The United States depends on a creative, skilled and inspired workforce to regain its competitive edge. It is imperative to get students excited about science, maintain their interest in the field and provide them with the skills necessary to make scientific innovations.

George Mason University recognizes the importance of providing a stimulating environment for aspiring scientists to experience learning beyond the textbook. In 2007, the Aspiring Scientists Summer Internship Program (ASSIP) was launched to give high school and undergraduate students unique opportunities to engage in real world research.

Five years after its inception and with 148 graduates, we are thrilled to publish the first ASSIP newsletter, which will be released quarterly as an electronic document.

This community-inspired publication will serve as a link to introduce extremely bright, talented and focused ASSIP alumni with local business leaders who are building a strong, competitive workforce. STEM (Science, Technology, Engineering and Math) institutions, government agencies and businesses will have the opportunity to advertise their job and internship opportunities. At the same time, ASSIP participants and alumni accomplishments will be recognized.

The newsletter will also relay important information for high school and undergraduate students interested in participating in the program. Application deadlines, upcoming events and tips on how to build competitive applications will be included in future issues.

Cutting-edge research conducted by ASSIP mentors and their students will be highlighted. To date, 16 Aspiring Scientists co-authored peer-reviewed journal articles, nine were listed on abstracts for national conferences, three have co-authored a submitted book chapter and two students’ research was included in patent applications.

ASSIP students contribute significantly to scientific research. We are excited for this opportunity to serve as a channel for information exchange within our scientific community; the students, educators, research scientists, ASSIP alumni and local business leaders.
Established in 2007 by Dr. Lance Liotta, Dr. Emanuel Petricoin III, Amy VanMeter and Virginia Espina, the Aspiring Scientists Summer Internship Program (ASSIP) is increasing in popularity each year and scientific advancements are being made.

The 2011 ASSIP class was competitively selected and represented by 35 high school and 13 undergraduate students from 19 different schools and universities. Each young, talented and determined participant worked alongside Mason’s expert researchers from the College of Science, Krasnow Institute or School of Nursing.

The students worked on a myriad of different projects, such as using an electronic nose to sniff out bio-threat agents, making discoveries to support personalized medicine for cancer patients, creating software to merge face and speech recognition and investigating supermassive black holes. As a result of the participants’ perseverance and mentors’ dedication, the Aspiring Scientists are making significant advancements in scientific research.

At the same time students were engaged in professional research, they also learned how to effectively communicate their findings to a scientific and non-scientific audience. “It is imperative that the students develop effective communication skills that are essential for any career they choose,” comments ASSIP director Amy VanMeter.

ASSIP participants also explored a variety of career opportunities in the STEM fields and forged a network of professional contacts. Twenty professionals from 15 different government agencies, corporations and institutions visited with the students this summer. Aspiring Scientist Chelsea Pinkham commented, “The speakers really shed light on the enormous amount of pathways that I would be able to take in the scientific field.”

Creativity was a top priority this summer. Dr. Liotta kicked off the program by speaking to the students about the process of creativity and importance of innovation. He encouraged them to form an inventors club. Rebecca Kamen, an esteemed artist, followed by challenging the ASSIP participants to create a piece of art which reflected their research project. Both initiatives were a hit. The inventors club met weekly to brainstorm new ideas and the students who participated in the scientific art challenge agreed that this unique experience encouraged their creativity and helped them to understand science at a higher level.

At the concluding poster session on August 15, 2011, the Aspiring Scientists proudly shared their research findings with the Mason community, educators, local high school students, business professionals and program sponsors.

One hundred forty-eight students have participated in the program since its inception in 2007. While many are still excelling in school, others have entered the workforce. Liotta believes that ASSIP alumni have a strong advantage over competitors when entering the job market. They have gained a set of scientific skills while working on hypothesis-driven research projects and can confidently and knowledgeably present their findings.

