nha Trang where, together with two undergraduates (an engineer and a physicist) she starts to set up the VNSC observatory in premises belonging to VAST. It includes a telescope that has already arrived, and a planetarium that will be there in March and is meant to attract a general public. She will try to establish relations with the university. The same is happening in Ha Noi, more precisely in Hoa Lac, where the VNSC Space Centre and the

USTH campus will be hosted. In addition to the telescope and the planetarium, the observatory will also include a museum, for which Thao has been collecting documentation on the history of astronomy. She is in charge of science issues in the small VNCS team responsible for the installation of the observatory. In general, she spends most of her time on outreach and training activities, including support to Pierre Lesaffre in relation with his USTH lectures, preparatory lectures to the Olympiad students, together with Diep, lab work using the Small Radio Telescope, etc. When Pierre Lesaffre spent time with us at the end of last year, she joined him in making some observations using the optical telescope of the University of Education.

Tuan Anh spent most of his time working on the analysis of the RX J0911 and 49 Ceti papers and taking care, together with Nhung, of the editing work that it implies. He submitted a project to Nafosted on the study of evolved stars and high redshift galaxies, which has now been accepted. Together with Pierre Lesaffre, who came to lecture at USTH before Christmas and stayed with us, he arranged to spend the month of May at the Paris Observatory.

As Tuan Anh, Nhung spent most of her time on the analysis of ALMA data. She gave a series of lectures, introduction to astrophysics, to USTH master students. The working group on USTH perspectives about which she reported in the last issue, with Daniel Rouan in the chair, reached some preliminary conclusions; but, in spite of the interest to develop astrophysics research at USTH, presently the only Vietnamese university including explicitly astrophysics in one of its departments, and in spite of its proximity to our team, IOP and HNUE, a realistic implementation has to face major obstacles related to the scarcity of potential candidates in Viet Nam.

Hoai gave birth to a strong and beautiful little boy who looks so much as his father, Son, that we call him Sonino. Yet, she found some time to help with the analysis of the 49 Ceti observations, with the training of one of the three USTH interns and with a paper that Thibaut Le Bertre has submitted for publication in RAA; the idea of the latter is to pave the way to a future FAST proposal to observe an evolved star in HI; the selected star, Y Cvn, is a Red Giant sufficiently

away from the galactic mid-plane not to suffer too much from the interstellar HI contamination that makes HI observations at low galactic latitudes so difficult. Lyn Mathews, Eric Gérard and Nhung are also co-authors. More than one year after having successfully defended her PhD thesis in Ha Noi in front of an international jury, Hoai finally received comments from two Vietnamese referees. One might think that they would have found of bad taste to request changes after the positive assessment of the international jury, but one of them felt differently. This gives a really bad and shameful image of Viet Nam; when will the Ministry of Education and Training understand it and simplify the rules in case of joint supervision theses? After having made the changes requested by the referee, Hoai will still have to make fifty copies of a 24 pages summary of her thesis, send them to fifty Vietnamese PhD, obtain a favourable assessment from fifteen of them and defend again her work, this time in front of a purely Vietnamese jury; incredible!

Phuong just left for her first four-month stay in France, she reports about it below. Anne Dutrey, from Bordeaux, and Diep are co-supervisors of her thesis work. They have established close contacts and communicate frequently via Skype sessions. Phuong registered in both doctoral schools, Ha Noi and Bordeaux, and the joint supervision (cotutelle) agreement has been signed. Anne Dutrey has submitted a proposal to the French Embassy in Ha Noi for some support to allow her to spend a week or so with us and Diep to do the same in Bordeaux. Phuong, on her side, has applied for an excellence fellowship from the Embassy to cover her travel expenses while in France. She spent her first week in France attending a school at Les Houches, at the crossing point between astrophysics, planetology and cosmo-chemistry, belonging to a series that Anne Dutrey contributed to start in the late nineties. She had to defend her thesis project in front of a panel of the GUST doctoral school (GUST stands for Graduate University of Science and Technology and is closely related to VAST); she did very well, but the panel engaged into a long discussion because astronomy and astrophysics are absent from the list of topics that are listed as possible PhD subjects... We already went through this comedy a dozen times or so on the occasion of

earlier master and PhD theses. One would think that it would be more useful to discuss how to fix the shameful omission of the most dynamic branch of contemporary physics in the list, but such is not the case. Diep has been proposing to Dinh Van Trung and Quynh Lan to join with him in making such a request, let us hope that it will be successful.

Diep has submitted a project to Nafosted to study star formation, which has recently been accepted. He is still expecting an answer from CNRS for support in relation with collaboration with Observatoire de Paris. As head of the team, he takes part in the work of the VNSC directorate and has to represent us on various occasions. He gave lectures to bachelor students (3rd year) at USTH, helped preparing the Vietnamese candidates to the International Olympiads by giving them lectures and inviting them at the lab, took care of welcoming a class of high school students who were curious to learn about research in astronomy and of showing them around, etc. The idea to dedicate two pages in each Tia Sang issue to young engineers and scientists, which had been received favourably by the editors, and which Diep is helping with, turns out to be more difficult to implement than previously thought: some potential authors who had given their principle agreement are getting cold feet at the last moment. Diep has written an article on introduction to astrophysics for a magazine that Ngo Bao Chau has been launching, and to which he donated part of his Fields Medal money; the title is *Pi* and the idea is to bridge the gap between professional mathematicians and young students in universities and high schools. Diep gave support to a proposal to devote two pages per issue to something like Astrowatch in CERN Courier, an idea also supported by amateur astronomer clubs, which has been accepted on a trial basis by the editor in chief, Ha Huy Khoai, former head of the Institute of mathematics.

Bac Pierre, apart from his contribution to the analysis work of the team, wrote several articles for Tia Sang, such as pleading for a better respect of the role of intellectuals in the Vietnamese society or for reducing the duration of bachelor studies from four to three years, in conformity with the Bologna agreement. He was invited to give the inaugural lecture at Hoa Sen

University in Saigon, followed the day after by a lecture on the life and legacy of Marie Curie; he will repeat the lecture on March 7th at the Hanoi University of Sciences on the occasion of the International Woman Day. He was very moved and honoured to receive the visit at his home of Vice-prime minister Vu Duc Dam, who strongly supports education and research, on the occasion of the new year. He went to CERN at the end of last year to report to the Word laboratory about the work of the team.



Reporting at CERN to Worldlab. From left to right: Horst Wenninger, bac Pierre, Fabiola Gianotti and Antonino Zichichi.

It was an opportunity to tell Antonino Zichichi how indebted we are for the support, material but also moral, which he gives us. Bac Pierre has been very moved to meet on this occasion Fabiola Gianotti, present Director General of CERN, whom he had first met when she was a young PhD student in UA2, and whose success and progress he had kept following over the years. He told her his admiration for what she has achieved, in particular as spokesperson of the ATLAS LHC collaboration, and wished her success in the very difficult task that rests on her shoulders. Bac Pierre has also been invited to take part in a seminar organised by the Ministry of Science and Technology on evaluation of institutes and projects. He was one of two speakers and said that if he had to name three key words for a good evaluation, he would pick integrity, competence and transparency. To his surprise, a senior participant objected to him that this was true in developed countries, but does not apply to developing countries... On Teachers' day, bac Pierre received the visit of the team, joined by The

and Dong, both former members. The, who is now teaching physics at high school, came with her very lively and lovely four year-old daughter who offered bac Pierre a beautiful colourful drawing showing a cat flying in the cosmos.

The series of VNSC seminars organised by Diep included the following titles: *Payload cameras in the Microdragon satellite*; *Modelling soil erosion, flash flood prediction and evapotranspiration in Northern Vietnam*; *VNSC satellite image management prototype*; *VNSC Optical Observatory (by Thao)*; *R & D on a space environment simulator for testing a satellite attitude determination and control system*; *New sensing system for autonomous space "rendez-vous"*; *Development and ground verification of store and forward packet decoder for Microdragon satellite*; *Introduction of star tracker development process*. In December, there has been no seminar because, in addition to the SEAAN meeting about which we report below, we celebrated the 5th anniversary of VNSC; this took the form of a conference attended by a broad Vietnamese audience of satellite users; the general topic was "*Space science and technology for development*"; Diep reported about our research work, and a Japanese engineer presented a new rocket, named *Epsilon*, dedicated to the launch of small satellites (up to about 300 kg), which will be used to launch Microdragon.



