Vatican Observatory Newsletter

Fall 2003

"Galaxies" are the focus of 2003 Vatican Observatory Summer School

Vatican Observatory Summer School students and guests participated in a Papal audience on July 4, 2003.

Students of the 2003 Vatican Observatory Summer School:

Nate Bastian	USA
Carlos G. Bornancini	Argentina
Emilio Donoso	Argentina
Igor Felipe dos Santos	Brazil
Daniel Espada	Spain
Isabel Franco	Mexico
Mark Gieles	Netherlands
Mindaugas Karciauskas	Lithuania
Sergey Koposov	Russia
Dorothy Kuipers	UK
Mariya Lyubenova	Bulgaria
Faviola Molina	Venezuela
Mariana Orellana	Argentina
Sabrina Pakzad	South Africa
Antonio Pipino	Italy
Fernando Fabian Rosales	Mexico
James Schlaerth	USA
Vernesa Smolcic	Croatia
Alina Streblyanskaya	Ukraine
Ana Vasile	Romania
Simon Verley	France
Daniela Muri Villegas	Chile
Theresa Wiegert	Sweden
Elizabeth Wylie	New Zealand
Michel Zamojski	Canada

The ninth Vatican Observatory Summer School was held this summer at Castel Gandolfo. 25 young aspiring astronomers from 21 countries participated in the four week school. Father José Funes, S.J., of the Vatican Observatory served as academic dean with Father George Coyne handling the administration. The faculty consisted of: Enrico M. Corsini, University of Padua, Robert C. Kennicutt, University of Arizona, Francesca Matteucci, University of Trieste, Leonadis Moustakas, Space Telescope Science Institute, Hans-Walter Rix, Max Planck-Institut für Astronomie, Heidelberg, and Rachel Somerville, Space Telescope Science Institute.

Topics that the students studied included structure and evolution of galaxies, star formation properties, black hole demographics, galaxy clusters and the cosmic background. Students worked in groups to prepare a research funding proposal, and gathered data to propose what is happening in a galaxy today. They had the opportunity to observe with on-site 40-cm refractor and 60- cm reflector telescopes. Students discussed their current research with faculty and observatory staff and presented this information to the other students.

The students also visited many cities in Italy while enjoying the wonderful Italian culture. They participated in a Papal audience, and then toured the Sistine Chapel, Vatican Museums and Vatican Gardens. The group took a bus trip to Padua and Venice for a weekend and toured the many sites of those unique cities. When school was done for the day, they had time to enjoy the wonderful small village of Castel Gandolfo and Lake Albano.

The Vatican Observatory sponsors these schools for two reasons. Observatory staff wants to encourage and motivate young people to continue their research careers. Additionally, summer school staff want to expose talented young astronomers, especially those from third world countries, to high quality research in astrophysics. The heart of the Schools is the exchange of professional knowledge and personal experience between teachers and students. The sharing of knowledge benefits all nations and has a significant impact on developing countries.

Beginning graduate students showing a passion for astrophysics and who are currently engaged in research studies are encouraged to apply. An essay written by the students on why they are interested in attending the summer school is required. Their acceptance to the summer school is based on references from professors and this essay. Strict criteria also apply with respect to the selection of the faculty for each school. Astrophysicists who are actively engaged in research, who are renowned in the international community of scholars for published research, and who can communicate their passion for the work are chosen. The summer schools are held every two years, so the next one will be in 2005.

It was a summer that these students will never forget. Lifelong friendships were started. Their lives will cross much more in the years to come. Summer 2003 at Castel Gandolfo will remain in their minds and hearts forever.

From the Director... *A Wonderful Summer... Un' Estate Magnifica!*

Father Coyne and students from the Vatican Observatory Summer School with Pope John Paul II this summer.

25 young enthusiastic students descended upon the quiet town of Castel Gandolfo this summer for four weeks of learning, sharing and having fun at the Vatican Observatory Summer School. This is truly one of my most favorite times. It is wonderful to watch young people of different nations and religions come together with one common interest – to understand our universe. They become acquainted with other languages, cultures and education – which truly enriches each one of them by the time they depart.