“America needs more scientists, and we are dedicated to inspire future scientific leaders,” Liotta comments. Petricoin also notes, “This program will continue to flourish because teachers are preparing students to engage in accelerated programs like ASSIP. Our mentors are enthusiastic about engaging students in scientific research, and community sponsors share our passion to provide such enlightening opportunities.”
Q: What is the most valuable learning experience you gained from participating in this program?

Definitely to take the initiative. It can be scary coming into the lab and not knowing how to work with different types of equipment, but this program has taught me to have an open mind, embrace new experiences and learn from mistakes. Expecting to be perfect or having all answers to what you're trying to discover leaves no room for improvement and essentially, there would not be anything left to explore. Because of ASSIP and my newfound ability to take the initiative, I'm more confident in class when approaching new ideas and topics because I know the right techniques to uncover answers.

Q: Can you provide insight on what it is like to gain hands-on experience while working one-on-one with your mentor?

A: Working in the lab is so incredibly exciting because I learn something new each day. The mentors are extremely good listeners. They also provide great advice as to what type of scientific information to focus on within your project and how to apply that information to answer the question you are researching.

Q: Please describe the project you are working on in Dr. Couch’s biochemistry lab.

A: This summer, I am primarily working with gas chromatography and mass spectrometry to detect and compare the presence of VOCs (volatile organic compounds) in human fecal samples from patients with and without Alcoholic liver disease (ALD). Our goal is to see if there are correlations between healthy and disease patients with ALD.

“ASSIP has shown me just how much collaboration and effort scientists put into their research because the research we commit to leads to patents, publications and journal articles that millions of other people read and process to proceed on how to make changes in the world of medicine.”

- Trish Ike

http://assip.cos.gmu.edu/
“My mentor Claudia Fredolini has helped me not only understand the correct way to do specific procedures but the importance of why we do them. I have also found that learning itself means taking chances and guiding myself instead of having others guide me everywhere.”

—Chandler King

Photo courtesy of Mason Creative Services.

**Center for Applied Proteomics and Molecular Medicine**
- **Dr. Alessandra Luchini and Dr. Davide Tamburro**
  Alexander Cox (Sidwell Friends)
- **Dr. Antonella Chiechi**
  Daphne Fong (Thomas Jefferson High School)
- **Dr. Claudius Mueller**
  Judy Rohrer (Northern Virginia Community College)
- **Ms. Claudia Fredolini**
  Chandler King (Osborn Park High School, Governor’s School @ Innovation Park)
- **Dr. Weidong Zhou**
  Emily Brown (Forest Park High School)
- **Ms. Isela Gallagher**
  Arturo Ruiz (George Mason University)

**National Center for Biodefense & Infectious Diseases**
- **Dr. Aarthi Narayanan & Dr. Fatah Kashanchi**
  Milan Patel (Thomas Jefferson High School)
- **Dr. Kylene Kehn-Hall**
  Annalise Schoonmaker (Cornell University)
  Chelsea Pinkham (George Mason University)
- **Dr. Myung Chung**
  Tiffany Tien-Li Chen (George Mason University)
- **Dr. Serguei Popov**
  Ben Barrett (George Mason University)
  Syed Naqvi (George Mason University)

**School of Nursing**
- **Dr. Jessica Gill**
  Kiran Toor (Virginia Commonwealth University)

**Krasnow Institute**
- **Dr. Ted Dumas**
  Sarah Albani (George Mason University)
  Man Hua Zhu (Lake Braddock Secondary School)
  Alexa Corso (Oakton High School)
  Himika Rahman (Thomas Jefferson High School)
  Suganya Sridharma (Thomas Jefferson High School)
  Akshay Deverakonda (Thomas Jefferson High School)

**Dr. Nadine Kabbani**
- Ananya Mishra (Thomas Jefferson High School)
  Snigdha Kumar (Thomas Jefferson High School)

**Dr. Rob Cressman**
- Serena Saffarini (Thomas Jefferson High School)
2011 Aspiring Scientists

School of Systems Biology
Dr. Dimitri Klimov
Sohail Farhangi (Thomas Jefferson High School)

