ASU School of Earth & Space Exploration
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SESE Source

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THIS ISSUE

SPOTLIGHT

ASU to host National EarthScope office
Read the story:
sese.asu.edu/node/1146

Kip Hodges: The Scientist as Storyteller
Watch the video:
humanities.asu.edu/node/962

A young visitor examines one of the many hands-on displays at the annual Earth and Space Exploration Day.

Reaching Out

Engagement and immersion in the process of discovery is a key component to exciting young explorers. **By Meghan Fern**

I went to the library and I saw an astronomy book. I looked at it…I fell in love with the pictures, the descriptions of everything, and how you study the subject," recalls Angel Fuentes, a SESE student pursuing a doctorate in astrophysics. In the seventh grade, he experienced his first memorable encounter with science.

Many scholars, like Fuentes, first notice their enthusiasm for a specific field during childhood, giving them an opportunity to instill a deeper sense of interest prior to graduating high school. Opportunities to discover a passion early is fundamental to honing an interest. These opportunities to explore topics beyond what is contained within school textbooks come in many flavors and varieties from school field trips and special classroom speakers to museum visits and public events.

But unfortunately impediments like the current fiscal crisis affecting most states is resulting in further reduction of funds typically allocated to schools. This affects areas of science heavily as they are dependent upon laboratory instruction and educational outings, necessary outlets for demonstrating the application of scientific concepts. This particularly has an adverse affect on science education, with many science topics being most efficiently taught by exposing students to material outside of the text.

Astronomy and geology are frequently taught from text books as evolved areas of study. The threat of misconstruing the subject is greater when students are not directly exposed to it. Outdoor excursions and experimentation involving the concrete and observable evidence is necessary for interpreting and understanding it.

"When it comes to the Earth Sciences, informal education is perhaps a better way to impart Earth Science literacy to larger segments of the population," stated Steven Semken, SESE professor of geological science and geoscience education.

Informal education is a crucial aspect for propagating knowledge related to Earth Sciences. It is often the most appealing and crucial liaison between the general public and the up and coming research.

To strengthen scientific, technological, engineering, and mathematical (STEM) concepts and skills, SESE provides a suite of activities and programs that centers on advancing the spirit and understanding of all types of exploration – Earth, Space, and beyond. The school expends a significant amount of time and effort on outreach activities. Through informal science outreach activities it is providing the public with a better understanding of the universe and our home world.

"There's only so much you can get in geology before you need to go out and start seeing it," says Vicki Mills, a SESE graduate student.

Public visitors peer through telescopes at the monthly Astronomy Open House night. Image courtesy of State Press.

Mills is the president of GeoCub, a student-run SORC funded organization that devotes time and resources to educational outreach activities that emphasize geological relevance.

SESE faculty and staff members are committed to informal and precollegiate science education. Many are involved with developing outreach programs geared toward ensuring that future generations will possess the skills necessary to be successful in a technologically sophisticated world. Their efforts include numerous outreach activities, such as offering facility tours to school groups, speaking in classrooms, running interactive student programs, offering workshops for teachers, and participating in the annual Earth and Space Exploration Day.

Earth and Space Exploration day is an all-day event that provides the public with access to displays and interactive activities from research groups within SESE.

SESE's commitment to outreach education is also upheld by its students, with one of the most notable activities being the monthly Astronomy Open House night. Both undergraduate and graduate students support and manage the event, offering visitors the opportunity to explore astronomy by gazing through telescopes and participating in physics demonstrations.

Organizations like the Astronomy Open House, GeoClub, and facilities like the Planetarium, LROC, the Center for Meteorite Studies and the Mars Space Flight Facility offer affordable opportunities to enhance an understanding of science, and also, they provide the opportunity for professionals educated in the field to facilitate and progress the public's education on the subject as well.

Too frequently it is viewed as a charity to donate time to educating the public on science topics, when actually, it should be a civic duty.

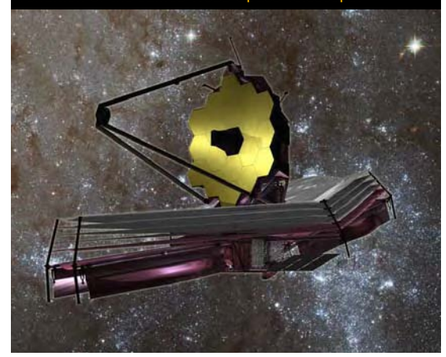
Scientist@Work

Rogier Windhorst

This cosmic sleuth is one of the six interdisciplinary scientists for NASA's James Webb Space Telescope.

