sigma xi today

September-October 2012 · Volume 21, Number 5

Procter Prize Winner Solomon Golomb

Engineer, mathematician and professor of electrical engineering Solomon W. Golomb of the University of Southern California, received Sigma Xi's 2012 William Procter Prize for Scientific Achievement during the 2012 SETA Conference at the University of Waterloo, Canada this past June. Executive Director Dr. Jerry Baker was on hand to give the award at a banquet in Golomb's honor, that also just happened to coincide with the Transit of Venus across the Sun.

Each year, Sigma Xi awards the William Procter Prize for Scientific Achievement to a scientist who has made an outstanding contribution to scientific research and has demonstrated an ability to communicate this research clearly to scientists in other disciplines.

Called "the inventor of polyominoes," Solomon W. Golomb's body of work has spanned topic and focus over the course of his career, beginning with his Fulbright studies on communication techniques in deep-space for lunar and planetary explorations.

While working on his Ph.D., Golomb spent time at the University of Oslo as a Fulbright Fellow, before returning to the United States to work at the Jet Propulsion Laboratory as a Senior Research Mathematician. He joined the faculty at USC in 1963, obtaining tenure a mere two years later, and has spent his academic career researching complex mathematics.

(continued on page 431)

From the President

The Importance of Science to Non-Sciency People

Hello Companions!

As I was considering what to share with you in this edition I decided to ask my friends and family for input. One of the first suggestions that came in was from a close friend who has no formal background in science at all. He suggested that I discuss "How science touches non-sciency people."

Think about that—we all know it's true and we all regularly take it for granted. The vast majority of the public, and certainly everyone in industrialized countries, is affected by science and engineering research every day. I'm not talking just about the obvious medicine or even personal care products; I'm talking about computers, GPS systems, smartphones, and even just having the lights turn on when you flip the switch. The list goes on and on.

Given how important both fundamental and applied research are in improving our quality of life, why is it more people don't know more about it? It's not lack of interest. My friend Rich, who gave the suggestion, is always interested to read about new scientific endeavors and is often a source for me learning something new. Another friend, Carmen, who has no formal background in science either, is deeply interested in cosmology and spends a lot of time reading and sharing information she finds compelling. But are they representative? Perhaps not in the sense they are actively seeking out the information. But in many ways they are in that they are non-sciency people who nonetheless have an interest in the universe around them.

How often do you get a response along the lines of "oh, you must be really smart" or "I didn't do well in physics" when you tell someone what you do? Do you just let that pass and try to move the conversation somewhere comfortable? Why?

We do ourselves a disservice if we don't take that opportunity to explain how that person, knowingly or not, has been impacted significantly by science and engineering research in a wide variety of ways. As another friend regularly says "That iPhone was not brought to you by Apple. It was brought to you by ENGINEERS!"

We need to reach out and explain what we do in ways that inspire and inform. I'm not saying people need to be able to understand the detailed nuances of your work—no one who isn't really specialized is likely to do so. In fact, at this point I would have to study quite a lot to return to the level of understanding I had of my own work when I wrote my dissertation! But we should all work towards that elevator speech about what we do and why it's important and interesting.

It is inherently valuable to have our fellow citizens understand and value our contributions, and we should strive to understand and value theirs. I've learned a lot about marketing and the importance of brand from Rich, and in many ways what I am saying is we need to own and improve the brand image of science and engineering research. We should work to change the response so that when people hear "I'm a chemist." It shouldn't be "Oh, chemistry is hard." It should be "Oh! Research in chemistry is really important! Tell me what you do."

Why? This isn't just altruistic. If everyone understood the importance of science and engineering research to our quality of life *and* to the economy then perhaps it wouldn't be such a struggle to maintain the all-important research budgets that fund our work.

Thanks for reading,
Kelly O. Sullivan

AAAS/ACS Northwest Regional Meeting in Boise, Idaho

Executive Director Dr. Jerry Baker and Manager of Chapters and Member Services Hallie Sessoms were proud to represent Sigma Xi at the **93rd Annual AAAS/ACS Northwest Regional Meeting** in Boise, Idaho June 24-27th at the Boise Center on the Grove. During this productive trip, they were pleased to meet with several Sigma Xi members—and even began the reactivation process for two Northwest region chapters.

Following two days of student research presentations and symposia, Sigma Xi also sponsored a pre-banquet reception in the Stueckle Sky Center's Double D Ranch Club at Broncos Stadium for all participants and friends of the meeting. Sigma Xi President Kelly O. Sullivan was also on hand to present Sivaguru Jayaraman with the 2012 Sigma Xi Young Investigator Award. Dr. Jayaraman is an Associate Professor of Chemistry and Molecular Biology at North Dakota State University, and his lecture "Learning from Nature: Bio-mimetic Supramolecular Photocatalysis" was one of the highlights of the meeting's final day.

