To the Edge of the Universe: the Vatican Observatory Welcomes Pope Francis

From Fr. Jose’ Funes’ interview with Ms. Fausta Speranza of the Vatican Radio after the Pope’s visit on July 14, 2013.

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Ms. Speranza: Father Funes, Pope Francis at the Vatican Observatory was also a Jesuit among Jesuits?

Fr. Funes: Exactly. He was one of our brothers. So it was a double joy: to have the Pope with us, the Jesuit Pope. Then, it was the first time that a Pope had lunch with the Jesuit community of the Observatory: this too was something extraordinary.

Ms. Speranza: Of the words Pope Francis has said up till now, what teachings have meant the most for your work?

Fr. Funes: I think it is that which the Pope has insisted on from the beginning: go to the boundaries, and not only geographical, but also existential [boundaries]. Our mission is part of this going to the farthest boundaries - if I can say it like that - because it has to do with the universe: we go back, in the sense that we also explore the beginning of the universe from the point of view of science, but we also go far away, because we also study the farthest, the most distant galaxies ... And this brings up the questions that we all should ask about the relationship between science and faith. I think this is the mission of the Observatory: go out to the truly most distant boundaries, the boundaries of the universe that is always a gift of God.

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These past months have brought a burst of action followed by a summer slowdown to the Vatican Observatory Foundation (VOF). Four of our scientists have spent time in Europe attending conferences and continuing their research at our headquarters, Castel Gandolfo. I have made several trips and spent time talking with folks in the Midwest and its environs. We continue to pursue and make great progress with remote observing from Mt. Graham and also toward the full automation (robotization) of the Vatican Advanced Technology Telescope (VATT) in conjunction with two of the University of Arizona’s smaller telescopes. In our last Newsletter some of this was presented and is well along in planning and execution.

The full robotization of the three telescopes is in the planning and estimate stages between the VOF, the Vatican Observatory (VO) and the University of Arizona. This will be a complicated and challenging project that will bring the three telescopes to the cutting edge of technology enabling many more scientists and educators to use the telescopes without the long trip back and forth from Mt. Graham. As I mentioned in the previous newsletter the savings in time and money will be substantial.

The VOF will continue to be a vitally important mission of the Church, the Society of Jesus and the entire Catholic populace and none of this would be possible without your continued generosity and support. As I stated in my last newsletter, ‘In no other area of the Church can you share in this vital work of understanding and exploring the fullness of God’s marvelous creation for this is truly where the Church “Reaches for the Heavens”.’

Tour the Magnificent Countryside and Telescopes of Chile
November 2014

Thanks to the generous collaboration of Dr. Fernando Comeron, an alumnus of the 1990 Vatican Observatory Summer School and currently European Southern Observatory (ESO) Representative in Chile, friends of the Vatican Observatory Foundation are invited to join Br. Guy Consomagno and Katie Steinke for an exclusive 12-day tour of astronomical Chile.

Spend two extraordinary nights at ESO facilities at La Silla and on Paranal! See some of the most amazing astronomical instruments under some of the darkest night skies on earth! See the current most advanced optical instrument, the Very Large Telescope (VLT) array on Paranal, and the incredible number of telescopes at the older ESO site at La Silla. With medical permission you may also visit the extremely high Atacama Large Millimeter/submillimeter Array (ALMA).

With the clear skies and altitude you might see the Milky Way!

Plus we will take in Santiago, the coastal town of Valparaiso, the wine growing Elqui River Valley, San Pedro de Atacama and the Valley of the Moon.

The cost will be approximately $5,000 per person and includes some meals, all lodging and all air and bus transportation within Chile. It does not include air travel to and from Chile. The exact dates are to be determined but the tour will complete well before Thanksgiving. To express interest contact Katie Steinke at katie@vaticanobservatory.org. Space will be limited.

To see amazing photos and to find out more about the ESO go to www.eso.org.
2014 Official Calendar of the Vatican Observatory

The newest edition of this annual publication is ready for distribution. Calendars are available for $25 each or $20 each for bulk orders of 4 or more. The VOF is happy to mail calendars to gift recipients if the names and addresses are included with payment.