By Matthew Button

Above: Rogier Windhorst examines Hubble images that show effects of gravitational lensing. Below: Artist's rendition of the James Webb Space Telescope.



The James Webb Space Telescope (JWST) looks similar to a satellite dish balancing atop a platform. When launched later this decade, this new generation of telescope will orbit the Sun-Earth system at a distance four times farther than the Moon, replacing the Hubble Space Telescope as man's most powerful tool for peering into the deep and unknown regions of space.

While Hubble is roughly the size of a school bus, its scientific successor JWST is a 6.2-ton tennis court of the finest observational technologies that modern space agencies can provide. Its primary mirror is seven times the area of Hubble's, and this larger light collecting area means that it can peer significantly farther back in time than Hubble. JWST's gold-coated hexagonal beryllium mirror segments can be individually calibrated to focus together at distances far enough in time and space to view infant galaxies that formed just after the Big Bang.

SESE's Rogier Windhorst has since 2002 collaborated on the design and imminent deployment of the instrument that is tasked to look for the First Light Epoch of the universe, the birth of stars, the assembling of galaxies and planets, and the possibility of life in these fringes of observable space.

Unlike Hubble, JWST will observe primarily in the infrared. Hubble's science pushed astronomers to look at longer wavelengths, to "go well beyond" what Hubble has already done. Though JWST's pictures may not be as colorful as Hubble's that are taken in the ultraviolet and visible range, the longer wavelength means that dust and

gas clouds are no longer a major obstruction. Hidden stars and star-forming regions can be more clearly seen. Stars and planets that are just forming lie hidden behind cloaks of dust that absorb visible light. However, infrared light emitted by these regions can penetrate this dusty shroud and reveal what is inside.

JWST is much more advanced than Hubble; it could produce a sharp image of a U.S. penny from 24 miles away. Its multi-ranging infrared cameras and spectrographs are so sensitive that a massive sun shield must block the light of earth, moon and the sun. Imaging is so precise, NASA has carefully taken into account the miniscule amount of beryllium lost during polishing processes because it could slightly affect the images.

When launched this decade the telescope will emerge like a cocooned butterfly, its flexible sun shield blocking the receptors and rear solar panels absorbing the light of cold space. It will orbit in the distant L2 orbit zone, requiring a small amount of thrust to keep in a stable orbit around the sun-earth system well away from the earth and the moon. The telescope must operate efficiently at -385 F, normal temperatures for the space nearly a million miles from Earth.

"It is a mammoth project and you might be thinking this is never going to work, but every mechanism is redundant, every tiny actuator has been tested, and all the techniques and equipment has been employed on ground-based telescopes for years," says Windhorst.

An image comparison between a Hubble image taken in the visible range and a similar infrared image like that of what JWST is capture. Credit: NASA.

Parts and mechanisms go through numerous movements and tests. The mirrors, for example, are violently shaken to simulate liftoff conditions. Much care is taken to assure the nearly 6.5-billion-dollar project goes smoothly over its projected 10-year lifetime. Windhorst is on the project to help sure NASA doesn't mess up JWST's ability to carry out its science; teleconferences, meetings with scientist, engineers, manufacturers and assembling plants are part of his duties to check the quality and condition of JWST.

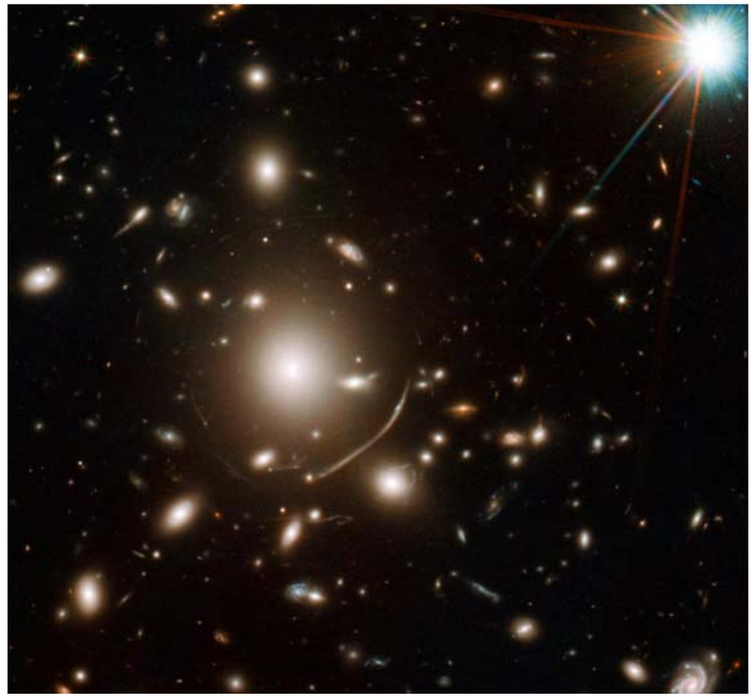
"If you look at Hubble's images of deep space you can see a lot of things. The larger bright blobs are foreground stars or galaxies; these are like rain drops on the windshield. We're looking at the smaller and dimmer lights, which are not stars but galaxies – collections of billions of stars like the sun, 5 to 13 billion lightyears from Earth. Hubble can only see the galaxies that are at wavelengths as red as 1.7 microns, and so far most of these objects appear to be dim and red," Windhorst explains.