Many thanks to Dr. Linda Mantell, Northwest Regional Director of Sigma Xi for her assistance in ensuring that Sigma Xi had an influential presence during the meeting. In the future, please be sure to look for Sigma Xi at a conference or meeting near you. •

Pizza Lunch Shout Out

About once a month at Sigma Xi headquarters, we liven up the lunch hour with an ***American Scientist* Pizza Lunch** talk. In these informal lectures, scientists describe new research to nonscientists. Each Pizza Lunch offers an in-depth look at a different subject, from bedbugs to the smart grid.

After each talk, *American Scientist* editors chat with the speakers about their research. Anyone can listen in via our *American Scientist* Pizza Lunch podcast, also located online. Don't miss our rich archives of full-length audio slideshows of earlier lectures, too.

Sigma Xi, the Scientific Research Society, hosts the talks in Research Triangle Park, North Carolina. The series is supported by a grant from the N.C. Biotechnology Center and is managed by *American Scientist* Managing Editor Fenella Saunders. •

University of North Texas

We are pleased to share this photo from the **University of North Texas Health Science Center Sigma Xi Honors Day & Induction Ceremony**. The oath was administered by Sigma Xi Member and Dean Jamboor K. Vishwanatha, and the certificates and cords were distributed by another Sigma Xi Member, Provost Thomas Yorio. The University of North Texas Health Science Center is an excellent example of how a chapter's success is greatly increased by the support of university administration. If you have photos of your chapter inductions, please share them with Hallie Sessoms, Manager of Chapter & Member Services today at hsessoms@sigmaxi.org.

Congratulations to the new members and many thanks to UNT for their dedication to Sigma Xi! •

Social Media Shout Out

Have you connected with Sigma Xi via social media? Please do so today and let's continue the conversation.

"Like" us on Facebook
www.facebook.com/SigmaXi

Follow us on Twitter
https://twitter.com/SigmaXiSociety

Connect on LinkedIn
http://www.linkedin.com/groups?gid=42707

Follow us on Pinterest
www.pinterest.com/SigmaXi •

Sivaguru Jayaraman: Young Investigator Award

Sigma Xi is proud to announce that Associate Professor of Chemistry and Molecular Biology at North Dakota State University, **Dr. Sivaguru Jayaraman**, is this year's Young Investigator Award Winner. Dr. Siva, as he is known by colleagues and students alike, has focused his efforts on the development of a program that involves synthetic effort to allow for freedom of design in the production of new structural motifs, for the study, not only of stereoselective reactions, but also for chemical and bio-molecular recognition of encapsulated guests within water soluable nano-reaction vessels.

Dr. Siva's research investigates the molecular and supramolecular assembly characteristics of systems to gain a deeper understanding of the interplay between molecular structure, assembly, dynamics and the role of external interactions critical for molecular recognition events in light-initiated reactions. Additionally, Dr. Siva's research group uses modern molecular tools and spectroscopic techniques to gain deeper understanding of molecular interactions in chemical and biological systems, using light as both a reagent that initiates the chemistry and as the product of excited state reactivity of organic molecules.

Dr. Siva joined the faculty at North Dakota State University in August of 2006. After receiving his Ph.D. from Tulane University in New Orleans, La., he completed a post-doctoral fellowship at Columbia University in New York, N.Y. Dr. Siva received his master's degree in chemistry from the Indian Institute of Technology, Madras, Tamil Nadu, India and completed his bachelor's degree in chemistry from St. Joseph's College, Trichy, Tamil Nadu, India.

Since 1998, the annual Young Investigator Award recognizes excellence in research and includes a certificate of recognition and a $5,000 honorarium. •

Noah Olsman: GIAR Recipient

As a part of the William Procter Prize, Dr. Solomon Golomb has selected **Noah Olsman** to receive a $5,000 Grant-In-Aid of Research. Olsman is originally from Los Angeles, California and in 2008, began studies at the University of Southern California majoring in electrical engineering and minoring in mathematics.

Olsman began his research under Professor Solomon Golomb as a freshman, generating computational results for open problems in discrete mathematics. In 2012, Noah participated in an NSF sponsored Research Experience for Undergraduates (REU) program in the computer science department at Harvard University on the RoboBees project. While working there, he developed a swarm algorithm in simulation with the goal of providing efficient means for robotic bees to uniformly pollinate a field given limited sensory information and poor controls.

Olsman also worked on a modeling project with Professor Daria Roithmayr in the USC School of Law. The goal of this project was to develop a framework for analyzing the evolutionary and game theoretic tradeoffs faced by groups of agents in public goods games.