This was the ninth Summer School. I have compiled the following history and data of previous summer schools and students. The VOSS was started in 1986 through the inspiration of Martin McCarthy S.J. Each summer school concentrates on one exciting modern topic with leading experts serving as faculty. The following is a list of summer school topics and faculty :

1986 — THE STRUCTURE AND DYNAMICS OF GALAXIES.
1988 — STAR FORMATION IN GALAXIES.
1990 — THE STRUCTURE OF GALAXIES AND THE SPECTRAL CLASSIFICATION OF STARS.
1993 — THE NUCLEI OF GALAXIES.
1995 — THEORETICAL AND OBSERVATIONAL COSMOLOGY.
1997 — OBSERVATIONS AND THEORETICAL UNDERSTANDING OF COMETS, ASTEROIDS AND METEORITES.
1999 — OBSERVATIONS AND THEORETICAL UNDERSTANDING OF SINGLE STARS AND CLOSE BINARY SYSTEMS.
2001 — STELLAR REMNANTS.
2003 — GALACTIC EVOLUTION.

Where do the students come from?

There have been 225 students who have attended the nine summer schools that the Vatican Observatory has sponsored. 60% of these have been from developing counties. 52 nations have been represented.

AFRICA:	Nigeria 4, South Africa 6	TOTAL 10
AMERICA, NORTH:	Canada 10, Cuba 1, Mexico 8, USA 22	TOTAL 41
AMERICA, SOUTH:	Argentina 20, Bolivia 1, Brazil 10, Chile 4, Peru 1, Uruguay 1, Venezuela 9	TOTAL 46
AMERICA, CENTRAL:	Honduras 1	TOTAL 1
ASIA:	China 6, India 10, Indonesia 1, Japan 1, Korea 3, Sri Lanka 4, Taiwan 2, Thailand 1, Vietnam 1	TOTAL 29
EUROPE, EAST:	Armenia 2, Bulgaria 7, Croatia 6, Estonia 2, Hungary 1, Iran 1, Lithuania 2, Poland 5, Romania 3, Russia 5, Slovenia 1, Ukraine 6, Yugoslavia 2	TOTAL 43
EUROPE, WEST:	Austria 2, Belgium 3, Denmark 3, Finland 4, France 1, Germany 4, Greece 7, Italy 8, Netherlands 2, Portugal 1, Spain 3, Sweden 2, Switzerland 2, Turkey 4, United Kingdom 2	TOTAL 48
OCEANIA:	New Zealand 7	TOTAL 7

Where are they now?

84% of the previous summer school students are engaged in astrophysics/astronomy research and education. They are working in major astronomical centers including the following:

VOSS Alumni		
Harvard Smithsonian CFA	8	
[United Kingdom]	7	
European Southern Observatory	5	28% of the 84%
California Inst. of Technology	4	
University of Arizona	4	
Other Major Centers *	19	

* Arcetri - Arecibo - Dominion Astrophysical Victoria BC - Leiden - Max Planck Bonn - NOAO Tucson - Ohio State U - Princeton U - SUNY - U of California Berkeley - U of Colorado Boulder - U of Hawaii - U of Toronto

IAG, Sao Paulo, Brazil	6	
[IAFE Buenos As + Obs La Plata]	7	
CIDA, Merida, Venezuela	7	21% of the 84%
INAOE, Puebla, Mexico	3	
Other Such Centers *	12	

* Bangalore India - [Cape Town South Africa] - Cordoba Argentina - PUC Santiago Chile - Tartu Finland - UNAM Mexico

Other	85	51% of the 84

Students attending these summer schools have experienced a unique educational and life opportunity that will last throughout their professional careers. The Vatican Observatory is honored to give these young students a summer of learning, sharing and growing in the wonderful village of Castel Gandolfo.

George Coyne Director

Summer 2003 at Specola Vaticana

Friends of the Vatican Observatory Enjoy Rome and Castel Gandolfo!

Friends enjoy the wonderful view on the balcony of Specola Vaticana

Saluté to a wonderful trip! Friends enjoy dinner on the patio of Hotel Bucci.

This July, 12 friends of the Vatican Observatory participated in a tour led by Carla Keegan of Tucson, AZ and Father George Coyne. Guests enjoying a wonderful Italian experience were Dan and Kristin Quigley, Mike Figueroa, Joe Studer and Dave Sirota, all of Tucson, Debra and Gary Gutt of Pasadena CA, and Rich, Stephanie, Michelle and Brittany Friedrich of San Jose CA.