These distant galaxies are very far away, and are expanding away rapidly from our solar system. This expansion of the universe creates a kind of Doppler effect, and thus the distance of these galaxies can be determined by their amount of "redshift". Hubble can only see as far as redshifts of eight, which is roughly 13 billion light years away from earth, whereas JWST can see as far as redshift 20 or more. At such a massive distance, the light from faraway galaxies can actually bend around more nearby galaxies and make the distant galaxies seem brighter or fractured – an effect known as gravitational lensing.

The Hubble image on the right shows a central foreground galaxy with swirls of bent light around it. The big white cluster of galaxies in the middle of the image has such powerful gravitational force that it actually bends the appearance of more distant background galaxies into encircling strands.

The gravitational lensing effect can also make distant galaxies appear at the edge of more nearby galaxies in the foreground, and make them appear brighter or larger than they actually are. Areas of extreme gravitation make light appear as though it is distorted by a lens. JWST will be looking so deeply into the beginning of the universe where the first stars started shining, that changing the images to compensate for gravitational lensing may be a challenge.

What is perhaps even more interesting is that this phenomenon can actually help scientists see even beyond the range of their telescopes at galaxies that are otherwise beyond the range of our telescopes. Gravitational lensing actually allows us to notice these even more distant worlds without improving the quality of our telescopes. "What amazes me most is the profundity of it all, and the possibilities of what we could find when we peer within around 100-200 million years of the Big Bang; we're going to be looking at the epoch of First Light," Windhorst says.


Looking deep into space is like experiencing the universe in a house of mirrors where everything is distorted through a phenomenon called gravitational lensing. The image above shows how light bends in arclets around the large white galaxy in the center. Credit: NASA.

Other people involved with JWST at ASU are research scientists Seth Cohen and Rolf Jansen, as well as a number of graduate students and postdocs. Faculty at ASU, such as professors Bowman, Butler, Groppi, Malhotra, Rhoads, Scowen and their research groups, as well as thousands of scientists worldwide will be using JWST as one of their main scientific tools to the explore the earliest stages of the cosmos and star-formation.

To probe the secret birthplace of the stars and to see farther back in time and space than mankind has ever seen – this is the purpose and potential of JWST, and the impassioning possibility that moves Windhorst and others to check, and recheck that each aspect of the mission goes swimmingly. Because unlike Hubble, stowed safely in Earth's orbit, no maintenance can be performed on JWST. Once its five-layered sun shield unfolds and starts toward the frigid clarity of remote space, NASA can only watch…but oh what a view it will be!

Sharing Science

Arizona/NASA Space Grant Undergraduate Research Symposium as seen through the eyes of writing intern **Matthew Button**

Undergraduate intern Zureyma (Zuri) Martinez, a senior majoring in biochemistry, presents her research on the sequencing genes for metal transport and storage from sediments collected from hot springs at Yellowstone National Park.

It was rainy April 9, too rainy, and Tempe sidewalks pool up when the water comes. But there we were anyway, a large group of mostly intelligent young adults all dressed up in our finest clothes sitting together in a banquet room on the second floor of ASU's Memorial Union. This was the 20th annual Arizona/NASA Space Grant Undergraduate Research Symposium – my first one.

It was a rather a serious affair from the attire and the décor to the entirely appropriate chocolate chip muffins, decidedly becoming fruit platters, and perfectly official black plastic plates.

We had our printed abstract books in hand, pondering to ourselves about when we would have to present, shying away from that stern old man or that skinny fellow who we didn't know or had not heard of.