Having lunch together with our visiting guests; Nhan is second from right; internship students are second and third from left and first from right

We enjoyed the visits of several friends, with whom we often shared a lunch, such as Pham Tran Le and Van Thanh from Tia Sang, with whom we maintain close and friendly relations. Daniel Froidevaux, who had been teaching in Quy

Nhon, spent an afternoon with us. Vo Bich Hien is a radio engineer having much expertise and experience in radio astronomy; he came back to Vietnam after a long stay in the US and is now teaching in Saigon at the German-Vietnam University. He is interested in training students and has nice ideas about building an array of long wavelength antennas, with which one can make all kinds of interesting observations; he first spent two days with us and returned on the occasion of the SEAAN meeting where he presented his project. Pr. Onishi, from the National Astronomy Observatory of Japan (NAOJ), came to VNSC to meet us, learn about what we are doing and tell us about NAOJ and possibilities of fellowships, short visits and more generally collaborations. He gave an interview to Tia Sang in which he underlined the importance of outreach. A Japanese postdoc, Shingo Takeuchi, spent two days with us at the end of November; he is presently working in Thailand and gave a seminar on black holes at the Institute of Physics, which Diep and bac Pierre attended; he would be interested in coming to Viet Nam. Nguyen Dang Thanh Nhan, a physics lecturer at Tay Nguyen University in Buon Me Thuot, spent a month with us during which she attended Diep's USTH lectures, learned about the SRT and studied SNIa's, about which she gave a nice seminar at USTH; she is very bright and full of life and we all were seduced by her; she applied for an Erasmus fellowship and should like to study abroad for a master. Sophie Ramstedt, a guru of Mira observations and analyses, gave a seminar at the University of Education, which we all attended; it was an opportunity to have a frank and friendly discussion with her about our analysis of ALMA observations that she had proposed and her refusal, together with the members of her collaboration, to referee our MNRAS article. We welcomed two young students wishing to spend time with us; Long is in high school, in grade 11, one of the candidates selected for the Olympiads; he wants to learn about our life in order to decide on his future; Thao will introduce him to SRT observations. Phong has completed his third bachelor year at REED University and decided to take a kind of sabbatical year spending time with us, again before deciding on his future; Diep introduced him to the physics of planetary formation and gave him articles to study; he will give us a seminar when he

will have digested them. A master student who recently got his degree on questions of water treatment at USTH and spent an internship in France came twice to visit us and exchange views with us on environmental and climate issues, on which he is interested.

The three USTH master students who spent their internship with us all obtained excellent marks and are now in their second and last year. Van has a job at the Institute of Physics, working with Dinh Van Trung, and Hoang in VNSC, working on software development for satellite attitude control.



Signature of the VAST/VNSC-NARIT MoU by our boss, Pham Anh Tuan, and Professor Boonruksar Soonthornthum. Diep and Phuong can be seen in the back row.

In August we received the visit of a delegation from NARIT, the National Astronomical Research Institute of Thailand, with whom VNSC signed a Memorandum of Understanding aimed at promoting exchanges and collaborations. It was the opportunity for two of them, together with Tuan Anh, to address a general audience, including high school and university students.

The proposal for observing Ep Aqr that had been submitted to ALMA by Thibaut Le Bertre has been accepted and observation took place before Christmas; we shall soon be able to work on the analysis.

Mid-February we moved to a new building on VAST campus, which VNSC shares with some mathematicians. We live in a large and well-equipped room on the seventh floor.

Tran Thanh Van and his wife Kim are now spending long periods of time in Quy Nhon and we

have opportunities to see them more often than in the past. Van is now establishing a permanent research team based in Quy Nhon. It will first focus on theory but he has the ambition to progressively build up an experimental team working on the KEK to Kamioka long baseline neutrino oscillation experiment; Nguyen Hong Van, presently working at the Institute of Physics, is seriously considering joining the effort and gave a report along this line at the workshop on cosmology and general relativity. Tran Thanh Van is also busy completing the installation of the Quy Nhon planetarium, which will include three major rooms: one on *From Particles to the Universe*, put together with the help of CERN, one on satellites and space technology, with the help of CNES and a third on Earth observation from space, for which he would like to imply the Vietnamese space community. We agreed to give him some help in this direction, and contacted several experts from USTH, STI, VNSC and MONRE, the ministry for natural resources and environment, who are prepared to propose ideas and offer some help; they met Van in February in Hanoi for a first brainstorming session.



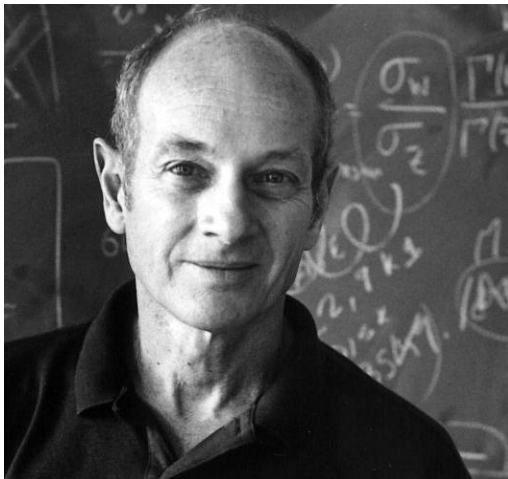
At Thieu's institute we were welcomed by him and Nguyen Tien Dung; both had been associated with VATLY and made their PhD work with us.

Finally, let us mention the decision to stop the nuclear power programme, which has been taken in the autumn. Many of our friends working at the Institute of Nuclear Science and Technology, or in other Institutes of Vinatom, are obviously strongly affected by this decision. The plan was to have in Ninh Thuan (Central Viet Nam) first two reactors, each of 1 GW, built by Russians, and next

two more built by Japanese. We paid a visit to our friend Dang Quang Thieu, former member of the team, who is presently heading the Vinatom Centre for irradiation. He is not directly affected by the decision and his institute is doing quite well. They have a fat cobalt source which they use in particular to sterilize food, and a cyclotron bought from South Korea that is already happily producing ^{18}F (FDG) for medical applications, but waiting for official certification. He is also very successfully developing a national network of radiation detection from the atmosphere (essentially radon). The visit was followed by an excellent lunch offered by Thieu.

***JIM CRONIN, FRIEND OF VIETNAM,
OUTSTANDING PHYSICIST, EXAMPLE OF
HUMAN DIGNITY***

Jim Cronin, who had so generously welcomed us in the Auger Collaboration, who strongly supported us and helped our small team to come of age, passed away in August. We reproduce below an article, which bac Pierre wrote in Tia Sang to pay tribute to him.



James Watson Cronin, 1980 Nobel laureate, passed away on August 25th, 2016. By having added elegance to his extreme intellectual and moral rigour, by having added grace to his generosity and tolerance, Jim will remain for all of us an outstanding example of human dignity.

I have been close to Jim over the past fifty years. The first time I met him was in Princeton a couple of years after he and Val Fitch, together with René Turlay and James Christenson, had

discovered CP violation in kaon decays. Their experiment had measured the magnitude of the CP violating decay amplitude and several new experiments were then busy measuring its phase. At that time, I had just switched from nuclear physics to particle physics and I had joined one such experiment at CERN, led by Carlo Rubbia and Jack Steinberger. Later on, I had again the good fortune to work in the same domain as Jim was, the production of large transverse momentum bosons in hadron collisions, a probe of the quark and gluon structure of nucleons. It gave us several opportunities to meet, such as in a working group on a possible proton-antiproton collider in the US that Jim had convened. At the end of the last century, Jim, together with Alan Watson, designed a major observatory near the Argentinean Andes, the Pierre Auger Observatory, aimed at detecting the very highest energy cosmic rays reaching the Earth. It was in this context that Jim became close to Viet Nam, of which he had been a long-time friend, and close to the small research team that we had put together in Ha Noi. Rather than reporting on his life and scientific achievements, which has been done superbly in recent accounts [1], I shall concentrate on this period of his life, and particularly on his relation with Viet Nam, mostly on the basis of personal recollections [2].

Jim and Alan had convinced themselves in the early 1990s that progress in cosmic ray physics was requiring the construction of a very large observatory, which would have sufficient sensitivity to detect the highest energy extra galactic cosmic rays and sufficient angular resolution to reconstruct where they were pointing from. Remembering the time when they were working on such a proposal, Jim said: *“I was very idealistic and very very discouraged with the role of our government in the Viet Nam war; so I was determined to somehow engage Viet Nam and other developing countries in this proposal to really make a very large experiment to measure the very highest energy cosmic rays. It had to be large because the rate of high energy events is something like one per square kilometre per century, so you need a very large area in order to catch some of these rays. So Alan Watson and I made a trip to Viet Nam in 1994 to try to get the Vietnamese interested in working on this experiment; and the thing we offered was to have them select somebody*

to come and work on the design of the experiment which was being planned.” Jim had always been allergic, in his earlier career, to very large experiments that bring together physicists by the hundreds, as “big science” had been more and more demanding in the recent years. However, in the present case, there was no other choice: “Once you have the passion to do something, he said, you have to do whatever it is that is necessary to achieve your goal.”

His trip to Viet Nam had resulted in having a young physicist from the nuclear institute in Da Lat, Huỳnh Đông Phương, join him and his team for six months to work on the observatory design studies. It also had initiated, with the help of Tran Thanh Van and Nguyen Van Hieu, steps that would soon lead to a framework agreement of possible collaboration, to the writing of which Vo Van Thuan had played an important role.



Top left: Jim lecturing at VNU. Top right: at dinner in Diep’s place (from left to right, Dong and his wife, Thao, Diep and his wife). Bottom: visiting President Triet (the five central people on the first row are, from left to right, Van, von Kitzing, Minh Triet, Jim and Nguyen Van Hieu).

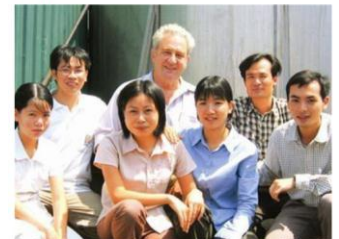
Around that time, Tran Thanh Van, in the context of the Rencontres du Viet Nam, had organized a school in Ha Noi, aimed at introducing young Vietnamese students to the physics of cosmic rays. However, as Jim said, “The point was that although the Vietnamese students were interested in the experiment, they really had nobody of any experience nor did they have any

leadership to really get them involved. So it was very very disappointing for me.”