After graduating from USC in May of 2012, Noah began work at Yale University in the Computational Biology Department, as a visiting student in research in the lab of Professor Thierry Emonet. His work at Yale focuses on modeling aspects of chemotaxis, the process by which cells direct their movement based on their ability to sense chemical gradients. Specifically, his goal is to develop a mathematical framework to analyze the trade-offs faced by single *E. coli* cells in navigating different environments. •

Proctor Prize (continued from page 429)

Among his greatest achievements are the invention of Golomb coding—a form of entropy encoding and the identification of the necessary values for pseudorandom, or maximum length shift register sequences. Golomb's work in this realm directly contributed to the advancement of cellular phone technology, and his work is applied daily in communication systems for all sectors across the globe.

It is also important to note that Golomb's work has not stayed solely in the classroom; he is a regular columnist and puzzle-creator for IEEE's Information Society Newsletter, *Scientific American's* Mathematical Games column, and *Johns Hopkins Magazine's* puzzle column. Video game aficionados will appreciate that Golomb's work with polyominoes is widely considered to be the inspiration for the widely popular, generation spanning, 1984 game *Tetris*. •

Meet Your Fellow Companion - Laurent Pirolli

The honor of membership into Sigma Xi spans disciplines and courses of research study. Each month in Sigma Xi Today, we will be highlighting a different "Fellow Companion"—asking them about their work and what the Sigma Xi honor has meant for their career.

This month, we are pleased to introduce **Laurent Pirolli, Ph.D.**, a Sensors Integration Engineer for Wireline at Schlumberger Technology Center in Sugar Land, Texas. Dr. Pirolli is a native of France who graduated with a bachelor's degree in chemistry from the University of Versailles. He received his master's degree from the French Petroleum School in Paris, after realizing a passion for the important roles of gas, oil and potable water in the 21st century. He then received a Ph.D. in physical chemistry from the University of Delaware, studying diffusion barriers for the microelectronics industry and catalysis at the molecular and atomic levels. This research widened his scientific background to surface chemistry and material science, which has been extremely valuable to him as an employee of an oilfield service company.

1) As a petroleum engineer, what are you currently working on?

Currently, I am working on developing new tools to increase our capabilities in characterizing reservoirs down-hole, so that oil can be discovered and produced more economically.

2) What is something we might see in our daily lives that correlates to your work?

There are many things related to energy, gas, oil, water and sensors. The easiest one is your car: from the oil to fill up your tank to the small sensors in it to optimize its use.

3) How are your sensor devices used?

Our sensor devices can be used to improve the operation of a tool, all the way to characterizing the liquid or gas in the reservoir, so that appropriate decisions can be made on the zones to produce and on designing the surface facilities accordingly.

4) Can you tell us a little about the development of your new sensor?

Our goal is to improve the quality and offering of our services, and to do so, we develop new sensor technologies. It starts in our Research Centers, and once the sensor has reached a certain maturity, one of our Engineering Centers further develops and tests the sensor under field conditions, to make it reliable in the specified down-hole environment.

5) Tell us about your work in multi-disciplinary teams in engineering and research.

It is one of the most challenging and rewarding part of my job. When developing new technology, we rely on different expertise and experience from all over the world. Everybody has a specific expertise and a defined role, so working all together as a team is the key to developing a successful product.

Both France and the United States rely on producing great scientists and innovators to remain leaders. It is a great challenge requiring a continuous effort, but it has great rewards, and I am looking forward to encouraging my own child in this endeavor!

6) Describe the patent experience – were there any bumps along the way for you?

I have learned a lot in my early years in the oil industry, and was lucky to work with Intellectual Property attorneys who educated me in making a strong patent case. Thanks to them, my patent experience has been very smooth.

7) What has the honor of induction into Sigma Xi meant to you?

It was an honor and a great reward to be accepted as a member after all the hard work during my PhD. For me, Sigma Xi has always been an elite society and to have the honor of being part of it has been an achievement and made all the hard work worthwhile.

8) Why do you believe honor societies are important?

Honor societies unite great minds from different fields, so that an expert from one field can educate experts from different fields. It is the best recipe to solve the greatest challenges!

Are you interested in being interviewed for our "Meet Your Fellow Companion" piece in each issue of *American Scientist*? If so, please contact us at memberinfo@sigmaxi.org.

Be sure to look out for next month's Fellow Companion Interview—when we interview one of Sigma Xi's youngest Full Members! •

GRANTS-IN-AID OF RESEARCH
SIGMA XI

Grants-in-Aid of Research Deadline: Oct. 15

Grants of up to $1,000 are available to undergraduate and graduate students in all areas of science and engineering. Designated funds from the National Academy of Sciences allow for grants of up to $5,000 for astronomy research and $2,500 for vision related research. •