My shoes are wet; though it isn't humid it is damp. Perhaps it's caused by the palpable nervousness in the air. We listen to one another speaking seriously – no professionally – about our research. Collective murmurs and commentary escape the nervous lips of speakers yet to present: "Measuring Tidal Features in Galaxy Clusters? Oh my, that sounds stupendously cooler than ours, can we top an act like that? What room am I in? Section F, oh that can't be good." The most troubling part: fearing that your presentation will be brutally cut off if you go a minute over seven minutes. I'm exaggerating, slightly, but the thought was present.

To be honest, I didn't know too many people there so it wasn't until a man named Barron Orr started speaking that I really focused on what was happening.

"You are going to have to be like a rock climber today," he said, "balancing on the edge of your fears, dangling from a single edge, full exposure."

Unfortunately I had seen the movie 127 Hours the weekend before and I wondered if I could indeed cut off my own arm for these people. But as I began to watch the presentations of my fellow NASA Space Grant interns I actually took Orr's speech, his metaphor about total exposure, in a different way. Collectively we teetered – the occasional speaker had the jitters, someone paused too long, or broken slides threatened rhythm – but no one fell over the precipice of personal exposure. In the end we triumphed over a much different ledge, a much taller, and a much bolder, sheerer obstacle than our public speaking qualms.

For the last six months each of us has worked routinely on some project or another. I suppose in our routines we can forget about the work we do, forget about the significance we make, and even trivialize the small impacts we make toward science. Science in itself is a big thing, but it is as much a cliff, more a cliff than any public presentation.

When we look at new rocket fuels, map out planets, simulate space, when we reach out into realms of thought and innovation far beyond, we are climbing steep cliff walls. When a scientist offers up his research, his arctic sea ice variability, his unmanned air vehicle teams, her models of primitive life to a community of peers, we state our claims and say, "Here, here is what I've done, these are the facts I cling to, this is the ledge I cling too. Here is my data, my work ethic, and my interpretation. Ask me about Martian climates, question me on plate tectonics, and interrogate me on uranium isotopes."

What's nerve wracking is not the big screen, the suited onlookers, or the wistful gaze of moderators but the thought that you haven't worked hard enough that you strode into the sideline of the observable world and you were wrong. So each of us, interns and mentors listened, for seven hours to presentations, engaged and skeptical, wondering all together, altogether wondering, but most importantly validating.

With over 200 guests at the banquet Friday night and 250 plus guests at Saturday's Symposium, it made for a long weekend but it was worth it to see around 140 interns from six schools in AZ present.

The 2011 symposium brought together the brightest and best collegiate students of Arizona, to both critique and validate each other's work, to assure one another that we are young scientists, but our work is not insignificant. That, if even for only seven minutes the rhetoric devices of science writing, the atom beam measurements, and nanostructure printing techniques matter to a small community.

We show off, clinging fully exposed to our body of facts and ask to be judged, watched, and engaged. We present facts, we ask questions, but most importantly we endeavor toward novel ideas and new concepts. This is science; this is peer review. The Arizona NASA Space Grant program looks to foster this communal exploration building the youth of today into the men and woman that climb bravely into the explorative worlds of tomorrow.

ASU interns Matt Summers, Aaron Goldstein, Maggie Pingolt and Hannah Thoreson gather to listen to fellow presenters.

Commemorating Project Mercury

ASU, NASA commemorate Project Mercury with digital image archive **By Nicole A. Cassis**

Beginning in 1958, NASA's Project Mercury was conceived as a bold experiment to give the United States its first human spaceflight experience, develop techniques and hardware for more ambitious space endeavors, and evaluate whether astronauts could safely function in space.

This image from Mercury mission number four taken on Sept. 13, 1961 is just one of the many images that was written on by engineers. Credit: NASA/JSC/ASU

The Mercury program was highly successful, yet the whole Mercury image collection has rarely been seen by the public – until now. A team of scientists led by Arizona State University Professor Mark Robinson is bringing these historic flights to life by making high-resolution scans of the original Mercury flight films.

On 5 May 1961, Alan Shepard became the first American in space aboard the Freedom 7 spacecraft. To celebrate the fiftieth anniversary of this milestone, the NASA Johnson Space Center (JSC) and the School of Earth and Space Exploration at ASU have released the Project Mercury Online Digital Archive. In this new digital archive, high-resolution scans of the raw and enhanced versions of the original Mercury flight films are available to both researchers and the general public, to browse or download, at: http://tothemoon.ser.asu.edu/.