I remember, at that time, while I had just completed my term as director of research at CERN and was working on superconductivity, having travelled with Jim in the RER from Orsay to Paris. He had told me about his effort to get support from UNESCO to help science blossom in developing countries, in particular in Viet Nam, which, for both of us, was a symbol of resistance to the unjust cruelty that history had made it to endure. He also told me about his contact with Pierre Auger’s daughter and the admiration he had for her father who had died on Christmas Eve in 1993. I happened to have met Pierre Auger on several occasions – he was already nearly blind at the time – in the context of a radio programme, *Les Grandes Avenues de la Science Moderne*, which he was running and to which I had contributed. I told Jim about this experience.



TP - Các nhà khoa học vừa kết luận: Các trung tâm thiên hà AGN với lỗ đen siêu nặng đang hoạt động mạnh là nguồn phát khắ đầ nhất của tia vũ trụ năng lượng cao đến trái đất. Đáng chú ý, phát minh này có đóng góp của các nhà vật lý trẻ VN.



Các nhà vật lý trẻ thuộc phòng thí nghiệm VATLY và GS Pierre Darrulat - Cố vấn khoa học của Dự án

Jim liked to remark that on the same day of November 2007, the Pierre Auger Observatory made the front page of Science magazine and our small team the front page of Tien Phong.

Jim welcomed the birth of our small team, at the turn of the century, as what he called a “miracle”, much exaggerated and much too kind a word. We were at that time hosted at the Institute of Nuclear Science and Technology, on Hoang Quoc Viet, and had chosen as name VATLY, both meaning physics in Vietnamese and being an acronym for Vietnam Auger Training Laboratory. Again quoting from Jim: “Vietnam, for wanting to re-establish basic fundamental research in Viet Nam; Auger, a very good focus for training because cosmic rays are everywhere – you don’t have to go to an accelerator – that is a most beautiful thing; Training, it was the main point,

training youngsters in a country that had been ravaged by wars for many many years and where all around you find enthusiastic bright young people”.



In 2006, on the roof of our Institute (upper pictures, with Jim Beatty, Dong, Diep and bac Pierre) and visiting the Hanoi Museum of Ethnography (lower left: Dong, Thao, Diep, Jim Beatty, Jim and Nhung). Lower right: in Orsay in 2008, with bac Pierre and his wife.

Jim was highly appreciative, exaggeratedly I must say, of what we had achieved at the time, in particular our detailed measurements of the cosmic muon flux, which had enjoyed an unexpected interest because Ha Noi happens to sit on the geomagnetic equator where the rigidity cut-off is maximal. He also highly praised our implication, in addition to analyses of the Auger data, in measurements performed at home, using instruments that we had assembled on the roof of the institute, such as *“the beautiful curve in Nhung’s master thesis showing proportionality between Cherenkov light and path length”*. He commented in this context *“What they are doing is not just sitting in front of computer screens – this is a most important thing to get people away from the computer – they have been very successful at adopting as a kind of philosophy the idea that you can make calculations and so forth, but if you don’t build a beautiful apparatus to collect the data you will never be able to replace them by any amount of software work”*.

The first important results of the Pierre Auger Observatory made the front page of the Science magazine, a prestigious American scientific journal, and, on the same day, November 9th, 2007, Tien Phong (a daily newspaper that had

been established during the first Indochina war) was posting a picture of our small team on its front page, commenting about our participation in the Observatory’s research. Jim was very proud about that and I heard him mention it on several occasions.

In Summer 2006, Tran Thanh Van and the Rencontres du Viet Nam organised a conference in Ha Noi that brought together physicists from all over the world, to discuss recent advances in particle-, astroparticle- and astro-physics. Diep reported about the work of our young team. On this occasion, Jim, together with Nobel laureate Klaus von Kitzing, met the President of the state, Nguyen Minh Triet. They told him that the time had come for Viet Nam to contribute more to the world’s scientific and technological development. Jim gave a lecture at the Viet Nam National University in which he emphasized that Viet Nam needs to provide more profound scientific education and create more favourable opportunities for scientists while developing appropriate policies on working conditions and salaries in order to attract talented people and avoid the brain drain of excellent domestic scientists leaving for foreign countries.

This 2006 visit to Viet Nam was also for us the opportunity to show Jim around Ha Noi, to take him to Ha Long Bay and to spend with him unforgettable moments.

Jim used to say how thrilled he had been to see us develop and realise his dream of trying to get the country involved in a little bit of science of very high quality. We will always remember him with great respect and devotion, aware as we are of the immense debt we owe to him and to the Pierre Auger collaboration, without whom our young team would have been unable to come of age.



[1] Here are a few relevant references:
<http://nature.com/nature/journal/v537/n7621/full/537489a.html>
<https://news.uchicago.edu/article/2016/08/27/james-w-cronin-nobel-laureate-and-pioneering-physicist-1931-2016>

<http://nytimes.com/2016/08/31/science/james-cronin-who-explained-why-matter-survived-the-big-bang-dies-at-84.html>
<http://physicsworld.com/cws/article/news/2016/aug/26/nobel-laureate-james-cronin-dies-at-84>

https://www.nobelprize.org/nobel_prizes/physics/laureates/1980/cronin-bio.html

His Nobel lecture is found at

https://www.nobelprize.org/nobel_prizes/physics/laureates/1980/cronin-lecture.html

[2] Most quotes are from an address given by Jim in Orsay (France), a video of which can be found at http://webcast.in2p3.fr/videos-lagarrigue_2008_auger_jim_cronin?cmb_video_liste=5746

EXPLOITATION OF ARCHIVAL ALMA DATA

For now two years, we have been analyzing many archival ALMA observations that had been proposed by others; we report about this experience and give some considerations on how we see the future in its wake.

In the past two years, our team has actively exploited ALMA archival observations, resulting in the publication of eight articles in major international journals (see table below). This experience invites some comments. We start with some facts before commenting on the lessons learned and on our vision of the future.

ALMA is by far the best instrument in the world for millimetre/sub-millimetre astronomy. It includes 54 antennas, 12 m in diameter, with baselines reaching up to 16 km and a compact array of 12 antennas, 7 m in diameter, at 5500 m altitude in the northern part of Chile, where the air is dry and thin. The ALMA partnership (essentially Europe, USA and Japan, but also Canada, Chile, Taiwan and South Korea) opens its observations to the public one year after they were made.

Moreover, the ALMA staff reduces the data to a form that can be used for physics analysis, still providing sufficient information to allow the user to check. This is at variance with other interferometers, which have generally far less open policies. Proposals can be submitted by anybody but their approval is subject to regional quotas, 2 to 3% for those from countries that do not belong to the consortium. We submitted one last year, but it has not been retained.

As it would not be practical for us to publish in journals asking for a page fee, we must exclude the American Astrophysics Journal (ApJ), the European Astronomy and Astrophysics (A&A) and the Publications of the Astronomical Society of Japan (PASJ), leaving only two journals of comparable prestige, the British Monthly Notices of the Royal Astronomical Society (MNRAS) and the Chinese Research in Astronomy and Astrophysics (RAA), the former having a significantly higher impact factor than the latter.

The topics that we study cover a broad spectrum, the result of our collaboration with Thibaut Le Bertre from Observatoire de Paris, who introduced us to evolved stars, with Frederic Boone from Toulouse, who introduced us to high redshift galaxies and with Anne Dutrey and Stéphane Guilloteau from Bordeaux, who introduced us to protostars, accretion discs and debris discs. This has the advantage of having made us familiar with a large number of physical processes at play in astrophysics, but we are conscious that this familiarity is very superficial, we lack experience. This weakness is lessened by the fact that the ALMA data are of such a high quality, that their analysis requires a new approach, or at least a new attitude, more quantitative, and to some extent more rigorous than when using earlier instruments; it is a challenge for all users, experienced and newcomers alike. From this point of view, our experience in particle and cosmic ray physics is a clear asset.

Each field has its jargon, and we do not master fully the jargon of astronomers. Astronomers prefer to speak of Bayesian inferences rather than of Monte-Carlo and consider that carbon is a metal; for a radio astronomer a Joule is a Watt per Hertz and Planck constant is measured in Jansky \times cm² \times s. It may result in

<i>arXiv</i>	<i>Journal</i>	<i>Source</i>	<i>Type</i>
1503.00858	RAA	Red Rectangle	Planetary Nebula
1601.04834	RAA	Pi Gru	AGB star
1601.01439	RAA	W Aql	AGB star
1603.00148	MNRAS	Mira Ceti	AGB star
1603.02405	MNRAS	Various	Methodology
1604.03801	MNRAS	L 1527	Young protostar
1609.03271	MNRAS	RX J0911	High z galaxy
1701.02131	MNRAS	49 Ceti	Debris disc

misunderstandings when discussing with our colleagues or communicating with the referee.

The astrophysics community tends to have strong feelings about the style that must be adopted in publications, as if there were a standard template in which each article should fit. We, on the contrary, would tend to write each paper as if it was alone of its kind, and we find it sometime difficult to switch to the new style. A result may be patronizing comments from some referees, who miss the point that we are making and think that being newcomers in the field we must be physics-illiterate.

