

There's Always More to Discover

~a conversation with Professor Harold Geller

By Brittany Sudberry

Every college campus tells a unique story of the people who built it, with each department contributing its own personality. The glow of desk lamps and the earthy smell of old paper and wood both greet you as you enter the English department. Computer fans hum and fill the hall with a fresh clean plastic smell in the IT department, and the Education department always smells of seasonal glade air fresheners and microwaved lunches- ironically and excitingly reminiscent of a high school's teachers' lounge. It is equally as easy to visualize the fictional office of Professor Dumbledore, with his office door opening to a cool musty smell of old brick and whirling golden gadgets that reflect the glow from his tower's high window onto the brown stone floor, and the framed paintings of those who occupied the office before him gliding around the walls.

When you walk through Professor Harold Geller's office door in the Physics department on the campus of George Mason University in Fairfax, Virginia, a sign above the door knob greets you quoting Albert Einstein stating, "If a cluttered desk is a sign of a cluttered mind, of what, then, is an empty desk a sign?" Then a short step inside surrounds you in a pure, unedited working exhibit of a life well lived. Full shelves lean on every wall of the tiny space, stacked beyond their tops with books Geller has studied, books he has taught, even some books he has written. On the walls hang posed photos of teams he had worked with, memories of recognition earned from respected colleagues, and projects saved for display from throughout his years of working with students as a professor at Mason. On the top shelf to the left sits a telescope he guided students in creating out of upcycled coffee cans (from the era when coffee cans were still metal), a small made-to-scale replica of Stonehenge (which he personally visited, and recently helped Cox Farms to reconstruct from giant foam blocks), and photos and books of planets and stars that teach with their presence. By the foot of his desk sits not a brown leather professor's briefcase, but a backpack printed with an image from the Hubble Space Telescope.

"I don't know what I'm going to do with all of this when I retire," he said looking up at the coffee can telescope, reflecting on all of it. He is set to retire from George Mason University in the Spring of 2020, which leaves two semesters left to finish out a long, successful career.

Out the window directly behind Geller's desk stands the Mason Observatory, for which he serves as the director and is largely to thank for its presence on the campus. On the Observatory's roof currently sits a 32" Ritchey-Chretien Telescope, 12" Cassegrain (Mancini), 6" Solar Telescope, 16" Dobsonian (Strickland), 2 Meade 12" Schmidt-Cassegrains (SCTs) and 2 telescopes from Mason's original observatory. In 1982, after the first observatory (inside a pig shed) was torn down to be replaced by Mason's Field House and the second observatory that sat in the athletic fields was vandalized, Geller began the petition to build the observatory that

Mason currently owns, a beautifully twisting grey tower that originally began with a design that would mimic a spiral arm galaxy.

The seeds of Geller's career were planted at the Hayden Planetarium in New York City as a boy. Remembering his trips there, Geller said, "I remember the original planetarium quite well. It's where I fell in love with Astronomy." He grew up during Kennedy's campaign for space exploration, and it made a huge impression on his life. "It was a great thing. We were going forward into the future, going out to the Moon, going into space; you have to learn about Space, so I thought, 'Learn about Space!'" That is exactly what he did, and his passion led him from his childhood in Brooklyn into his rich career of both research and service to the community.

Geller received his Bachelor of Science degree from the University of the State of New York in Albany, NY, before beginning his work as a government contractor, focusing on data analysis from the Viking Lander. In 1989, he received the volunteer service award from the Goddard Space Center. His years of work with the Viking Lander led him to complete his master's degree at George Mason University, where he then continued his education by earning his D.A. and joined Mason's staff as a professor, sharing his growing skill set with an even wider group. Since then he has been recognized as an Inductee for the Albert Nelson Marquis Lifetime Achievement (2018), been a recipient of both the Bronze Telly Award and the Silver Telly Award, was an ambassador for NASA/JPL Solar System, as well as being recognized by his own high school, undergraduate school, and George Mason University for his achievements, along with many other awards.

One of the biggest struggles Geller faced when trying to get approval to build an observatory was the question of "What can you even see when you have a telescope in Fairfax, VA?" It was hard to get interest from the University because many didn't see the value in the telescope. The location didn't appear to be prime, and at the time, the University didn't offer an Astronomy major. The students who were helping lead the 1982 petition were not Astronomy majors themselves, but students who saw value in the subject. The chair of the department persisted that if the telescope was going to be useful, it had to be where the students are. The location was a compromise, but a positive one. Since then, the telescope has become an asset to the entire community both for education and research, along with its community outreach. Dr. Peter Plavchan and his students are currently using the telescope for research, contributing to the scientific community by doing validation and verification of planets orbiting other stars. "It is not so easy in the light environment we have here, but we are able to do it," Geller said. It's used for instruction as well, teaching students how observatories run, and what you can use them for.