"It was a real privilege to lead up this effort, especially working with the dedicated professionals at JSC who handled and scanned the images with the greatest care," says Robinson, a professor in the School of Earth and Space Exploration in ASU's College of Liberal Arts and Sciences. Robinson, the principal investigator for the Lunar Reconnaissance Orbiter Camera, a suite of three separate cameras on board NASA's Lunar Reconnaissance Orbiter, is also partnering with JSC to scan the original Apollo films, which are being posted online since scanning started in 2007.

Robinson's team received the raw scans from JSC, and ASU was responsible for the processing and archiving of the scanned photographs. Among the steps taken to improve the visual quality of the images was the adjustment of contrast and the enhancement of colors. According to Robinson, once he had worked out a procedure it only took a few seconds of processing per image. Of course, a handful of the images did need individual "hand processing" and thus took longer.

Between 1960 and 1963, NASA launched numerous unmanned and six manned Mercury flights. To record their historic voyages and collect scientific observations from Earth's orbit, astronauts snapped nearly 2,000 photographs in 70 mm format with handheld and automated cameras. Many of the images (specifically those from the unmanned flights) were taken with cameras mounted on brackets looking out the window on a timer. Robinson's team assembled these into movies and they are posted on the webpage also.

The collection of scanned images, most taken with the Swedish designed Hasselblad 500c camera that was first introduced in 1957 and renowned for its clarity, are now available in high-resolution for scientists, engineers and the public. After the missions returned to Earth, the films were developed and stored at JSC.

"When the first scans arrived I was surprised to see writing on the images," says Robinson. "At first I was appalled – these images are part of history, how could somebody have written on them? Then it dawned on me – these were engineering test flights, the imperative was to get an American into space. Analysis of the images far outweighed any historical imperative; the Mercury team was pushing towards the project goals! Now I see the notations as dedication to the cause, a signal of the urgency to succeed."

As we start the 10th year of a permanent human presence aboard the International Space Station and the sixth decade of American spaceflight, it is hard for many people to remember that there was a time when we simply didn't know whether humans could live and work in space.

The first Mercury flight named Freedom 7, piloted by Alan Shepard, lasted a mere 15 minutes. Shepard was launched 100 hundred miles into space and then fell back to Earth into the Atlantic Ocean. The flight, though short, was a huge relief. At the time the Soviet Union had orbited a cosmonaut (April 12, 1961), Yuri Gagarin, about the Earth while the United States was having problems getting rockets off the pad without an explosion. The American public was deeply concerned that the United States had indeed fallen behind the Soviet Union in the realm of rocketry, and technology development in general.

Less than three weeks after Shepard's flight (May 25, 1961) President Kennedy challenged America "to send a man to the Moon and return him safely to Earth" by the end of the decade. With only fifteen minutes of manned spaceflight experience to build upon, sending a man to the Moon in this short time frame was an audacious goal. Project Mercury was followed by the successful Gemini Program and then, of course, the Apollo Program, which fulfilled Kennedy's challenge. Today, the other unmanned and manned Mercury flights are mostly forgotten; however, each flight played a critical role in NASA's early efforts to learn to fly in space.

It has now been 50 years since the United States took those first steps into human spaceflight. In that time Mercury (1960-1963), Gemini (1964-1966), Apollo (1966-1975), and Skylab (1973) have come and gone. The Space Shuttle (1981-2011) is months from retirement, and the International Space Station (1998 -present) has matured into a fully functional science and engineering laboratory.

"The fiftieth anniversary of Alan Shepard's flight presents an opportunity to reflect not only on what NASA and the United States have accomplished in terms of human space exploration, but perhaps more importantly, where do we go from here?" says Robinson.

Romance is in the Air

SESE employee Cami Skiba publishes her first book "Hidden Heart"

By Nicole A. Cassis

Eight years ago Cami Miron Skiba left the life she had known in Romania for a new start in America. Today she is not only Kip Hodges' assistant (and time keeper), but also a published author.

You may know her as Kip's assistant, but Cami Skiba is also a published author. Her first book, Hidden Heart, came out this spring.

So, Cami, you are officially a published author now – congratulations! Your book, Hidden Heart, is a riveting story that I've personally read three times. What can you tell readers about this book?

Thanks, Nikki, for this amazing opportunity. This is my first interview and I'm absolutely thrilled! To put it in a few words, the story is a tale of love, betrayal and friendship. A woman's journey to forgiveness and redemption. A man's fight for a second chance. Dark secrets threatening to destroy everything and more.