Dr. Iosif Vaisman
Anand Prasanna (Thomas Jefferson High School)
Arjun Srinivasan (Thomas Jefferson High School)
Tanmana Sarkar (Thomas Jefferson High School)
Sundeep Kutumbaka (Thomas Jefferson High School)

Dr. Jason Kinser
Vansh Kumar (Thomas Jefferson High School)
Alex Chen (Thomas Jefferson High School)
William Rieger (Thomas Jefferson High School)

Dr. Jim Willett & Dr. Gita Sudama
Kevin Cao (Thomas Jefferson High School)

Dr. Monique van Hoek
Sameer Singh (Thomas Jefferson High School)

Dr. Yuntao Wu
Lily Yang (George Mason University)

Chemistry and Biochemistry Department
Dr. Barney Bishop
Samarth Mohan (McLean High School)
Sheila Kaushik (Thomas Jefferson High School)
Kyungmin Chae (University of Virginia)

Dr. Paul Cooper
Abby Schneider (George C. Marshall High School)

Dr. Robin Couch
Anisha Kolla (Loudoun Academy of Sciences)
Sara Bellakbira (Osbourn Park High School)
Trish Ike (Stonewall Jackson High School)

Department of Physics, Astronomy and Computational Sciences
Dr. Shobita Satyapal
Will Andes (Woodson High School)

Environmental Science and Policy
Dr. Esther Peters
Adrienne Gillevet (Thomas Jefferson High School)

School of Systems Biology and Genomic Liver Diseases Center, Inova Fairfax Hospital
Dr. Ancha Baranova
He Wan (Thomas Jefferson High School)
Nhut Pho (George Mason University)

Dr. Michael Estep
Amna Bibi (The George Washington University)

School of Systems Biology and Krasnow Institute
Dr. Daniel Cox
Shalini Boddu (Ad Fontes Academy)
Rithvik Prasannappa (Thomas Jefferson High School)
Waleed Osman (George Mason University)

“I loved the program’s ability to let me experience in-depth research with freedom and creativity. I learned a lot about college-level research and gained a further understanding of how to research activity in extragalactic astronomy.”

—Will Andes

“Perhaps the greatest asset of this program is that we were paired with a mentor who is an expert in the field and was able to help us every step of the way. Also, very central to this program is that we were doing meaningful translational research.”

—Amna Bibi

“ASSIP provided an amazing summer experience and springboard for my career. It was one of the most rewarding summers I have ever had.”

—Chelsea Pinkham
Mentor Spotlight: Dr. Robin Couch

Dr. Robin Couch is one of the many scientists who provides one-of-a-kind research experiences for the students in ASSIP and has participated as a mentor in the program since 2007. Couch has worked with more than 60 students in his lab and firmly believes that using steep learning curves is an effective teaching method. “I believe 100 percent in hands-on learning. I’m a huge fan of learning by doing and I treat everyone the same—whether you’re a high school student or a graduate student. I don’t differentiate between high school level and college level research,” Couch states.

Couch is motivated by the pursuit of knowledge and was inspired by his former University professor Maurice Gaucher, whom he credits as being his best teacher. Couch worked in Gaucher’s biotechnology lab as an undergraduate student. This experience confirmed Couch’s interest in scientific research. “I feel like I was given an opportunity that changed the course of my involvement in science. I want to provide this opportunity to others, so that’s my part in this. And then it’s what those individuals do with it that makes all the difference. The successful students that leave my lab take the reins and run with it,” he notes.

When asked what he hopes the students will gain from ASSIP, Couch immediately says, “passion for science.” He wants students to get excited about science and get excited about science at George Mason University. Couch jokes that he may sound like a politician, but he firmly believes biotechnology is the future of America. He believes it is a strong economic driving force and we should invest more in experiential education for all students. “By offering students the opportunity to get involved in my lab, I hope to inspire them to pursue science and understand basic science and the underlying molecular biology. You need to really know it, not just superficially.” Couch is pleased with how the program is evolving. He enjoys working with the students and is impressed by their enthusiasm.