More importantly, our analyses of observations that were proposed by someone else tend to make us quite unpopular with the relevant PI and his collaborators. They feel that we have stolen their baby, that they have been scooped by us, and to some extent we understand them. As several of our articles deal with sources which are quite fashionable in the community, such as the Red Rectangle, Mira Ceti and 49 Ceti, these collaborators are often many. We met the PI of many of the Mira observations, and she confessed that all members of her collaboration had agreed to refuse to referee our article. When bac Pierre sent an email to the Japanese PI of the L1527 observation, the answer he got was simply: *Who are you?* And after bac Pierre had explained in a long and polite mail who we are, we never heard of him any longer, which does not match the idea we have of Japanese iconic politeness. Another example: the referee of our RX J0911 work took two months to send his comments. They were mostly on the form, in particular he repeatedly stated that we should check the “*grammer*” (sic), and we promptly and humbly produced a new version, which was taking all his comments in due consideration. Two months later, we still had no feedback; we enquired with the Editor in Chief and less than a week later, the paper was accepted. Fortunately, the editorial team of MNRAS, and particularly the Editor in Chief, understand very well these problems and pay much attention to make sure that we are treated in a fair way. We are deeply indebted to him for this support.

There are many amusing differences between the astronomer and particle physics cultures. The former pay much attention to outreach and to considerations of relevance to our

species, such as the formation of life-related molecules and the “habitability” of planets; this was to be expected, the importance of the standard model and beyond is of less obvious relevance, or at least less direct...; astronomers like to give fancy titles to their papers, such as “*On the possible triple central star system of PN SuWt 2: No ménage-à-trois at the heart of the Wedding Ring*”; but they are less conversant with mathematics, and even with elementary calculus, than we are and tend to use standard analysis codes rather than to write their own.

Our experience with submitting a proposal was a useful exercise. We did not expect to be accepted, and indeed the proposal was not retained. There were ~1600 proposals submitted, ~400 from Asia. You can see us on the map below. What we missed is information that would help us to do better next time. No detailed report is issued, you are only informed of the result. But we will repeat the exercise for next cycle, even possibly with two proposals. Anyhow, it is good training.



Map showing the location of the PI's having made proposals for ALMA 2106 observations. The sizes of the dots are proportional to the number of proposals.

No doubt, we are very fortunate to have such an easy access to data of such quality! And we are deeply indebted to those who, in the ALMA partnership, deliberately adopted a policy aimed at promoting astronomy and astrophysics in developing countries, where fundamental research often enjoys little support and suffers of a low priority in the governmental programmes. One year after observations were made, many are still not analysed by the proponents, even if many are of sources presenting a particularly strong interest.

Our present priority is to be recognized as respectable members of the international astrophysics community and to keep learning from our mentors, Thibaut, Anne and Stéphane. The only way to achieve this goal is to publish quality papers. All articles listed in the above table have our team as only co-authors, which is good from this point of view, but which is not essential in itself. On the contrary, we must be attentive to engage in collaborations with colleagues from abroad, in particular from Asia. Our current collaboration with Observatoire de Paris on evolved stars implies Nhung and Hoai; an ALMA proposal to observe EP Aqr has been accepted, the data will soon be available; a paper on Y CVn has been submitted for publication in RAA, aimed at paving the way to a future proposal for FAST. Our collaboration with Bordeaux on young protostars implies at least Diep and Phuong. Both collaborations will go on for some time. We have been encouraged to collaborate with astronomers from Taiwan, Korea and Japan; the study of high redshift galaxies is probably the best topic in this context.

We will continue with our present style of work for the few years to come, consolidating our knowledge and acquiring new expertise. At some point, however, it might become desirable to specialize, which implies selecting some topics which we find particularly interesting as having a strong impact on our understanding of the underlying physics and as being rich of promises of important results. In the domain of evolved stars, we should like to learn about the early stage of the AGB branch, when spherical symmetry starts being broken, in particular to learn about the role of magnetic fields; but how to do this in practice is not obvious.

We thought about joining large collaborations, like Planck, which addresses very exciting questions at the frontier of current knowledge, but we think that it would be very difficult for us to maintain our identity in such environment and the danger of being used as cheap labour is not negligible.

We noted, in recent years, and in particular in relation to ALMA observations, a tendency of author lists to grow significantly.

Finally, when we were working on cosmic rays, we were sharing our time between hardware

and analysis, which was an obvious asset. The operation and maintenance of the 2.6 m SRT kept our hands busy, but since we moved to VNSC, we spend full time in front of our PC screens, which is not good. We need to think of a way to fill this gap.

We are very happy with our decision of having switched from cosmic ray physics to radio astronomy, it fits much better our constraints and our needs. We have to convince our authorities that Viet Nam must invest more in fundamental research and, in particular, in one of its most dynamic branches, astrophysics. We do our best, but there is a long way to go...

PROMOTING AND SUPPORTING OUTREACH ACTIVITIES

Thao has been active in promoting and supporting various outreach activities, which she tells us about below.

The Vietnam National Satellite Centre (VNSC) has now completed the construction of a 60 seat planetarium and an observatory on Hon Chong island, facing the city of Nha Trang in the south of central Viet Nam. The observatory is equipped with a 50 cm Ritchey-Chretien telescope and an échelle spectrograph. The aim is to promote interest in astronomy and astrophysics in the general public, especially the young generation. The observatory will be ready to welcome visitors in March. Information about the observatory has been made publicly available and it has become an official spot for tourists in Nha Trang. Hoang Anh moved to Nha Trang last October to prepare for the event; she will stay there permanently.

In Ha Noi, a copy of the Nha Trang observatory is in the process of being completed. It is located in Hoa Lac, some 25 km away from the city, in a Hi-tech Park that will also host the USTH campus. There, the planetarium offers 100 seats and will be appended by a Space Museum covering an indoor area of 3'350 m² shared over two floors and an outside area of 3'500 m². The theme is space exploration and basic space science: birth of the Earth and of the Moon, how the ionosphere protects the Earth, space missions, satellite launches, rockets, an introduction to the International Space Station, how space technology affects life and society, and so on.



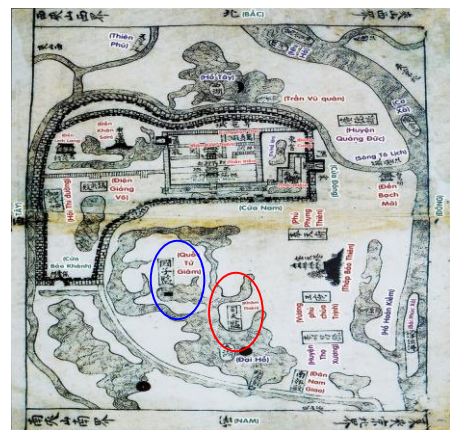
Hoang Anh and the Nha Trang telescope building

In addition, 100 m² are devoted to the history of astronomical observations in Viet Nam, on which I have been busy working. It was an interesting experience to collect old documents related to astronomical observations such as descriptions of observatories and instruments and some old sky maps. Vietnamese astronomy developed jointly with meteorology in response to the need to predict the weather and to compute the calendar, which governs agricultural activities. But it played also an essential astrological role as a divination tool to take important decisions. Astrology turned out this way to foster interesting astronomical observations, such as the shape and number of sunspots, solar and lunar eclipses, planetary movements, the direction of comet tails and the fall of meteorites.

Each Vietnamese dynasty built its own observatory close to the royal palace. However, we know of these only from written reports as they have been destroyed by bad weather and by wars. The only such observatory that is still visible today was built in 1827 under Minh Mang's reign in Hue. Nothing is left of the imperial observatory of Kham Thien Giam in Hanoi. Its location can be seen on a map of the city dating from 1490.

Nothing is left either of the instruments that were used. We only know of these from the descriptions given in old books. For example, we know of an instrument called *ling-long-nghi* that had been constructed by Dang Lo in the 14th century to

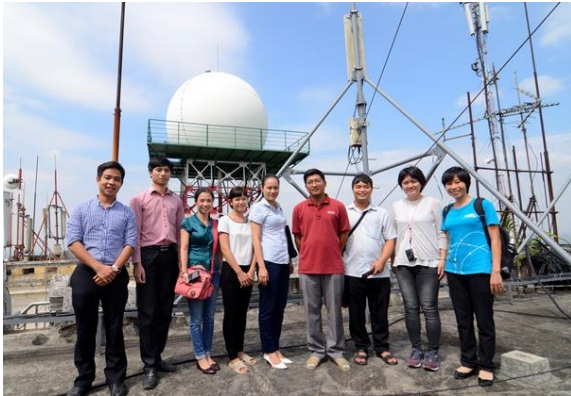
calculate the trajectories of the Sun and of the Moon as well as the time of rising and setting of some stars. This document was taken to China together with many others during the Chinese invasions that followed at the turn of the century. The Chinese were particularly targeting texts stating the independence of the Vietnamese nation but were also interested in local chronicles, calendars, astronomy and astrology documents. A collection of Chinese texts dating from 1170, called *Song hui yao*, mentions Vietnamese ambassadors of the Ly dynasty attempting to obtain books covering various topics but being prevented to have access to forbidden literature related to divination, to the yin and yang categories of Chinese philosophy, to the calendar and to numerology. Such attempts are known to have continued through the early 14th century.



Map of Trung Do (Hanoi) under King Hong Duc from the second Le dynasty (1490). The location of Kham Thien Giam is shown in the red ellipse and that of the university in the blue ellipse.

We do not know much of the nature of the training that was given to future astronomers. During Minh Mang's reign, rich Hue families were training their children in anatomy, geography and astronomy; a poem dated 1911 mentions 28 constellations and a book dated 1853 explains that planets live in nine spherical layers surrounding the Earth (sic!), thereby avoiding bumping into each other. This was three centuries after Copernicus! Indeed, because of the backward Jesuit influence, it was not until the early seventeenth century that Copernician ideas could penetrate China.