We have not found life on Mars yet, as we were all sure we would back in the 1990's, watching *Men in Black* and wearing our t-shirts with bright green "Martian" faces printed on them, waiting for the Viking Lander's data. But what we gained is a wealth of research and technology from missions that travelled past Venus, Mercury, and our Sun, and others that have traveled past Pluto and beyond. Science is a continuous process. The viability of our planet in the future may depend on the data we've gained from these missions. "That's the

neat thing about science,” Geller said, “No matter how much you do, there is always more to discover.”

Geller has spent his life not only dedicated to research, but in making sure that knowledge is available to everyone. As a Mason professor he has taught classes ranging from introductory Astronomy to more advanced courses on renewable energy, then up to the highest graduate levels of study. He has worked with students on advanced research and observation, as well as guiding members of the community who come visit the observatory into a new understanding of the night sky. Geller has even presented a clear and simply model for teaching Physics at a younger age, which closely follows the goals of the STEM project. “I presented evidence to the state council of higher education for Virginia of how they should change the standards of learning in VA. I was also on a committee to recommend changes to the council,” he said about his efforts. “They ignored our recommendations, of course, but we tried.” His model may not have been adapted yet, but the idea of teaching concepts of modern Physics in elementary schools is undeniably logical. Progress takes time.

From his work with Mars exploration and leading into his research and application of Astronomy for renewable energy on Earth, Geller has spent his career working for humanity. He has volunteered, written, educated, and guided the community throughout his life. Why? Why work so hard when noting research is really all that is required? “Serving the community, that’s what I’ve always worked towards,” Geller explained. “Who is rich is he who is content with what he has, who is wise is he who learns from everybody else. Those are things I learned growing up.”

As we arrived at the end of our conversation, the opportunity opened to ask a question that I was sure was clever. “Your generation of researchers has created our tools and technology, out of almost nothing, to advance the world of science to what we have now. What would you like us, the new rising generation, to appreciate about the world in which your generation began all your work, and the vast difference of tools and knowledge we have to work with?” I expected him to explain how the research looked different at the time, or maybe about all the cool technology they invented to solve problems.

“In a way I have to disagree with you.” He smiled and continued, “You said that, um, read that part again? I’ll tell you where I...disagree with” he said, and I smiled too, because that time we both heard it.

I started again at the beginning of the sentence, “Your generation of researchers has created our tools and technology, out of almost nothing, to advance-”

“Ah! Right there!” He smiled, and then as he has done for his students for years, patiently offered me the lesson that I didn’t know I needed. “We didn’t create this out of nothing; we also stood on the shoulders of those who made things before. And that’s the key thing. It was Isaac Newton who said if he sees so far, it’s because he stands on the shoulders of giants. So even Newton, who was definitely an egotistical SOB and was really considered a grumpy, nasty old guy,” Geller paused for a moment, laughing, “Even he knew. Start from where we are, don’t go back to zero and start all over again. Learn from the past.”

My own theory was wrong. I assumed that Professor Geller and his generation, now preparing to pass us the reigns of their life's work and settle into their much-deserved retirement, must be doing so hesitantly, knowing we of the computer age could never understand how they advanced us to where they did. But as Geller showed, his generation was the same, starting out with confidence that they would change the world, but also like us, being led and instructed by mentors that had preceded *them*. Like Professor Geller's respect for Albert Einstein and Buzz Aldrin, we also, in whichever field we are entering, have an entire generation's work we should embrace in our personal beginning. We aren't standing at a starting line by any means, but as Geller said, we are simply being handed a baton.

Sitting in his office, I suddenly felt the reality that this visual history of items will soon no longer be displayed for us behind this door in the Physics department. The walls will be emptied and someone new will set their laptop down on the desk. But it's not the end of anything- we always have the legacy that our predecessors gift to us. At George Mason University, Professor Geller will be retiring in the Spring leaving for us not only his research and knowledge, but our observatory.

During the Monday night I spent at one of the events Professor Geller hosts on the Fairfax campus of George Mason, I looked around and saw college students, adults from the community, and even a few young kids, all eager to see the sky. "It was always meant as a public outreach" Geller said about the programs. The observatory invites us, students and community both, to spend an hour under the stars on Monday nights. Geller hosts a 30-minute lecture, given by himself, a colleague, or an astronomer from our community, followed by the opportunity to go up to the roof and take a look through the 0.8m (~32") Ritchey-Chretien telescope. Life will be lived by those who decide to show up for it. We might be studying law, communications, political science, writing, or maybe at home in Fairfax reading *Harry Potter* to our kids! But we all live (for now, anyway...) on the third planet rotating counterclockwise around the Sun in the Milky Way galaxy. Every one of us has a lot we can learn. As Geller teaches, "The only way to know the Universe is through science."

Come spend a Monday night under the stars! The events are listed on the Observatory's website at <https://sites.google.com/view/georgemasonobservatory/home> ; The viewing is based, of course, on the revolution of the earth, and is weather permitting. Check website for updates.