This summer his students worked on an eclectic mixture of projects. Sara Bellakbira spent her summer testing whether an electronic nose can detect biothreat agents. Trish Ike searched for biomarkers to predict Alcoholic liver disease and Anisha Kolla evaluated the antibiotic properties of cranberry extract.

“Our ASSIP mentors are an invaluable asset to the program,” says Vikas Chandhoke, dean of the College of Science.” Not only do they willingly volunteer their time and knowledge, they also explore real-world problems with our students that help them reap unique benefits from their summer research experiences."
ASSIP Alumni: Where Are They Now?

The Aspiring Scientists program was developed with a key goal in mind—to give young students the opportunity to perform hands-on, real-world science research. Students apply their acquired knowledge to not only pursue science careers, but to thrive in those environments as well. Many former students have noted how participating in ASSIP helped build their research backgrounds and prepare them for the future. See what exciting things some of our former students are up to now:

**Nishant Trivedi**  
Thomas Jefferson High School (2007)  
University of Virginia (2009)  
Mentor: Dr. Weidong Zhou

Nishant Trivedi is a senior at the University of Virginia studying biology and pre-medical science. He completed a summer course on Field Methods in Wildlife Ecology at Mountain Lake Biological Station and performs research at the Center for Biological Timing at UVA.

**Ashley Groth**  
Brentsville District High School (2009, 2010)  
Mentor: Dr. Robin Couch

A sophomore at Virginia Commonwealth University, Ashley Groth is majoring in bioinformatics and is considering minorning in chemical and life science engineering. This summer she participated in the Howard Hughes Medical Institute (HHMI) Summer Scholar’s program as an intern in Dr. Stephan Fong’s Synthetic Biology Laboratory. Ashley was a co-author in a peer reviewed publication in 2010.

**Sara Pittman**  
Home schooled (2010)  
Mentor: Dr. Robin Couch

Sara recently transferred from Virginia Tech and is a sophomore at George Mason University. She is currently working as a research technician in Dr. Robin Couch’s biochemistry laboratory. Sara was co-author on a peer-reviewed article published this year.

**Anahita Mostaghim**  
University of Virginia (2009)  
Mentor: Dr. Amarda Shehu

Anahita Mostaghim graduated from University of Virginia in 2011 with a bachelor’s degree in biology. She is currently working as a contractor at the Naval Research Laboratory.

**Katherine Cardiff**  
UCLA (2008)  
Mentor: Dr. Victor Morozov

Katherine graduated from UCLA and is a second year post-baccalaureate intramural research fellow at the National Institute on Drug Abuse.

**Dennis Wang**  
Thomas Jefferson High School (2008)  
Mentor: Dr. Daniel Cox

Dennis Wang is currently a sophomore at Yale University, planning to double-major in molecular biophysics and biochemistry and global affairs. He is currently working at the Yale Stem Cell Center with Director Dr. Haifan Lin, focusing on the gene piwi (co-discovered by ASSIP mentor Dr. Cox). This year Dennis will be traveling to China and Honduras to help run a Model UN conference and hopes to gain global experience working in the health field.

**Arvind Thiagarajan**  
Thomas Jefferson High School (2007)  
Mentor: Dr. Daniel Cox

Arvind Thiagarajan is an MIT undergrad double majoring in physics and biological engineering with a minor in math. Arvind performs research in Dr. Ron Weiss’ Synthetic Biology laboratory during the academic year and participated in the Amgen Scholars Program this summer where he engaged in systems biology research with Professor Michael Elowitz at Caltech.