The group received private tours of the Sistine Chapel, Vatican Museums, Vatican Gardens and the excavations under St. Peters. Special Masses were celebrated at the International College adjoining the Gesù Church, where St. Ignatius founded the Jesuit Order and at the Pontificial Gregorian University. The group also toured the beautiful Borghese Museum. Every day, the group dined at wonderful Italian restaurants and sampled true Italian cuisine and wine. The highlight of their visit to Rome was a Papal audience where Pope John Paul II greeted the group along with students from the Vatican Observatory Summer School.

They also enjoyed the charms of Castel Gandolfo, location of the Papal summer residence and the Vatican Observatory. They toured the Observatory and Papal Gardens, located next to the palace. They visited the local countryside and several small villages in the area. In their free time, our guests enjoyed wonderful Lake Albano and the shops of Castel Gandolfo. All of the guests agreed that it truly was a once in a lifetime experience.

You are Invited to Join the Vatican Observatory Legacy

The Vatican Observatory Legacy was established to honor friends who plan to give to the foundation through bequests, trusts, and other life income gifts. Michael Cronin of Phoenix, an attorney specializing in estate planning, is currently a member of the Vatican Observatory Board of Directors. Here are his thoughts on how to establish a planned gift and the benefits to the donor and the Vatican Observatory Foundation.

PLANNED GIVING, ESPECIALLY WITH TAX QUALIFIED PLANS

Planned Giving sounds so onerous and complicated. It's not. Planned Giving is simply planning for your charitable gifts, often to be made in the future. Rather than simply writing a check or giving an asset to VOF now, the donor plans now for his or her gifts to VOF in the future.

A donor can do "Planned Giving" in many ways. Two simple, planned gifts are: (1) a gift to VOF in the donor's Will or Trust, to be given on the donor's death or on the later death of a beneficiary; and (2) designating VOF as a beneficiary of a life insurance policy. The benefit of each of these planned gifts is that the donor retains control over, and the benefit from, the property eventually given to VOF, but has the satisfaction of knowing that VOF will eventually receive the gift, unless the donor changes his or her mind.

Designating VOF as the beneficiary of an IRA, 401(k) plan, profit sharing plan or other tax qualified plan can also be an attractive, planned gift. Because of its income tax burden, a tax qualified plan paid to VOF on the donor's death can be a less expensive gift from the viewpoint of the donor's surviving family. For example, if VOF is paid the donor's $100,000 IRA on the donor's death, that gift's "net cost" to the donor's surviving family may only be $60,000 if they would have paid 40% income tax had the funds in that IRA been distributed to them instead. Of course, any income tax burden on the donor's surviving family could be minimized by their own tax planning. However, because the IRS' new Regulations now allow VOF to be a beneficiary of a tax qualified plan without increasing the donor's annual required minimum distributions, designating VOF as the beneficiary of a tax qualified plan is a "Planned Gift" worth considering.

If you would like further information on the Vatican Observatory Legacy program, please contact Nancy Knoche, Development Director at 602-482-9147 or *Nknoche@earthlink.net*

The preceding should not be considered tax advice. VOF does not provide tax or estate planning advice. The conclusions expressed are those of the author, not VOF. While this material is based on information believed to be reliable, no warranty is given as to its accuracy or completeness. Concepts expressed are current as of the date of the preparation of this article only and are subject to change without notice. You should consult your personal tax advisors when considering any planned gift.

VATT Celebrates 10th Anniversary

The VATT was completed and dedicated in September 1993.

2003 marks the 10th anniversary of the opening of the Vatican Obseratory Technology Telescope on Mount Graham. In the spring edition of the newsletter, Vatican Observatory researchers Aileen O Donoghue, Chris Corbally, and Richard Boyle collaborated on significant findings from the VATT. The earlier edition highlighted **research involving dark matter and energy in the universe**, and the **acceleration of the universe**. Here are two more research highlights done in the 10 years that the VATT has been operating:

An asteroid with a moon: The asteroid Vesta, discovered in 1807, is the only asteroid that can be seen with the unaided eye and has continually challenged our theories about asteroids. In 1996, the Hubble Space Telescope revealed a crater in its southern hemisphere 460 km (285 mi) wide and 12 km (7 mi) deep on this 540 km (335 mi) diameter asteroid. The crater and spectroscopic studies have revealed Vesta to be layered like planets. The crater also reveals that Vesta has been battered by collisions with other asteroids or comets, and is the likely parent of many "Vesta chips" found near it.