In Phu Lien, near Hai Phong, an observatory was built by the French in 1902 on top of a small hill, Thien Van. It is still being used for meteorology and is visited by tourists. We went there with a small group from VNSC and saw a well conserved meridian circle that we will transfer to the Hoa Lac museum.



Visiting Phu Lien Observatory: VNSC and Phu Lien staff posing together (Thao on the extreme right)

Last year, I gave lectures to the small group of five high school students who were preparing for the International Olympiad of Astronomy and Astrophysics. Their teacher had contacted Diep, Nhung and me independently, calling for help. I gave lectures on observations and instruments and Diep on astronomy and astrophysics. I took the students to the HNUE telescope and they learned to recognize stars and constellations and to operate optical telescopes; they learned about different kinds of optics and mountings; I was impressed by how fast they grasped the essentials, in only four evenings of observations. I very much enjoyed this experience and having met such wonderful students; we had a joyful supper together before they left for the competition.

ANNUAL SEAAN MEETING

In December, the South-east Asia Astronomy Network hold its yearly meeting in Ha Noi and VNSC was host for it. Diep and Tuan Anh report on the event below.

In 2007, the National Astronomical Research Institute of Thailand (NARIT) initiated the Southeast Asia Astronomical Network (SEAAN) with the aim to strengthen research and training

among the ten member countries in the Southeast Asia (SEA) region: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Each country is on an equal footing and the mutual benefit of the collaborative effort is meant to foster lasting international relations between them in both scientific cooperation and assistance.

SEAAN organizes a yearly meeting with the purpose to bring together people working in the fields of astronomy and astrophysics research and training from the entire SEA region (but not exclusively) to enable them to share their results and experience. The 8th SEAAN Meeting, in 2016, jointly organized by NARIT and VNSC, took place on December 12th and 13th on the VAST campus. There were about 40 participants attending, coming from Thailand, Indonesia, Malaysia, Myanmar, Philippines, Singapore, China, Japan, Korea, Taiwan, Austria and Vietnam. From the Vietnamese side, apart from the whole DAP team, there were Dinh Van Trung from the Hanoi Institute of Physics, Vo Bich Hien from Vietnam-Germany University in Ho Chi Minh city, and some USTH students interested in astronomy.



Professor Soonthornthum chairing the 8th SEAAN meeting in the VNSC conference room

The meeting was divided in two parts: one devoted to the reports on SEAAN, working group and country activities, and the other to science. The first morning of the meeting was used for the former. Out of the many activities in the region, NARIT has being doing outstandingly well. As the South-East Asian Regional Office of Astronomy for Development (SEA-ROAD), a regional node for astronomy development of IAU, they have been very active in organizing workshops, schools and conferences. Under the director, also president

of SEAN, Professor Boonrucksar Soonthornthum, SEAN was part of the 27th meeting of the Sub-Committee on Space Technology and Applications (SCOSA). This sub-committee of the broader ASEAN Committee for Science and Technology (ASEAN COST) did not use to recognize astronomy as a field of relevance.



Professor Hakim Malasan giving the Indonesia report at the SEAAN meeting

Thanks to SEAN, an agreement will now be signed between SEAN and SCOSA. NARIT played also a key role in the establishment of the International Training Centre in Astronomy under the auspices of UNESCO which is endorsed by the Royal Thai Government. This could become an important driving force in SEAN. These were important successes because we remark that astronomy is not yet included in the curriculum of many countries of the region and there is almost no astronomy activity in some of these, which, consequently, have no national representative in SEAN. Therefore, one of the goals of SEAN is to trigger more astronomy activities in these countries by sending there astronomers and to support their universities with offering small telescopes and documentation. After this session, we listened to national representatives reporting on research, teaching and public outreach activities in their countries. The reports were usually providing complete information about the national astronomy environment and, at the same time, looking for future collaboration and/or support from the region. For example, the 2.4 m Thai optical telescope is now fully operational and welcomes proposals for observing time from the South East Asia region and nearby countries. Moreover, NARIT is going to build three 45 m diameter radio

telescopes to form a Very Large Baseline Interferometer (VLBI) network to become part of a larger network of antennas such as the East Asia or Australia VLBI networks. NARIT invites astronomers and institutions from the region for cooperation.

We also had a good impression of the situation in Indonesia: aside with a lot of astronomy activities, they are implementing an ambitious project to build the so-called ITERA park, including an Astronomical Observatory and a Earth and Space Sciences Education Centre in Sumatra. For Vietnam, Diep reported on active research activities around the four nuclei: DAP/VNSC, IOP (Dinh Van Trung), HCMIU (Phan Bao Ngoc) and HNUE (Nguyen Quynh Lan); he mentioned the construction by VNSC of two centres, each hosting a 0.5 m optical telescope and a planetarium, in Nha Trang and Hoa Lac. Vo Bich Hien, from Vietnam-Germany University, proposed to build a cheap long wave-length radio network in Vietnam, to be later expanded to the South-East Asia region. The meeting spent the rest of the time of the first session discussing about a new SEAN charter draft and it was decided to form a working group consisting of five people with the task to amend the proposed draft; Diep is a member of the group.



A group of the SEAAN meeting visiting Bai Dinh pagoda under Thao's guidance

The 8th SEAAN meeting hosted two invited talks, one from Kevin Govender, director of the IAU Office for Astronomy Development, about IAU public outreach activity; unexpected family problems prevented him to come to Vietnam but he could still successfully deliver his talk via Skype. The other invited talk was from Dinh Van Trung

who told us about his research on AGB stars and the role of binaries in shaping the diversity of circumstellar envelopes. DAP had two presentations, one on stellar physics by Nhung and the other on high redshift galaxies by Tuan Anh.

After the two day meeting, we organized a one-day tour to Trang An-Bai Dinh, Ninh Binh, where participants had a boat trip and enjoyed the landscape of a rural and hilly area of Vietnam. We also took them to a water puppet show, which turned out to attract much interest and to restaurants where we could enjoy Vietnamese cuisine with a lot of discussion going on around the tables. Co-organizing the meeting with the NARIT team was indeed a nice experience for us with lots of interactions via email and telephone.

Many participants expressed their appreciation for the excellent organization of the meeting and we are very happy to have had the opportunity to host it. The next ones are expected to be hosted in Myanmar (2017), Indonesia (2018) and maybe Singapore (2019).

AN OPEN FORUM ON THE USE OF SATELLITES TO HELP WITH THE MANAGEMENT OF NATURAL RESOURCES, ENVIRONMENTAL PROTECTION, MITIGATION OF NATURAL DISASTERS, SOCIO-ECONOMIC DEVELOPMENT, NATIONAL SECURITY, SCIENTIFIC RESEARCH AND TRAINING

In December, the two VAST institutes dealing with space matters, STI and VNESC, and the National Department of Remote Sensing, Ministry of Natural Resource and Environment jointly organized this meeting that was attended by a large audience of concerned users. Diep gives below a brief summary of the event.

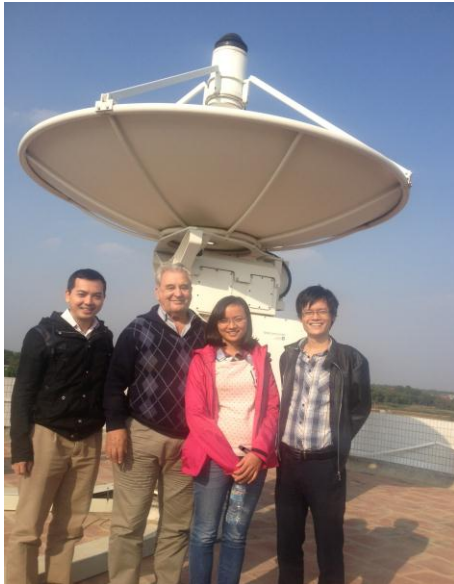
The forum covered two days, December 28th and 29th, on the VAST campus. There were about 150 participants attending from ministries of natural resource and environment (MONRE), of education and training (MOET), of science and technology (MOST), of agriculture and rural development, of post and telecommunication, of public security, and of national defence. There were also representatives from the departments of science and technology of many provinces all over the country, from research institutes and universities which have part of their staff carrying

activities related to space technology and remote sensing such as the institutes of geography, geological sciences, marine geology and geophysics, marine environment and resources, military technical academy, Hanoi university of science and technology, Hanoi university of mining and geology, etc. The purpose of the forum was to share, exchange and evaluate achievements which have been made and, on this basis, propose efficient ways to use Earth observation satellites for the development of socio-economy, national security, scientific research and training. Moreover, through the forum, the organizers had the ambition to create opportunities for government managerial offices and operation units of Earth observation satellite as well as for the user community to discuss about issues related to remote sensing. These include, in addition to technological matters, policy planning issues: role and duties of the government managerial units and of the research institutes, including the importance of training centres to make the best possible use of Earth observation satellite data.

