Founded in 1891, the Vatican Observatory demonstrates the Church’s desire to embrace, encourage and promote scientific study, on the basis of her conviction that ‘faith and reason are like two wings on which the human spirit rises to the contemplation of truth’ (Fides et Ratio, Proemium).

For more information, email (kate@vaticanobservatory.org) or call (+1 (520) 795-1694).

Father José Funes, S.J.
Director, Vatican Observatory

Brother Guy Consolmagno, S.J.
President, Vatican Observatory Foundation
So many exciting things have been happening this spring, as you can see just from paging through this newsletter. But I’d like to highlight two in particular:

In January, we held our first Faith and Astronomy Workshop, bringing 25 educators from parishes across the country (including two from Mexico!) to spend a week in Tucson learning about astronomy and discussing how we can share our love of the stars. The enthusiasm generated by our week together continues to pay dividends as each of the participants has spread the word back home.

I am delighted to announce that our next workshop is scheduled for the Redemptorist Renewal Center in Tucson, the week of January 11 - 15, 2016. If you, or someone you know, is an educator, deacon, or priest with a passion for astronomy and desire to share that passion, check out the details on our Vatican Observatory Foundation web page. Applications open September 1.

The other project that has me excited is our “Sacred Space” blog, The Catholic Astronomer. Check it out, at www.vofoundation.org/blog. You’ll find a new article every day on topics that range from “what’s new in the solar system” to reflections of how the astronomy we do reflects on our faith and our culture.

For example, just recently Dr. Brenda Frye explained the giant hydrogen halo discovered around the Andromeda Galaxy. Bill Higgins wrote about the first “hard science” fiction novelist: none other than Galileo’s contemporary, Johannes Kepler. Bob Trembley has been updating us on the Dawn mission to Ceres. And Fr. Kurzynski recently reflected on how Confirmation preparation at his parish could be tied to the sense of awe that fuels our passion for astronomy.

Science is a conversation, not a cold book of facts. Both the Workshop and the blog give our Foundation supporters — you — the chance to talk to us about what you find fascinating about the universe, and what you’d like to hear from us, as professional astronomers and people of faith. And more such programs are in the works. Watch this space!

The other thing about these two programs is that they started with ideas from you, our supporters. Fr. James Kurzynski first suggested the Workshop in an email that came to us “out of the blue” about a year ago. Bob Trembley’s enthusiasm launched the Catholic Astronomer website, and his technical skills keep it running.

I am humbled by the contributions of ideas, prayers, and finances that has made all of this possible. Thank you all. And I look forward to seeing what you will come up with next!
Education and Public Outreach

**Annual Seminar held at Catholic University of America, Washington, D.C.**

Presenters and Esteemed Guests: **FR. JOSE GABRIEL FUNES**, Director of The Vatican Observatory; **ARCHBISHOP CARLO MARIA VIGANÓ**, Apostolic Nuncio; **BR. GUY CONSOLMAGNO**, **PROFESSOR DUILIA DE MELLO**, Institute for Astrophysics and Computational Sciences at CUA; and **MONSIGNOR MARK MOROZOWICH**, Acting Provost at CUA.

To a standing room only crowd **FR. PAUL GABOR** continued the tradition of Vatican Observatory staff participation at the University Series lectures during Lent in Ventura County, CA, presenting “Are We Alone in the Universe? A Vatican Observatory Update”

In January **BR. GUY** opened the 2015 University of Arizona Lecture Series: “Life in the Universe” with his presentation of “What Is Life?”

In Charlotte, North Carolina, **BR. GUY** participated in the Temple Beth El 2015 Comparative Religion Series: “Religion and Science: Can They Coexist?”

In San Antonio **BR. GUY** visited Central Catholic High School, the Oblates School of Theology, and the Scobee Education Center Planetarium where he presented “The Adventures of a Vatican Astronomer”. The event at the planetarium was a special honor for Brother Guy due to the many years **DR. JUNE SCOBEE RODGERS** dedicated to the VOF as a member of the Board of Directors.

**BR. GUY** was honored to present at the inaugural event of the Academy of Catholic Thought and Imagination at Loyola Marymount University in March. The theme “Science, Religion, and the Art of Storytelling”

Photo Credit: Jude Harding

Photo Credit: Joaquin Loustau

Photo Credit: Bob Kelley

Photo Credit: Joaquin Loustau
The Vatican Observatory Foundation visit to Chile, 2015

by Br. Guy Consolmagno, S.J.