The book is being marketed as both a multi-cultural fiction novel and a contemporary romance story. Often the words "romance novel" make us think of those "bodice rippers" of the Harlequin-novel brand in which the beautiful young heroine is emotionally tortured by a dangerous yet handsome hero who in the end falls for her. But there are so many exciting categories of romantic fiction now. The genre includes dozens of sub-genres (from extremely light humorous stories to "vampire romances"). How would you classify your own romantic writing?

This made me laugh, especially the "bodice rippers" description. While my characters live in the modern world, I see what you mean. It gets confusing with so many sub-genres and really finding the right place for my novel took me a while, but it's safe to say it's women's fiction. I do read a lot. I used to read much more, but since I began writing I only average one book per week – a little more if Chris snores [laughs]. I just purchased five new books written by my favorite authors and I look forward to reading each story.

Where did the idea for Hidden Heart originate?

There is a lot of abuse going on around us and we have no idea what hardship some people endure. Abused women is a very sensitive subject to me and I wanted my book to bring awareness to this plague, no matter what side of the world it happens.

You've been working as Kip's assistant for a few years now. Did something at work inspire you to become a writer or have you always wanted to be a writer?

And I intend of retiring from this position – if I can keep Kip working for about 18 more years. [Laughs] I'm still working on that; he is hard to convince.
To answer your question, I always wanted to write. To be more exact, sometime during high school I discovered a notebook of my older sister in which she penned a young adult love story. She never finished it, but to this day I remember it very clearly, wishing for the heroes to have had a happy ending.

I never had the confidence I could do it (write), but wished and dreamed of it, until one day during summer of 2009, driving down the road with my son Patrick we had a conversation about following our dreams. I told him about my dream of writing novels. He listened and said, "Why don't you do it, Mom? Just sit down and write. I'm sure you can do it." And for some reason his simple words and his trust in me was reason enough to begin writing.

Your lead character Tessa is a pretty strong-willed young woman. Does she bare much resemblance to anyone we might know, Cami? [Wink, wink]

I'm an angel, what are you suggesting? I'm always drawn to books that have strong-willed heroines, women that no matter what life throws at them, they fight back and survive. Women who know what they want and go after it. Women who have values and a backbone, as we Romanians say. Basically, women who refuse to be victims.

The book is based in the once communist country of Romania, where you grew up. You relied on your personal experience living there to build the story. Was it painful to write about some of those circumstances, or was it sort of therapeutic?

To some degree it's more disappointment than pain, with the way things are still happening there (the corruption, the political chaos, the bribing, etc. despite communism being eradicated over twenty years ago).

Not many people know that way back before moving to the U.S. I came out of an abusive relationship. Tessa goes through the same type of heartbreak, but she finds healing and moves on- like I did. And if my book can give hope to at least one woman, then I'm okay with that.

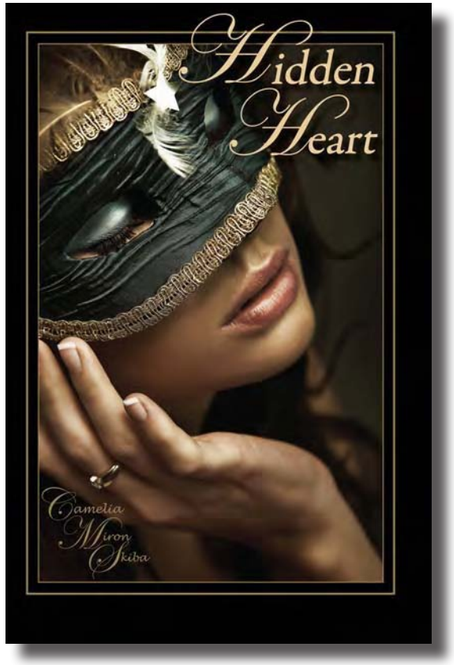
Many new writers enter their books into writing contests to bring their work to the attention of editors and agents. Is that something that you have thought about doing, or have done?

Since my book was finalized this past December, I'm just now starting to look into entering it in contests. I once submitted a partial and received two excellent reviews (out of three), which helped my confidence. There is an upcoming contest with a deadline for submission in the middle of April. I will keep you posted.

Do you have any plans to write another romance story or perhaps pursue a different genre?

Actually, my second novel is about 80% done, with heavy editing going on in parallel. My goal is to have it ready for publishing sometime in the beginning of winter. I have two more stories outlined and two others in an "embryo" stage. I have learned to never say never, but I think I will stick with romance/women fiction/multicultural for a while.

Learn more about Cami at:
http://cameliamironskiba.com/



Fulbright Scholar

SESE doctoral student Michael Rutkowski has received a prestigious Fulbright Research Scholarship to continue his research on the compositions and ages of the stellar populations extant in distant early-type galaxies at Yonsei University in South Korea.