The first day of the forum was spent for visiting the infrastructure of VNREDSat-1, the first optical Earth observing satellite of Vietnam. Its primary mission is to monitor and study the effects of climate change, predict and take measures to prevent natural disasters, and optimise the management of Vietnam's natural resources. We had four people from the group to join the tour including Tuan Anh, Phuong, bac Pierre and myself. The satellite, weighing 120 kg, had been constructed by European Aeronautic Defence and Space Company (EADS) Astrium and was launched in May 2013. It resides at an altitude of 690 km and repeats the same orbit after three days. Officially, it will remain in orbit until the end of 2018 but, in practice, it may be still be operational for two additional years. There exists a plan for a follower, called VNREDSat-2, but the project is not yet approved. VNRedsat-1 is controlled by STI (VAST) and the images are received and managed by the National Department of Remote Sensing (MONRE). We gathered on VAST campus and were first taken to Hoa Lac High-Tech Park (HHTP), some 25 km West of Hanoi, where the ground station is located.

The control of the satellite is done using a 3 meter diameter antenna tuned on 2.4 GHz (S-band)

on the roof of a three floor building. On the third floor, computers collect and pre-analyse the data: one can see the current status of the satellite and control it. Only a few people need to stay there, mostly in case of emergency, because the satellite is, in practice, controlled remotely from STI on the VAST campus.



Diep, bac Pierre, Phuong and Tuan Anh in front of the VNREDSat-1 antenna at Hoa Lac.

At the end of the tour, we were taken to the control room where the operation of the satellite is calculated and optimized. The satellite has been taking pictures over the whole of Vietnam for about three times. Usually, users have to submit their requests for images about three days in advance. The STI staff has been operating VNRedSat-1 successfully for now nearly four years. The operation team consists of about 20 people who were trained by Astrium. We were impressed by the work of the team. Their experience with the operation of this first satellite will be an invaluable asset for the future. In between these two STI installations, we were taken to the National Remote Sensing Observatory, a unit of the National Department of Remote Sensing of the MONRE, where the satellite data are collected and reduced to images. The user requests are centralized and processed here before being forwarded to STI and the images are stored here as well. The rationale for having the receiving station separated from the control station was to use of a pre-existing telescope for data reception.

Besides receiving VNREDSat-1 images the station can also receive images from some other satellites.

On the second day of the forum, 16 reports were presented. Emphasis was put on the achievements of VNREDSat-1, which has been taking some ten thousands images until now. They are used for monitoring natural resources, dealing with climate change and environmental incidents, preserving natural and cultural heritages. In particular, they are useful for sea and island monitoring and national security and defence. Moreover, these satellite images have also been shared with national and international training organizations contributing to the integration of Vietnam into the space technology of the world.



Dr. Bui Trong Tuyen, director of STI, presenting VNREDSat-1

During the forum, governmental managing units introduced the existing regulations in managing and exploiting satellite images for natural resource monitoring, socio-economic development, national defence-security, scientific research and training. The participants discussed and evaluated the situation, the needs and challenges in developing remote sensing technology in Vietnam, and considered policy and solutions to boost the development of the applications of space technology. Comments were made to propose solutions to improve the current policy for developing manpower and applications of Earth observation satellites. These have to be seen in the context of the “Programme of Research and Applications of space technology by 2020” which was issued by the government. Many participants in the forum expressed the hope that with the experience of VNREDSat-1 and the development of future satellites, in particular by

VNSC, space technology will bring more benefits to the nation in the years to come.

THE 2016 INTERNATIONAL OLYMPIADS ON ASTRONOMY AND ASTROPHYSICS

We, and particularly Diep and Thao, helped high school students getting prepared for competing in these Olympiads, for which they had been selected. Diep reports about the event that illustrates how Viet Nam can be at the top when proper support is given to whom deserves it.

The International Olympiad on Astronomy and Astrophysics (IOAA) is an annual astronomy competition for high school students. The aim is “to foster friendship among young astronomers at international level so as to build cooperation in the field of astronomy in the future among the young scholars”. The first IOAA was held in Thailand in 2007 to commemorate the 80th birthday of King Bhumibol Adulyadej and the 84th birthday of Princess Galyani Vadhana. Twenty-one countries attended. It was decided that an international Board, made of representatives of each participating country, would become the ruling body. Professor Boonruksar Soonthornthum, from Thailand, was appointed chairman for a five-year term and Professor Chatief Kunjaya, from Indonesia, general secretary. Last year, from December 9th to 19th 2016, the 10th IOAA was held in Bhubaneswar, known as the City of Temples, near the north-eastern Indian coast. For the first time, Viet Nam sent a team to compete. They were five 11th graders from Hanoi-Amsterdam High School for Gifted Students. They spent ten days over there. The competition covered theory, observation, image analysis and team work. There were 234 students attending, each team being made of 5 members, and some countries having sent two teams. The Vietnam team returned home with a silver medal and four honour medals. They ranked number 13 over a total of 43 national teams.

It was Nguyen Quynh Lan from Ha Noi National University of Education (HNUE) who took the initiative by submitting a proposal to the Ministry of Education and Training (MOET). The proposal was supported, but later than proposals from other fields, which had been already represented in previous Olympiads. Therefore, MOET asked the Hanoi Department of Education

and Training for help, Hanoi having a long tradition of training and sending students to international science Olympiads. Pressed by time, Hanoi turned to Amsterdam High School for help, one of the most prestigious high schools in the country. They have an astronomy club and were asked to select the best students from the school to attend the competition. A selection exam was promptly organized and a team of five students from the excellence physics class was formed, only 3 months before the competition. Mrs Le Thi Oanh, the rector of Hanoi-Amsterdam High School, told us after the competition that as soon as the team was formed she offered them the best possible conditions to get prepared.



The Vietnamese IOAA team at the award ceremony

Hanoi-Amsterdam High School is one of the best and most selective high schools in Vietnam (with an acceptance rate lower than 10%) and is internationally recognized for the strength of its teaching and for having nurtured an outstanding number of excellent students, many of whom earned national and international awards, including top prizes at competitions such as International Olympiads in mathematics, in physics, in informatics, in biology and in chemistry. It is a member of the Strategic Educational Alliance of Southeast Asia. In 1972, as the Vietnam War was in one of its most brutal phases, Hanoi being heavily bombed by the US Air Force, Dr. I. Samkalden, mayor of Amsterdam, launched a campaign to mobilize the Dutch to express their support to the citizens of Hanoi by making donations aimed at creating a high school. This is how Hanoi-Amsterdam High School was born. September 5, 1985, was the official starting date of the first school year.

The Hanoi Department of Education and Training asked HNUE to take care of the organization of training the students. They appointed lecturers from their staff having experience with earlier physics Olympiads and some Vietnamese astronomers, one of whom even came from Quy Nhon, to deliver lectures. Thao and I gave them some preparatory lectures. A French astronomer who happened to visit us at the time, Pierre Lesaffre, spent also some time helping them to deepen their understanding. Dinh Van Trung also spent about half a month with the students teaching them about basic astronomy and observation using a telescope made by his students. The idea was that whoever had some knowledge that might help the students was invited to do so. There was not much time for getting prepared; when I first met them they confessed that they did not know much about astronomy and astrophysics. However, their background in mathematics and physics is well above that of students from other Vietnamese high schools. By the end of the 10th grade they are already familiar with the math and physics programme being taught in grades 11 and 12 in other high schools. Accordingly, they learn very fast. Moreover, their ability to study on their own is amazing. They can search the web, mostly in English, very efficiently to acquire new knowledge. I must say that a major factor that contributed to their success is the effort that they made. As soon as they had been selected they started to study basic astronomy books (Fundamental Astronomy and An Introduction to Modern Astrophysics). Another important factor was the sustained support given by their families, their parents were always besides them. Some of the parents called us to help with the time table of the lectures and, when the students had to stay overnight for observations, they brought them meal boxes.

For most of the team members the trip to India was their first time abroad. Indian food was a problem, one of them had his nose bleeding because it was too spicy, and so was the climate. They took dry food from Viet Nam with them to be sure not to have problems with Indian food during the exams. The competition was an opportunity to make friends from other countries. The IOAA organizers took them to some famous places in Bhubaneswar such as the Temple of the Sun which

has a sundial with an accuracy better than one minute. The practice examination in the planetarium embarrassed most of them because they have never been in a planetarium before while many of the competitors from other countries had been familiar with astronomy and astrophysics for at least three years. Indeed, the student who obtained the highest score had attended IOAA for the three previous years. In an interview, the Vietnamese students confessed that their main weakness was to lack practice: they had been able to devote insufficient time to observations.

We invited them to spend an afternoon with us before the competition; we were impressed by how bright they are, how hard they must have been working to become so knowledgeable in such a short time. Bac Pierre was amazed to hear them ask questions and discuss issues about the evolution of the Universe that are usually addressed at master level. It was nice to see how curious they are, how open a mind they have. Obviously, their parents and teachers must have played an important role in helping them blossom so happily and be so greedy of new knowledge.

Viet Nam is rich of a young generation, its future rests on their shoulders. If they are given a chance, they will spend their enthusiasm and energy for the progress of the nation. All they need is encouragements from their parents and their teachers. The older generation must give them all the support they need, make them free of the chains of bureaucracy and obsolete regulations that prevent them to blossom in a constantly changing world. When we asked what they wanted to do in future, two of them said that they did not know for sure, one said that he would like to do something related to industry, another that he would like to do research but not in medicine because he was afraid of seeing blood... When the team was asked by journalists whether they were planning to study astrophysics at university, their answer was: *"We cannot be sure. If we win scholarships to study abroad, in the US, UK or Japan, or have a chance to get a job there, we may choose to go that way, these countries have good space technology and infrastructures. But if we do not have such a chance, then it will be difficult because astrophysics is kind of ignored in Vietnam and the equipment is inadequate. We hope that in the future, Astronomy and Astrophysics will become*

more popular in the country, especially after this competition". Indeed, for decades, the brightest Vietnamese students have been brought up with the idea that they must go abroad to study. Their answers illustrate well how astronomy in particular, and more generally fundamental science, is perceived in the country: there is still much to do to progress.