To place an order:
- Use the enclosed envelope and pay by check or credit card. All appropriate areas must be completed.
- Order online by visiting the Vatican Observatory Foundation website: www.vofoundation.org
- You may also send a check made out to the Vatican Observatory Foundation including a return address to:

  Vatican Observatory Foundation  
  2017 East Lee Street  
  Tucson, AZ 85719

If you have any question please contact katie@vaticanobservatory.org or (805) 901-6591

About 150 of the more than 4,000 current Inmates at San Quentin State Prison enjoy the Vatican Observatory calendars each year. The prison was built in 1852 and covers 432 acres. Fr. George Williams, S.J., the Catholic Chaplain at the prison, works with the men in the photo with him and hundreds others alongside a Jewish Rabbi, a Muslim Imam, and a Protestant Minister. These men and those on death row who have our calendars have expressed gratitude for being able to have the beauty of God’s Universe on their walls.

Mysteries of Cygnus OB2 and Cygnus X: a Workshop at Vatican Observatory

Cygnus OB2 is an association of perhaps a thousand young, massive stars, some of them a hundred times more massive than the Sun and a million times brighter, immersed in a much larger molecular cloud known as Cygnus X. Because it is so close to us (“only” 4700 light years away) we can study Cygnus OB2 in detail, comparing model predictions about the formation of such massive stars with actual observations. These studies might help us understand how such stars are born not only in our galaxy but also in more distant galaxies.

But that mass of data can overwhelm our understanding. It’s impossible for any one astronomer to keep track of all the latest developments. And so from May 15 to 17th, the Vatican Observatory hosted a workshop at Castel Gandolfo on Cygnus OB2 and Cygnus X, organized by Dr. Fernando Cameron of the European Southern Observatory and Fr. Christopher Corbally of the Vatican Observatory. Two dozen astronomers attended, coming from Belgium, Chile, France, Germany, Italy, Spain, Sweden, the United Kingdom, and the United States.

“This is a meeting of the blind men talking about the elephant,” one participant mused. The rich bounty of information available about Cygnus OB2 and Cygnus X and the wide variety of ways they can be studied motivated the astronomers to discuss how they might come up with a coherent interpretive picture of them. That work was by no means complete at the end of the workshop; rather, the participants went away with a deeper understanding of the complexities of star formation, but also with new friendships and collaborations to help them explore this problem in the future.
News from the Observatory: Science, Religion and Visitors

In Castel Gandolfo Professor Daniel Britt of the University of Central Florida presented a seminar on “Orbits and Ice Ages” in June.

In July Professor Daniel Apai of the University of Arizona gave a seminar on “Extrasolar Storms: Exploring Cloud Cover and Atmospheric Dynamics in Brown Dwarfs and Exoplanets.”

During the summer Dr. Matteo Galaverni, now a seminarian in Reggio Emilia, Italy, visited the Specola to work with Fr. Gabriele Gionti. While there Dr. Galaverni gave a presentation on “Lorenz Invariance and Cosmic Rays.”

In September Br. Guy Consolmagno is speaking at several schools in Scotland: the Jesuit High School in Glassgow and the Kilgraston School in Perth. From September 29th to October 4th he is leading an Anglican Astronomy Retreat at Launde Abbey in Leicestershire, England.

Besides Pope Francis and NASA astronauts (see photo below) there were many other visitors to the Vatican Observatory headquarters in Castel Gandolfo over the past few months including a group from Galloro, Italy, during their 30 day Spiritual Exercises retreat; Jesuit scholastics studying at the Gesu’ in Rome; a group of Legionaries of Christ; a BBC crew filming a documentary on the observatory’s work with the Carte du Ciel star map; visitors from the Milan Planetarium; several amateur astronomy groups; benefactors; and many friends.
International Network of Catholic Astronomical Institutions (INCAI)

Among other activities INCAI, of which the VO is a founding member, organizes annual workshops on research in Astronomy. The First INCAI Workshop was held at the Pontifícia Universidade Católica do Rio de Janeiro, Brazil, in 2011. The Second INCAI Workshop was held last year at the Catholic University of America, Washington, in 2012. The Third INCAI Workshop will be held at the Pontificia Universidad Católica in Santiago, Chile, in 19-24 August 2013. The theme of the III INCAI Workshop is Exploring the Nature of the Evolving Universe. The scope of the workshop is to discuss evolution in the Universe at all scales, from the formation and evolution of planets, stars and galaxies to the Big Bang.

New Names for Pluto’s Moons: Kerberos and Styx

The IAU has officially approved two names for two newly discovered moons of Pluto: Kerberos and Styx. The new moons are important because they help sweep out the material in the region that will soon be visited by the New Horizons spacecraft – a NASA probe that will speed close by Pluto in July, 2015. In preparation for that encounter, scientists had been looking carefully to see if Pluto might be surrounded by rings of dust or other material that might damage the spacecraft during its encounter. The presence of the small moons helps reassure them that any other potentially dangerous stuff nearby has probably been swept up by their gravity.