Rutkowski, who received his masters in astrophysics through SESE based on work on X-ray supernova remnants, will begin his Fulbright-sponsored research in November.

"With the Fulbright Scholar program you specify preferences for multiple sites where you would like to carry out your research, but my first and only choice was South Korea to work with Professor Sukyoung Yi," says Rutkowski. With his research interests in South Korea tied to his doctoral research, specifically older stellar populations in early-type galaxies and the morphology of UV light profiles of those galaxies, which Yonsei University has both experience and familiarity with, it was an easy decision for Rutkowski.

The Fulbright Scholar Program, sponsored by the U.S. Department of State, is the largest U.S. international exchange program for students, scholars, and professionals in the world. It currently operates in more than 155 countries, with recipients chosen based on their academic merit and leadership potential.

During his year in South Korea, Rutkowski will work at Yonsei University in Seoul with Yi's Galaxy Evolution team of students and postdocs. He will be using Hubble Space Telescope multi-wavelength imaging to better understand the compositions and ages of the stellar populations extant in distant early-type galaxies.

Rutkowski grew up in Urbanna, Va. and attended Hampden Sydney College, a small private liberal arts school in Va., double-majoring in physics and mathematics before pursuing his masters degree at ASU. Once he completes his doctorate in late 2012/early 2013, Rutkowski hopes to continue his research, as a post-doc at a research university or NASA facility, into the nature of stellar populations in early-type galaxies over the past 6 billion years. He also intends on applying to a number of public policy fellowships that would put him near Capitol Hill and back on the East Coast.

"If we (in the astrophysics community) are going to conduct all of the research that we think is important, we are going to have to look more often to international collaborations. As missions and observatories grow increasingly more expensive, and public investment in a diverse program of fundamental, experimental science declines, we'll have to split the cost with international collaborators if our missions are going to fly," explains Rutkowski.

"I hope that this experience increases the opportunities for joint research programs with Korea, a nation that is dramatically ramping up their investment in launch vehicle, detector, and satellite technologies. Collaborations will enhance the science programs of both nations. With some nations in the region moving to weaponize space, I think my emphasis on the use of space-based observatories for scientific purposes in my proposal caught the interest of the State department officials that reviewed my application."

As for spending a year abroad, Rutkowski looks forward to it, but expects the transition will take a little longer than in the past.

"Each country always has its various cultural or social mores to be aware of but in most of the countries in which I've lived abroad, like Australia or England when I was studying mathematics at Sydney University as an undergraduate or at Oxford University as part of my dissertation, you can learn those quickly," he says, adding, "Only on short trips to Europe or Central America have there been language barriers to overcome."

The de facto language of science is English, so he won't have to worry about learning enough Korean to deliver talks to the community at Yonsei and at conferences.

Professor Rogier Windhorst, Rutkowski's advisor, enthusiastically endorsed his application, saying, "Michael has excelled at ASU since setting foot on campus," says Windhorst. "He is intelligent, intellectually curious, passionate about science, and committed to making a difference in the world. That combination will take him far."

Scholar Award

Erin DiMaggio, a Ph.D. candidate in Geological Sciences in SESE, received a $15,000 Scholar Award from the Philanthropic and Educational Organization (PEO), which awards competitive scholarships to women attending graduate school in the United States and Canada.

DiMaggio, who grew up in the greater Detroit, Michigan area, received a B.S. in Geological Sciences from the University of Michigan in 2004. Working with Prof. Ramon Arrowsmith, she earned a M.S in Geological Sciences from ASU in 2007.

Her current research focuses on interpreting the Earth's sedimentary record to extract information about the mechanisms and history of plate tectonic rifting (including volcanism and faulting) and the implications for paleoenvironmental changes during a crucial period of human evolution 2-3 million years ago. DiMaggio conducts her field investigations in the Afar Depression in Ethiopia. Her research contributes to understanding past environments in East Africa during a particularly interesting period of biologic, climatic, and structural change.

"Showing future employers that you can independently secure funding to support your research is big plus," says DiMaggio, who plans to use the Scholar Award to fund her upcoming field season in Ethiopia in October. "I am honored to be recognized by such a wonderful organization of women."

The P.E.O. was founded in 1869 to bring women increased opportunities for higher education. The Scholar Awards program began in 1991 to provide merit-based awards for women in the U.S. and Canada who are either pursuing a doctoral level degree or are engaged in postdoctoral research at an accredited college, university or institution.