**Anirudh Mohan**  
Mentor: Dr. Barney Bishop

Anirudh attends Duke University on a full scholarship. He is studying electrical engineering and physics, and performs research in the mechanical engineering department at Duke. Anirudh studied abroad at Oxford University in England this summer.
ASSIP participants have significantly contributed to scientific research projects at Mason. Many have become co-authors on scientific peer reviewed journal articles and their work has and will be presented at local and national scientific conferences.

**Peer-Reviewed Journal Articles**


**Abstracts for Scientific Conferences**


*Abstract Received J. Shelton Horsley Research Award*

“Einstein’s quote, ‘I have no special talents. I am only passionately curious,’ infers the significance of curiosity as a catalyst for creative vision,” says Rebecca Kamen, art professor from Northern Virginia Community College. Rebecca was recently awarded a prestigious Chancellor’s Commonwealth Professorship and is traveling all around Virginia to educate students and teachers about the important intersection between art and science. Her passion for art and fascination with science inspires her to create beautiful works of art that portray tangible visualizations of her observations of scientific phenomena.

“Thinking outside the box is a key aspect involved in becoming a successful scientist,” says ASSIP Director Amy VanMeter.

Art is a powerful vehicle; it gives students the ability to see their project in a new light while also allowing them to appreciate the importance of creativity. This summer’s ASSIP students had the privilege to meet Kamen who challenged them to create a piece of art that reflected their research project.

ASSIP student Sara Bellabkira created a sculpture to explain the physics principles behind the mechanics of the “large box” better known as the mass spectrometer. Chandler King developed an abstract photo montage, which depicted a diagnostic protein that he was looking for in a sea of other complex proteins. A group of four students wrote lyrics to a song and recorded it to describe the experiments they used to study disease.

A common theme that each student shared was that this unique experience encouraged their creativity and helped them to understand the science at a higher level.

“Art’s ability to transform ideas, materials and the way people view the world is evident in the exciting work created by students in the ASSIP program. Using visualization as a muse, they have made the invisible visible. Their artwork creates a powerful bridge between art and science, as well as making us aware of the beauty found in scientific observation and data,” says Kamen.

The Aspiring Scientists’ art will be displayed alongside a selection of Rebecca’s collection at the Science Museum of Virginia in spring 2012.

**Eigenedges**

Electronic image that represents an eigenface, an image created by considering many faces from a database painted with colored text. The image was created by Alex Chen, Vansh Kumar and William Rieger.
The Aspiring Scientists proudly shared their research findings with more than 200 guests who were impressed with the students’ sophisticated projects and their abilities to effectively communicate such complex scientific information.

George Mason University’s President Merten and Dean Chandhoke were in attendance along with many guests from the university, Northern Virginia Community College, area high schools and local businesses. The 2011 Poster Session was held at the Hylton Performing Arts Center on August 15th. This community event shed light on the top scientific talent that will be entering the workforce in the near future. Closing the poster session Dr. Liotta commented, “Remember the names of these students. They will appear as award finalists, authors on publications, holders of patents, and eventually as CEO’s of Biotechnology companies and famous researchers.”

At the awards ceremony, Dean Chandhoke extended his sincere appreciation to the faculty and staff mentors who provided such cultivating experiences for the students.

Annalise Schoonmaker, three-time ASSIP participant, followed Dean Chandhoke by recognizing the mentors she worked with as a high school and undergraduate student. She proudly shared her ASSIP story with the audience, discussing how the program enabled her to apply concepts she learned in textbooks to solve real world research questions. “It is a way to help many people at once,” she said. Schoonmaker further commented, “This program gives high school and undergraduate students the responsibility and trust to go into a lab and make significant discoveries. That’s pretty unique to find in a science research program for students.” Schoonmaker concluded by expressing that her fellow classmates now have a story to tell everyone from family and friends to university admissions counselors.

Guest speaker Glendon Wu, research associate at Medimmune and former NIH student intern, pointed to the endless opportunities that the Aspiring Scientists will encounter in their future. He encouraged them to dream big and never underestimate their abilities.