In mid April, a group sponsored by the Vatican Observatory Foundation went to tour a number of the European Southern Observatory (ESO) (and other) astronomical observatories in northern Chile. The whole trip was made possible thanks to the wonderful help of Dr. Fernando Comerón, the ESO representative in Chile who set up the whole tour and got us places to stay in the observatories themselves.

Our guests included Ken and Karen Miller, longtime Sacred Space Giving participants from Los Angeles; Conrad Plimpton, a member of the U of Arizona Galileo Circle; Gary Gutt, who works at JPL and is a long-time VOF supporter; and two veterans from previous Rome trips, Andrea Dudek and Mary Louise Jackowicz from Chicago. Also joining us on the trip was former director of the MMT (and former VOF board member) Faith Vilas, and for part of the trip, Dante Minniti and Joyce Pullen from ESO.

There were three major observatory stops along the way. The first was La Silla, which is located a few hours outside of the Chilean city of La Serena, which is also near the American observatory of Cerro Tololo. Both La Silla and Cerro Tololo were developed in the 1960s, about the same time as Kitt Peak, and they have a very familiar feel to them... the telescopes are also mostly from the 1960's to the 1990s. The site was chosen to be both clear and dark, yet still conveniently accessible at that time. Later telescopes were built in sites that are even darker and more remote, as accessibility developed over the past 50 years.

Even though some of them are nearly 50 years old, they’re still heavily used. The 3.6 meter telescope, for example, is the home to the HARPS spectrometer that is used full time to discover and characterize exoplanets – planets around other stars, a discovery that was far in the future when that telescope was first built.

Here are some photos from our group, to give you an idea of what those wonderful telescopes look like.
A few days after we visited La Silla we went to the telescopes that defined astronomy in the 2000’s: the VLT (Very Large Telescope) at Paranal. These telescopes are a couple of hours from Antofagasta, a desolate plain utterly devoid of life. The dryness of the area makes Tucson look like an oasis by comparison. Thus the shock of the astronomer’s hotel... It is built into the side of the mountain; from the road, all you can see is a small dome.

But once you go through the airlock double-doors, you find yourself in a moist rainforest environment! In fact, the setting is so dramatic, it was used in the James Bond movie “Quantum of Solace”...

But the best part was being in the dome of one of the 8.2 meter telescopes as it was being prepared for observing that night.

Our last stop on the Chile trip was San Pedro de Atacama, a hiker’s paradise that now serves as the headquarters for the APEX microwave telescope (a friend of mine was using it while we were there) and the ALMA microwave radio telescope array, located at 16,400 feet (5,000 meters). It’s so high up that you have to be examined by a doctor before they let you visit. Everyone in our group passed the test... except me. (I was on antibiotics, fighting a sinus infection I’d picked up in Denver.) As a result, I don’t have first-hand descriptions... but these are some of the photos that Katie took and shared with us.

But along with the telescopes, we also got to visit a couple of the remarkable sites near San Pedro... the El Tatio hot springs and geysers (best seen at sunrise, which meant an early start for us) and the “Valley of the Moon”, a remarkable collection of mountains and valleys carved by wind and water.

All I could think of was Ceres. As you may recall the Dawn spacecraft is orbiting Ceres, getting closer and closer to the mysterious white spots seen on its surface. One theory has it that they are patches of ice left by geysers on the surface of Ceres. Well, here are some geysers at 14,000 feet in the dry desert of Chile.

But an equally possible theory is that the white spots are salt deposits left behind after the water evaporated into space. And that’s where the “Valley of the Moon” comes in.

As you may have heard, this desert only gets rain about once in a hundred years; but one of those times was just this past spring. And the rocks here are full of salts like gypsum, or even regular rock salt (NaCl as halite). They were the site of salt mines as recently as the 1960s. And with all that rain, a lot of salt got dissolved into the water... and then left behind as the water evaporated. So, for the moment, this valley has a remarkable white patina.

Maybe they should call it the Valley of Ceres?
During Dr. Sykes presentation most prominent was a mysterious white spot and small companion that stood out against the dark surface of the dwarf planet. Models of the interior of Ceres indicated the possibility of an interior ocean. The white spot might indicate the existence of cryovolcanism that brings heavily mineralized liquid water to the surface. Exposed to the vacuum of space at Ceres' distance from the Sun, this water would rapidly sublime, leaving behind bright residue including salts and other minerals.