Bell receives Sagan Medal

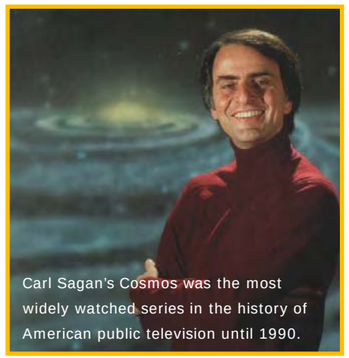
The Carl Sagan Medal for excellence in public communication in planetary science will be presented to professor Jim Bell this Oct. in Nantes, France. **By Nicole A. Cassis**

Professor Jim Bell, planetary scientist in SESE, is the 2011 recipient of the Carl Sagan Medal for Excellence in Public Communication in Planetary Science. The prize is named after the distinguished planetary scientist Carl Sagan (1934-1996), who through public lectures, television, and books, contributed significantly to the public's understanding of planetary science.

Bell is the twelfth recipient of the Sagan Medal and the first from ASU.

A faculty member in SESE since early this year, Bell's professional interests primarily focus on the geology, geochemistry, and mineralogy of planets, moons, asteroids, and comets using data obtained from telescopes and spacecraft missions. He is widely recognized in the planetary science community for his cutting-edge research on Mars and for being an extremely active and prolific public communicator of science and space exploration.

Bell's extensive involvement with NASA missions is matched by his career-long commitment to outreach and engaging the public in the excitement of science. His dedication to disseminating the photography and imaging results from the Spirit and Opportunity rovers is but one example of how he has helped to bring the excitement of exploration to the living rooms of many households around the world.



Carl Sagan's Cosmos was the most widely watched series in the history of American public television until 1990.

He is a frequent contributor to popular astronomy and science magazines, and to radio shows, TV and internet blogs about astronomy and space. He has also written three photography-oriented books that showcase some of the most spectacular images of Mars and the Moon acquired during the space program.

In addition, Bell is president of the Planetary Society. He also serves as a faculty advisor for the ASU chapter of the Students for the Exploration and Development of Space, and works closely with the ASU Mars Education Program to help with teacher workshops and public speaking events.

"It's such an honor to receive this award, named in honor of one of my mentors. Like many colleagues from my generation, I was inspired by Carl Sagan's Cosmos TV series in the early 1980s. When his show came along it was the first time that we could get the latest information about space directly from an expert who could actually communicate with people," says Bell. "It's hard to remember a time when you couldn't just go on the internet and get information. You could only find out about the latest discoveries in science if they happened to be on the nightly news or in the newspaper. I think that's why that show made such an impact, both on the general public, and on me in particular. I can trace my early interest in planetary science–and in communicating the excitement of science in general–to Cosmos and to Carl Sagan's patient, enthusiastic, and very personal style of science education."

The Carl Sagan Medal will be presented to Bell during the DPS 2011 meeting in Oct. in Nantes, France.

Congratulations Graduates

27 SESE students applied to graduate in Spring 2011

Erika Beam, B.S. Geology

Kyle Burns, B.S. Earth & Space Exploration

Melanie Busch, PhD. Geological Sciences

Joshua Coyan, PhD. Geological Sciences

Jenna Donatelli, B.S. Geology

Colton Edmister, B.S. Geology

Daniel Foley, M.S. Geological Sciences

Rebecca Frus, M.S. Geological Sciences

John Geier, M.S. Geological Sciences

Jennifer Glass, PhD. Geological Sciences

Amber Gullikson, B.S. Geology

Bradley Kassing, B.S. Geology

Rebekah Kienenberger, M.S. Geo. Sci.

Mateusz Kolodziej, B.S. Geology

Jason Lowman, B.S. Earth & Space Expl.

Jennifer McNeil, B.S. Geology

Derek Miller, B.S. Geology

Justin Mitchell, B.S. Geology

Matthew Monte, B.S. Geology

Cody Raskin, PhD. Astrophysics

Michael Sheehan, M.S. Geo. Sciences

Matthew Smith, B.S. Earth & Space Expl.

Alana Stern, B.S. Geology

Robert Stevens, B.S. Earth & Space Expl.

Devin Waller, M.S. Geological Sciences

Joseph Walsh, M.S. Geological Sciences

Jennifer Glass stands beside her advisor, Professor Ariel Anbar. Starting in August 2011, she will be a NASA Astrobiology Postdoctoral Fellow at California Institute of Technology. In August 2013, she will be starting an assistant professorship at Georgia Tech in the School of Earth and Atmospheric Sciences.