Satellite names are approved by the International Astronomical Union’s Working Group on Planetary Surface Nomenclature; and Brother Guy Consolmagno of the Vatican Observatory sits on that committee. Themes are chosen as mnemonics; moons of Pluto, for example, are named for characters associated with the underworld in Greek and Roman mythology. No more than one solar system body can have the same name. And the names must respect the sensibilities of the many different nations and cultures represented by the IAU.

Discoverers get to propose names. The New Horizons team had previously found two other moons, and they chose the names Nix and Hydra. (Their initials are the initials of New Horizons.) In that case, the IAU suggested the odd spelling for Nix since there was already an asteroid 3908 Nyx. But Mark Showalter of the SETI Institute, who led the team that discovered the two new moons, opened up their naming to an on-line Internet vote. Nearly half a million votes were tallied, fueled in part by the suggestion of “Vulcan” from Star Trek actor William Shatner. Vulcan did indeed get the most votes; Cerberus was second, and Styx came in third.

Again, there is already an asteroid 1865 Cerberus, so the IAU committee suggested the alternate Greek spelling of Kerberos. Vulcan was turned down because the name is already strongly associated with a long-sought (but never found) planet inside Mercury, and because it had little association with the Roman underworld. There was another problem with Vulcan as well, however. As it happened, Brother Consolmagno had a chance to chat with William Shatner earlier this spring, and he explained his reluctance to use the name. “These moons are very small, really insignificant,” he pointed out. “Vulcan is just too wonderful a name to use up on such a small body!”
Finding God in Meteorites
Meet the Newest Member of the Vatican Observatory Staff: Br. Robert Macke, S.J.

One of the things that attracted me to the Society of Jesus was the Ignatian principle of finding God in all things. I saw Jesuits seeking and finding God in so many ways, from ministering in the Third World, to delving into questions of philosophy and theology to exploring the grandeur of the universe.

As someone with a background in physics and astronomy, I am no stranger to the idea that by studying God’s creation we encounter God. As a 38-year-old, first year theology student at Boston College and a recent graduate of a physics doctoral program, I can see in hindsight a pattern of formation as a Jesuit brother that has only strengthened this idea.

After I completed philosophy studies in 2006, I began teaching physics and astronomy at Rockhurst University in Kansas City, a wonderful opportunity to teach in my field and minister to students. Introductory astronomy courses are particularly well-suited to this task because they provide a context for inspiring wonder at the universe and exploring the relationship between faith and science. Undergraduates come with so many questions, and they respond very well to encouragement to explore those questions.

During that time, I heard from a Jesuit friend at the Vatican Observatory, Br. Guy Consolmagno, who told me about an opportunity to study meteorite physical properties in a doctoral program. With the provincial’s blessing, I left regency after only one year and spent the next four years at the University of Central Florida measuring the densities of meteorites, the percentages of pore space within them and their responses to a magnetic field. And somehow, as part of graduate studies and in the context of Jesuit life, I was to find God in these rocks from outer space.

Studying meteorites can be tedious work, but the pursuit involved travel to New York, Washington, Chicago and London where meteorites are held in museum or university collections.

As I studied more than 1,300 specimens, sometimes the tedium of the repetitive process became too great. I then would hold one of the more primitive meteorites in my hand and muse upon it, reminding myself that it was 4.5 billion years old, one of the earliest objects to form when the solar system itself was forming, and holding clues to that history.

Embedded within the meteorite are a few tiny grains of material that survived the heat and shock of its forming and that remain essentially unchanged from the moment they were created in stars. They are literally stardust. I am awestruck, and in that awe I once again encounter God.

This work also allowed me to minister to people in the sciences. Simply by being a scientist and a member of a religious order, I stand as a counterexample to the false notion that science and faith are incompatible. My presence has sparked many conversations with colleagues who wish to explore that idea more deeply and who have no other way to do so.

Now that the doctorate is completed and theological studies have begun, I have not abandoned the pursuit of science. Fr. Cyril Opeil has provided space in his lab at Boston College where I can construct some new research instruments. Furthermore, by helping out with campus ministry at my alma mater, the Massachusetts Institute of Technology, I can continue to have good conversations about faith and science with its many students of science and engineering.