SUMMER CONFERENCES IN QUY NHON

The end of July, beginning of August was busy with a conference on star formation (Tuan Anh and Phuong), followed by an astrophysics school (Phuong) and by the Blowing in the Wind conference organized by Pierre Lesaffre, which the whole team attended; Tuan Anh and Nhung report below.

At the end of July 2016, a conference on star formation was organized in Quy Nhon, on the southern central coast, at the conference Centre ICISE that Tran Thanh Van has created. It had been initiated by Nguyen Luong Quang, an oversea Vietnamese postdoc now working at the Korean Astronomy and Space Science Institute (KASI). It was jointly sponsored by the National Astronomical Observatory of Japan (NAOJ), the East Asia Observatory and the Rencontres du Vietnam. Fumitaka Nakamura from NAOJ oversaw the organization.

In the past five years we have seen significant progress in the field of star formation thanks to the recent availability of new international telescopes from infrared to radio wavelength: Herschel, JCMT, ALMA. Consequently, the aim of the conference was to address the most recent advances in our knowledge of the field. It also aimed at fostering collaboration between theory and observations and between East and West. Moreover it was an opportunity for Vietnamese astrophysicists and students to learn about the main stream of current research. The conference topics covered all relevant phenomena: low and high mass star formation, filamentary structure, giant molecular clouds and star formation on galactic scale. There were over 200 participants from all over the world. Many of them are leading experts in the field: Doug Johnstone (Canada) from NRC Herzberg; Paul Ho (USA)

from EAO; Karl Menten (Germany) from Max Planck Institute for Radio Astronomy; Peter Schilke (Germany) from University of Cologne, Nami Sakai (Japan) from Riken, Shantanu Basu (Canada) from Western University and Jonathan Tan (USA) from University of Florida.

Phuong and I attended the conference. I gave a talk reporting about our work using ALMA archival data on L1527, a protostar which attracts much interest from the scientific community. It was well received. After the talk, a Japanese professor approached me to discuss details; it turned out that he was one of co-PIs of the ALMA proposal, the data of which we had analysed. He congratulated us for our work and said to be very open for future collaboration if we want to propose something related to low-mass star formation.

We now exploit ALMA archival data more and more intensively and thanks to conferences such as this, we start to be recognized by the community. Indeed, the conference was timely: the conference was the first on star formation being held Vietnam and the L1527 work was our very first effort to join this new research field! An astrophysicist from ASIAA (Taipei) submitted a Cycle 4 ALMA proposal for this star and, if accepted, he would like us to collaborate on the analysis of the new data. Another Japanese professor suggested that we can jointly analyse data with them on a high mass star formation study, again using ALMA archival data.



Pierre Lesaffre and his student Le Ngoc Tram at the Blowing in the Wind conference in Quy Nhon

The conference was followed by a two-day bootcamp, meant to provide students with basic knowledge in the field. The lectures were given by distinguished astronomers from Canada, Germany,

Spain and Japan and covered the evolution of the molecular cloud core from hydrostatic equilibrium to collapsing envelopes and the properties of discs and jets.

Just a week after the star formation conference, the “Blowing in the Wind” conference organized by Pierre Lesaffre took place at the same place from August 7th to August 13th; four of us attended. The aim of the conference was to bridge the gap between researchers working on the inside and outside regions of evolved stars. The conference gathered more than 60 participants: astrophysicists, postdocs and PhD students from many different fields revolving around stellar winds. The presentations covered broad topics in relation with stellar winds: stellar structure evolution and chemical abundances, winds launching mechanisms in luminous stars, pulsations and dust formation, wind impact on circumstellar environments, bow shocks, mass loss and its feedback onto host galaxies and stellar clusters...

On behalf of the group, Diep and Nhung presented some of our recent studies, one on the methodology of space reconstruction of axisymmetric radio sources and the other on the gas envelope of an interesting binary system, Mira Ceti.

The diversity of the participants was a good opportunity for them to learn and discuss with colleagues from different fields. A point emphasized during the conference was a need for close interaction between people working on modelling and on observations, on stellar evolution and on stellar winds. It became clear to everyone that the new ALMA observations, with high resolution and sensitivity, will greatly help with drawing a better global picture of stellar winds.

At the conference, we met several of our friends: Thibaut Le Bertre, Hoai’s former supervisor, Le Ngoc Tram and Nguyen Hoang Phuong Thanh, former USTH students who now work in France for their PhD. It was also an opportunity for us to have a friendly discussion with Sophie Ramstedt, a Swedish astrophysicist, about our work using ALMA observations of Mira Ceti that she had proposed.

Thanks to Pierre Lesaffre, the participants had many opportunities to talk to each other, not only in the conference room but also on the beach

where much was done to make the breaks enjoyable, such as having small round bamboo boats, traditionally used by fishermen in the region, available for our entertainment. An afternoon was spent on a boat trip to beautiful close by islands, where we enjoyed swimming and diving.

We take the opportunity of writing this short report to express our gratitude to Professor Jean Tran Thanh Van for his constant support.

A MONTH IN FRANCE

Phuong will now spend four months in France, working in Bordeaux in the team of Anne Dutrey for her PhD. In preparation, she spent September-October sharing her time between Bordeaux, Grenoble and the Plateau de Bure. She tells us below about her impressions.

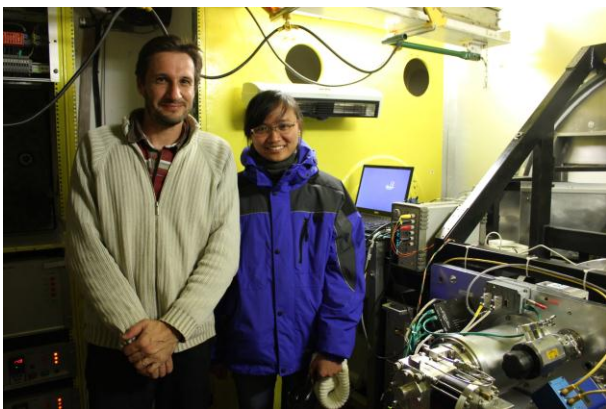


Phuong in Anne’s lab in Bordeaux

I defended my master thesis at Hanoi University of Science last July. Then I registered to doctoral schools in Hanoi (Graduate University of Science and Technology) and in Bordeaux (Université de Bordeaux) under a cotutelle programme. The subject of my PhD work is the study of the properties of gas and dust in protoplanetary discs around young low mass stars under co-supervision

of Anne Dutrey (LAB/Bordeaux) and Pham Ngoc Diep (DAP/Ha Noi). I am supposed to spend 4 months in Bordeaux to work with Anne and the rest of the time in Ha Noi to work with Diep. In addition, I shall spend some time on conferences and/or schools and/or collaboration meetings at various places.

Last October, I had a chance, thanks to Anne, to spend a month in France. This was my first time in France before the PhD thesis. I spent two weeks in Bordeaux and one week in Grenoble, attending the 9th IRAM interferometer school and some days visiting NOEMA observatory at Plateau de Bure in the Alps.



Phuong and a PdBI engineer in the technical cabin below one of the antennas

As I do not speak French, it was not easy for me at the beginning but Anne helped me a lot. She and her husband Stéphane picked me up at the airport and drove me to my apartment in a park inside Bordeaux University campus. She helped me with the accommodation, took me to the laboratory the day after, helped me completing the administrative formalities and introduced me to everybody in the lab, helping me getting closer to those with whom she is working. Thanks to her, step by step, I explored the university campus and nearby places. My PhD thesis topic had been decided nearly one year earlier, when we first met in Ha Noi at the time when I was still completing my master work. So, I really started working on it at that time. During two weeks in Bordeaux, I acquired new general knowledge of the field and learned about analysis software that the Bordeaux team is using. I attended a video conference with the CID (Chemistry in Disc) consortium: listening

to the discussion about their different projects gave me an overall view of their work.

After two weeks in Bordeaux, I attended the 9th IRAM interferometer school. The school is organized each year alternately in Grenoble on interferometry and in Granada on single dish observations. IRAM operates NOEMA, the Northern Extended Millimetre Array, previously known as Plateau de Bure Interferometer, in the French Alps and the 30 m single dish antenna at Pico Veleta, in Andalucia near Granada. It was for me an occasion to meet many radio astronomy experts. Thanks to the introduction of Anne, I met astronomers working at IRAM: Edwige Chapillon, Vincent Pietu and Frederic Gueth. I also had a chance to talk with our collaborator, Jan Martin Winters, who works on AGB stars in close collaboration with Thibaut Le Bertre and Hoai. On this occasion, I was extremely lucky to have a chance to visit the observatory at Plateau de Bure with Edwige Chapillon. I spent three days there, following the work of the operators and astronomers on duty at the observatory. In particular Patrick Chaudet and André Rambaud very kindly explained the operation of the interferometer and showed me around, introducing me to the subject of antenna construction. I really enjoyed these days at Plateau de Bure, in a beautiful environment, together with very kind people and sharing with them good French food.