It was a bittersweet moment for President Merten who will be concluding his appointment at the university in 2012. We are very thankful for President Merten’s everlasting support of the Aspiring Scientists program.
Micron is one of the world’s leading semiconductor companies producing DRAM, NAND and NOR Flash memory products. Along with its Foundation, Micron is committed to promoting education opportunities specifically in the areas of STEM. Micron Technology Virginia has an ongoing need for engineers, technicians and manufacturing technicians. www.micron.com/jobs

Kelly Scientific Resources® is the world’s leading provider of scientific and clinical research workforce solutions, and connects scientific professionals with businesses around the world. In addition Kelly Scientific also provides internship opportunities through our Future Scientists Program. Kelly Scientific is part of Kelly Services®, a Fortune 500 company and a global industry leader in workforce solutions. Visit www.kellyservices.com and connect with us on Facebook, LinkedIn, & Twitter.

Aspiring Scientists experienced life in academic labs this summer but also recognized that many other career opportunities exist in STEM fields. Twenty professionals from 15 different government agencies, corporations and institutions visited with the students this summer.

Steve Greer, Systems Integration Analyst at Lockheed Martin, discussed the field of engineering and exciting opportunities that exist in Northern Virginia.

Mindy Bickel, Supervisory Patent Examiner and Special Programs Advisor at the U.S. Patent and Trademark Office (USPTO) informed the students that the USPTO seeks numerous graduates with degrees in science each year.

Karen Dalfrey, Director of the Governor’s School @ Innovation Park, discussed the importance for bright, creative students to become teachers. This is essential to promote scientific achievement of current and future U.S. generations.

Dolly Oberoi, C² Technologies CEO, provided an enlightening story about her path to entrepreneurship and encouraged the students to focus on what they love the most. Oberoi also commented that there is no substitute for hard, solid work.

Professionals from MedImmune, The Bode Technology Group, Federal Bureau of Investigation, American Association of Pharmaceutical Scientists, Biostrategies Inc., Naval Research Laboratory, Kelly Scientific, Howard Hughes Medical Institute, Nikon and George Mason University also met with the students.

In addition to discovering a broad range of career opportunities, the participants also learned how to develop competitive resumes, prepare for interviews and submit successful college applications.

All speakers shared personal stories about their career paths, which reassured the students who are questioning which degree they should pursue, career experiences they should gain and how they can most effectively accomplish their goals.

To list job and internship opportunities in upcoming publications, please contact: Amy VanMeter (avanmete@gmu.edu)

“Prince William County believes that the life sciences industry will be a prime growth sector in the coming years and decades. One of the key assets that has spurred the emergence of Prince William County as a premier location for life sciences companies is the strong pipeline of talent that can meet the workforce needs of this burgeoning industry. Programs like ASSIP, George Mason University’s life sciences curricula and the cutting-edge research now occurring at Mason’s Prince William Campus demonstrate to life sciences companies that the future of the industry lies right here in Prince William County and Northern Virginia.”
First and foremost, we would like to thank the entire ASSIP community, especially Amy VanMeter, for offering us this great opportunity to write and design the newsletter. As the ASSIP students went on their own eight week journey to think, learn and strive, we went on a journey as well. Our passion lies in writing and communications, rather than science, but our journey was just as exciting and enlightening as the students’.

We made several visits to Mason to meet different scientists and students, and we noticed how everyone is united by passion and dedication to their work. At the beginning, our task of describing scientific research felt daunting, but as our work continued we were able to develop a unique, newfound appreciation for science. We caught a glimpse into the research world and found how truly important it is now and for our future. Everyone in the ASSIP community was so welcoming and excited to talk about their research that we felt more confident in our ability to share and communicate this program to the public. Creating this newsletter has been a marvelous experience that allowed us to enter an environment we wouldn’t have otherwise known. We hope you get a glimpse of the scientists of the future, too.

Kim Deausen & Emily Espina
Co-Editors