In my spare time, I research properties of lunar materials, which led to a visit over Christmas break to study Apollo moon rocks at NASA's Johnson Space Center in Houston.

But most importantly, I am discovering that theology studies themselves provide tools for integrating these pursuits with the many other ways in which we are called to find God in all things.

from Jesuit Bulletin of the Missouri Province
Christopher Corbally, S.J. and Co-Author Margaret Rappaport present at VIII Conference on the Inspiration of Astronomical Phenomena, “City of Stars” in NYC

Christopher Corbally, S.J., Vatican Observatory, and his co-author, Margaret Boone Rappaport, an anthropologist, gave a joint presentation at the INSAP VIII conference at the Hayden Planetarium in New York City, July 13 – 19. This unusual conference is held about every three years, with the goal of exploring the inspiration that astronomical phenomena provide to the arts and literature. About half the attendees are astronomers and half are artists, writers, and educators. The conference was instituted by the late Ray White (University of Arizona), George V. Coyne, S.J. (then Director of the Vatican Observatory), and Rolf Sinclair (then at the National Science Foundation). The first meeting was held at the Vatican Observatory in 1994.

The theme of the 2013 conference was “City of Stars,” and co-authors Corbally and Rappaport joined others in a session on “Our Relationship with the Sky.” Their joint presentation was on “Visible Supernovae in A.D. 1054, 2054, and 3054: Inspiration for the Religious and Artistic of the Past and Future.” As part of their efforts to develop new formats to educate youth and the general public on both religious and astronomical topics, Corbally and Rappaport performed two skits and an interpretive dialogue to convey their theoretical model. The authors repeated their presentation in Pasadena, CA, in August as keynote speakers for the Journal of Interdisciplinary Studies 2013 International Symposium. Another performance, with a third skit added, is scheduled for the Marian Club, in Tucson, Arizona, in January 2014 (see Upcoming Events to the left).

This presentation stems from the authors’ Human Sentience Project© that asks, “What is so special about the way humans think?” and it looks for answers, starting with a foundation in semiotics and moving through existing findings from archaeology, evolutionary biology, cognitive psychology, and theology, to extrapolate the underpinnings of human thinking in Science, Religion, and Art – what co-authors Corbally and Rappaport call, “Advanced Domains of Thought.” The Human Sentience Project is interdisciplinary, addressing fundamental questions at the intersection of Science and Religion. Yet, it relies fully on the latest findings in the social and physical sciences.
Quotes from Recent Letters to Sacred Space Giving Program Participants

“When asked why the Church is involved in science, one of our answers has always been, to show the scientific world that the Church is not against science; and that we, being both in the Church and in the scientific world, also want to assure the Church that science is not incompatible with Church teachings. We also say that our commitment in studying the created universe draws us to the Creator. In the first chapter of the book of Genesis, at the end of each day of creation, God says that what has been created was beautiful. This beauty really exists and is an embedded reality in the world. It is the truth that invites us to go behind what we see, what we touch, what we analyze. It is this beauty we invite the scientific world to encounter in their work. Actually, they do perceive it. But some choose to ignore it; others embrace it, and let themselves be inspired by it. For those who face more ultimate questions raised within their scientific research, but whose answers go beyond science into the realm of philosophy and theology, we accompany them.

We thank you for supporting us. Your support allows us to continue to show the world that science opens some doors whose keys are in the hands of our fellow professional astronomers; and that collaborating with them can only make science stronger.” Fr. Jean-Baptiste Kikwaya, S.J.

“. . . this scientific research, as any endeavor in science, may be seen as a religious experience. An experience in which God reveals to us through the harmony and the beauty we find in nature.” Fr. Gabriele Gionti, S.J.

“There is no conflict between faith and science, if each is properly understood. Conflicts arise when we misunderstand the scope and the limitations of the natural sciences and theology. We deeply appreciate your interest in our work here at the Vatican Observatory, and your generosity in helping us continue this mission that the Church has given us.” Fr. Bill Stoeger, S.J.

To join this monthly automatic giving program and receive the quarterly letters like these see our website or contact Katie Steinke at (805) 901-6591.

Join us on our journey of discovery. Help the VOF bring together scientists, philanthropists and the Catholic Church to facilitate and promote scientific research of the heavens through support of the Vatican Advanced Technology Telescope and educational initiatives around the world. As a benefit to your monthly contribution, you will receive a complimentary Sacred Space prayer book. Support the Vatican Observatory Foundation today.