In September of 2001 and February of 2003, Bill Ryan of New Mexico Tech and New Mexico Highlands University and other collaborators, observed a Vesta chip, (3782) Celle, with the VATT. The variations in the brightness of the object show that it is a binary asteroid with a moon more than 40% the size of (3782) Celle. This is the first Vesta chip to be identified as a binary asteroid, providing new insights into the origin and history of these asteroids.

A "Mini" Whole Earth Telescope: In the fall of 2002, Matt Nelson, VATT's own telescope manager (and best friend), observed a variable star for up to 12 continuous hours over two weeks. This was part of a "mini" Whole Earth Telescope (WET) effort to observe the star continually over the entire two weeks. This was a "mini" WET in that it was rather informal, headed up by S. Seetha in India with observers in Spain, Korea, the Canary Islands, and China, as well as VATT. With no other observers in the US or Canada, VATT filled in a significant 9-hour gap in coverage over the western hemisphere.

The observed star, HD12098, is a roAp, or rapidly oscillating A-type peculiar star that exhibits stronger lines of Strontium, Chromium, and Europium than standard A-type stars. The rapid oscillations, detected as variations in the star's brightness, give clues to the interior structure of the star just as oscillations of the Earth's surface … seismic waves or earthquakes … give information on the interior structure of Earth. The "asteroseismology" done on HD12098 during the 15-day WET campaign revealed it has a 5.5 day rotation period and other important stellar parameters.

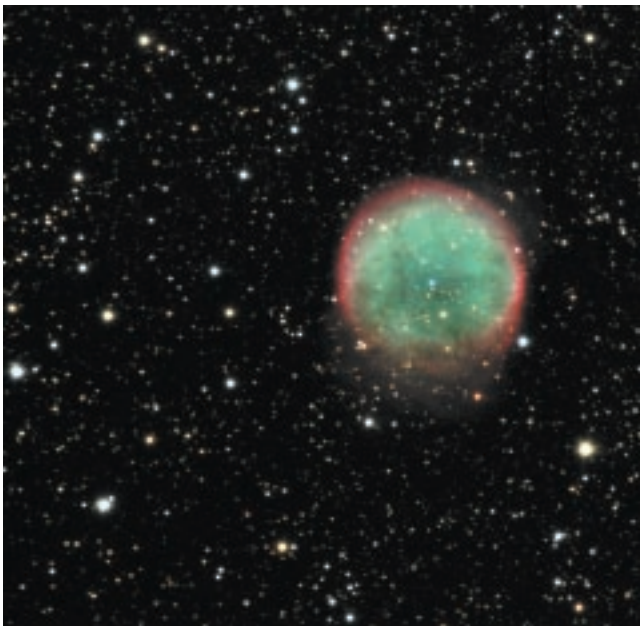
Please feel free to visit the Vatican Observtory's website at http://clavius.as.arizona/edu/vo for updated information on the VATT.

Vatican Observatory Scientists Contribute to NASA Launch

The Space Infrared Telescope Facility (SIRTF) successfully launched from Cape Canaveral on August 24. University of Arizona researchers, colleagues of the Vatican Observatory staff, played key roles in the successful launch of this NASA telescope. Peter Strittmater, chairman of the University of Arizona Astronomy department said "It has literally taken some two decades to get to this point."

The last of NASA's suite of Great Observatories, the SIRTF will use infrared detectors to pierce the dusty darkness enshrouding many of the universe's most fascinating objects, including brown dwarfs, planet forming debris discs around stars and distant galaxies billions of light years away. Past great observatories inclue the Hubble Space Telescope, Chandra X-Ray Observatory and Compton Gamma Ray Observatory. The two-and-a- half year to five- year mission is an important bridge to NASA's Origins Program, which seeks to answer the questions:"Where did we come from? Are we alone?

For more information about the SIRTF visit their website at http://sirft.caltech.edu/



Like other planetary nebula, NGC 6781 is a bubble of gas ejected by a dying star. This nebula sits in the part of the Milky Way that goes through Aquila, a summer time constellation for the northern hemisphere.Photo from the Vatican Advanced Technology Telescope, Mt. Graham, Arizona.

Announcing the 2004 Vatican Observatory Calendar!

Colorful wall calendar that will make an ideal gift for friends and family this year!

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Featuring 14 four-color images of celestial heavens. The calendar illustrates how the Observatory has served as a bridge between science and theology.

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Includes dates of significant scientific observances as well as religious holidays.

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Please visit our website at http://clavius.as.arizona.edu/vo to see images of the calendar and further information on the Vatican Observatory

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