Phuong and Edwige Chapillon on the site of an antenna under construction

Bordeaux and Grenoble are very beautiful cities, much quieter than Ha Noi. I visited some emblematic places such as the Water Mirror and the Stone Bridge in Bordeaux, where I also passed

by a group of young people demonstrating. In Grenoble, I visited the Museum of Art and the Museum of Archaeology and went up the Grenoble Bastille from the top of which one has a beautiful view of the city; I also enjoyed visiting the agricultural fair and the music festival in Grenoble.

This first visit was very helpful for me and I am extremely fortunate to spend my PhD time in Bordeaux. Not only because Bordeaux is a famous and beautiful city, but also because I could make many friends. I will learn a lot there, both scientific and cultural.

Distribution: Zamri Zainal Abidin, Elie Aslanides, Patrick Aurenche, Maarten Baes, Cristoforo Benvenuti, Jean Pierre Bibring, Pierre Billoir, Frederic Boone, Bui Duy Cam, Ludwik Celnikier, Catherine Cesarsky, Ngo Bao Chau, Pham Phuong Chi, Nguyen Duc Chien, Nguyen Mau Chung, Françoise Combes, Alain Cordier, Pierre Cox, Manoel Dialinas, Luigi Di Lella, Do Tien Dung, Giap Van Duong, Anne Dutrey, John Ellis, Pierre Encrenaz, Roger Eychenne, Jerome Friedmann, Daniel Froidevaux, Yoshitaka Fujita, Jose Gabriel Funes, Michèle Gerbaldi, Nguyen Van Giai, Sheldon Glashow, Yannick Giraud-Héraud, Stéphane Guilloteau, Edward Guinan, Duong Ngoc Hai, Jacques Haïssinski, Chu Hao, Masahiko Hayashi, John Hearnshaw, Pham Duy Hien, Nguyen Trong Hien, Nguyen Van Hieu, Emmanuel Hinglais, Paul Ho, Nguyen Dai Hung, Fadi Ibrahim, Antonio Insolia, Phrudth Jaroenjittichai, Stavros Katsanevas, Le Hong Khiem, Dao Tien Khoa, Marc Lachièze-Rey, Nguyen Quynh Lan, Pham Tran Le, Thibaut Le Bertre, Luc Le Calvez, Pierre Lena, Pierre Lesaffre, Di Li, Nguyen Van Lien, Alain Maestrini, Hakim L Malasan, Grant Mathews, Michel Mayor, Young Chol Minh, Pham Thi Thanh Nga, Phan Bao Ngoc, Wayne Orchiston, Etienne Parizot, Denis Perret-Gallix, Guillaume Patanchon, Minh Ha PhamDelègue, Tran Dinh Phong, Bui Tran Phuong, Tran Viet Phuong, Vu Viet Phuong, Nguyen Quan, Nguyen Luong Quang, Philippe Quentin, Burton Richter, Nguyen Quang Rieu, Jean-Michel Rieubland, Daniel Rouan, Carlo Rubbia, Kaz Sekiguchi, Rogel Mari Sese, Greg Snow, Do Hoang Son, Phan Hong Son, Boonrucksar Soonthornthum, Michel Spiro, Jack Steinberger, Annick Suzor-Weiner, Tran Minh Tam, Charling Tao, Nguyen Thien Tao, Dick Taylor, Ngo Duc Thanh, Tran Chi Thanh, Samuel C.C. Ting, Tran The Trung, Dinh Van Trung, Hiroshi Tsunemi, Cao Anh Tuan, Nguyen Van Tuan, Pham Anh Tuan, Hoang Tuy, Marcel Urban, Odon Vallet, Jean Tran Thanh Van, Suzy Vascotto, Sylvie Vauclair, Tini Veltman, Nguyen Ai Viet, Dang Van Viêt, Alan Watson, Joël Weisberg, Jan Martin Winters, Atsushi Yoshida, Antonino Zichichi.

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– PHOTO ALBUM –



Vice Prime Minister Vu Duc Dam came to bac Pierre's home to "chuc Tet"



At the Galaxy Forum meeting; Tuan Anh is fourth from left. The man in the centre is the head of Skyworld in Jakarta, the man on his left is a pioneer of amateur astronomy in Indonesia



Bac Pierre giving the inaugural lecture at Hoa Sen University



From left to right: Nhung, Thieu, Pierre, Dung and a senior staff member at Thieu irradiation institute



Sonino between Son and Hoai, surrounded by Thao, Nhung and Diep



Happy birthday, bac Pierre! From left to right: Hoang, Nhung, Thao, Khoi (Diep's son), Persie (grandson of Pierre's wife), bac Pierre and his wife.



Dinh Van Trung asking a question to the speaker at the Blowing in the Wind conference



Tuan Anh together with Indonesian amateur astronomers showing the logo of their club



At ASIAA, Tang-Tang and Naomi together with Diep



Daniel Froidevaux visiting us in our VNSC office



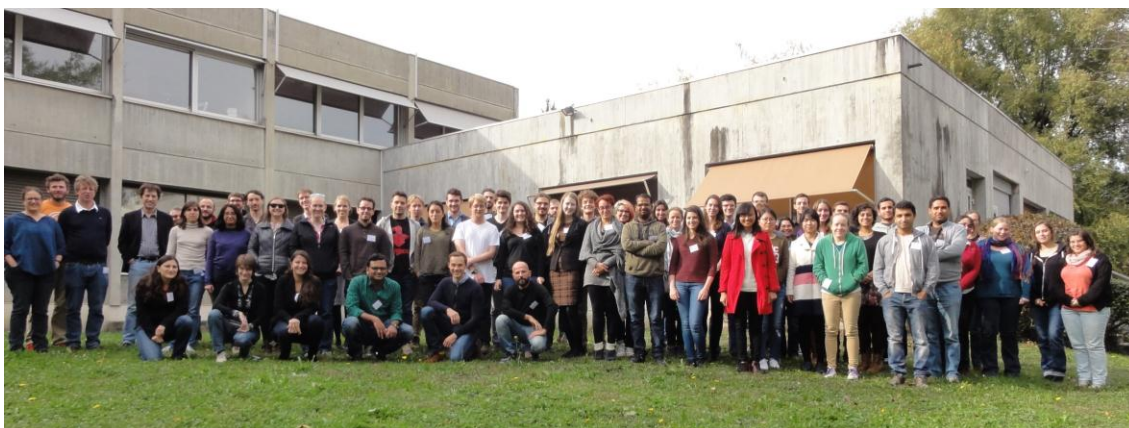
Celebrating Thao's birthday in our office. The young people in the foreground are visiting students



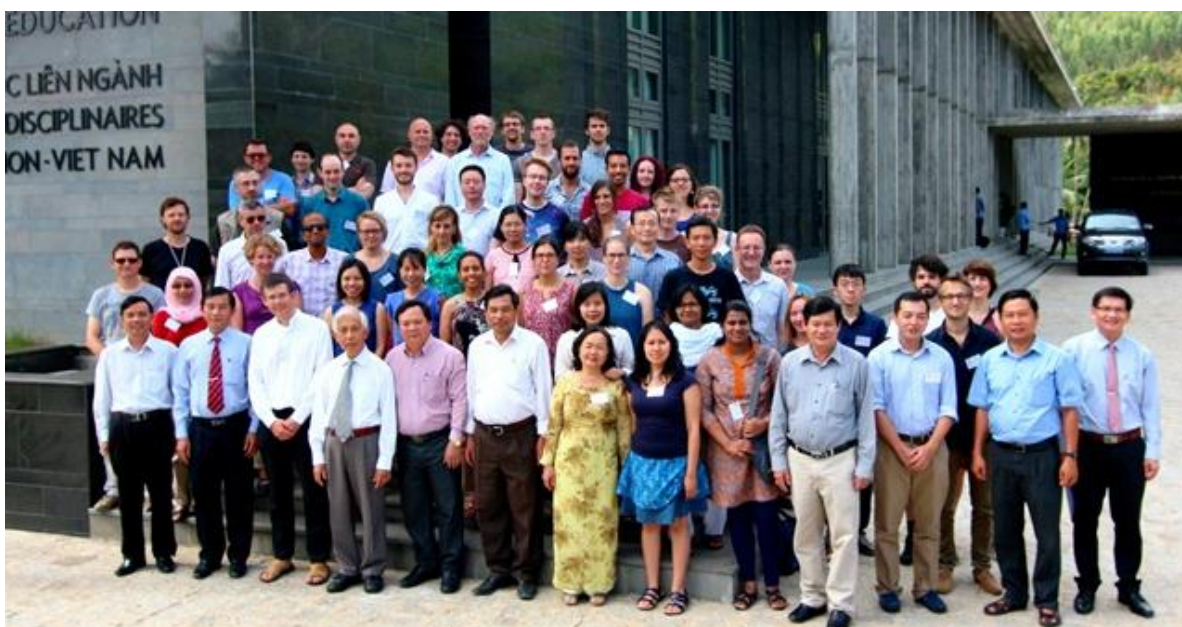
Farewell dinner in Nhan's honour . Diep's family is on the front left, Tuan Anh, his wife Ngoc and Thao on the front right



Group photo of the 8th SEAAN Meeting. Diep, Anh Tuan and Boonrucksar Soonthornthum are in the centre



Group picture of the 9th IRAM school. Phuong (red jacket) is in the front row



Blowing in the wind conference. Pierre Lesaffre and Tran Thanh Van are third and fourth from left in the front row