Sykes spoke about the astrobiological implications of such a water reservoir existing over the age of the solar system, suggesting extremophyle life might exist without exposure to sunlight. This would be analogous to life in the deep oceans of the Earth near thermal vents. Such life might then be transported to the surface, entrapped in the evaporites of something like the white spots. The interior ocean of Jupiter's moon Europa is another location that life might have developed, but Ceres has the advantage of being much easier to get to than Jupiter (being only a little more than half Jupiter's distance from the Sun) and Ceres does not have the Europa's extreme radiation environment (a consequence of orbiting within Jupiter's strong magnetic fields). So, one could envision a relatively inexpensive mission, traveling to the surface of Ceres, scooping up some of the white material on its surface, looking at the material under magnification and asking the question: are there any dead bugs? - resulting in the most important discovery in human history.

This is all speculation, but it is a question that will be on the minds of investigators as the Dawn spacecraft continues to spiral closer and closer to the surface of Ceres.
Faith and Astronomy Workshop: Reflections on my week with the Vatican Observatory

By Fr. James Kurzynski

Under clear skies just north of Tucson, amid temperatures that felt more like late spring than winter, I had the privilege of joining 24 priests and lay people to participate in the first ever Faith and Astronomy Workshop, hosted by the Vatican Observatory Foundation. This brief, four day workshop was a mix of lecture, discussion, hands-on science, and field trips to help parish educators and pastors learn how to address the relationship of faith and science with the people they serve.

The event was led by astronomer and President of the Vatican Observatory Foundation, Br. Guy Consolmango, S.J. Joining Br. Guy were a number of local scientists and friends of the Foundation who presented on subjects ranging from the ancient understanding of the universe to critiquing the “new atheists.” The breadth of subjects combined with daily visits to active and future space missions provided an eye-opening look at the current state of astronomy and the importance of the Vatican Observatory’s presence in the scientific community.

One of the memorable themes of the workshop was given by Vatican scientist Fr. Paul Gabor, S.J. during his homily at daily Mass. Fr. Gabor explained that the lesson science teaches us is that the world is rational and able to be understood. This intelligibility of the universe is an invitation from the world’s Creator. This invitation shows us that God wants us to understand Him through studying creation. Therefore, we do not have a God of deception and confusion, but rather a God of love who makes Himself accessible and known through His creation. This mediation became the interpretive lens that helped me unify the entire Workshop and clearly understand the true relationship between faith and science: Faith and science are complementary explorations of truth and, presuming adherence to moral laws, cannot be in conflict with one another since truth cannot contract truth (CCC 159).

On the final evening of the Workshop, Br. Guy asked me to preside and preach the homily for the closing Mass under the night sky. The reason I was approached was because of my role in the development of the conference. Shortly after ordination, I e-mailed Fr. George Coyne, Director of the Vatican Observatory at that time, asking if the Observatory offered retreats or conferences on the subject of faith and science for people who do not work professionally in science. His polite response stated that the Observatory did not have such a program, but that I should check back in the future. Ten years rolled by before I did check back. This time around, I contacted Br. Guy. Again, I was informed that there wasn’t such a program, but Br. Guy wanted to take the idea to the Director, Fr. Jose Funes, S.J., for consideration. In short, the idea was embraced and the first ever Faith and Astronomy Workshop (FAW) began to take form.

At the conclusion of the Workshop, it was decided that this event would happen again with the hope of it becoming an annual event for the Vatican Observatory Foundation. The next Workshop will be held January 11, 2016. For those who are unable to apply for this conference, but would still like to explore the question of faith and science, there is now a blog called “The Catholic Astronomer” allowing you access to astronomers who desire to reach out to the general public to explore Astronomy and its relationship with the Catholic faith. (There is a (continued on page 8)
(continued from page 7)

monthly donation to have full access to this blog). I invite anyone interested to check out this wonderful resource at http://www.vofoundation.org/blog/.

The Faith and Astronomy Workshop was a memorable event that I will cherish for the rest of my priesthood. It is consoling to see that, in light of the advances in science that loom just around the corner, the Vatican Observatory is developing new programs to make the work they do more accessible to the non-scientist. In the process, they are helping us to be more literate about one of the hottest topics in the Church: the relationship between faith and science. Please pray for the ongoing work of the Vatican Observatory and may their work help remind us that the Church supports true science.

Looking for the Green Flash from Paranal, Chile.