

## Commencement Address

Penn State Harrisburg

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Congratulations to you the graduates, your family and your friends. Today you celebrate your commencement, the beginning of a journey made possible because of all you have achieved during the years you have studied at Penn State Harrisburg. At this moment, it may seem to you that your accomplishments can be categorized by courses you have completed, exams you have successfully passed, and knowledge you have amassed. All of that is true. But you have also learned things less tangible -lessons that transcend the details of your field.

I recently completed a rather unique journey of my own, at the Smithsonian. Like you, I learned a lot of what we would call content- about biodiversity, astrophysics, space exploration, anthropology, archeology, and much more. But I only have 15 minutes so don't panic, you're not about to get a big data dump. What I would like to share with you is a little Smithsonian history, and a couple of lessons that may be applicable as you move forward in your lives.

Let's start at the beginning. James Smithson, was born in 1765, the illegitimate son of the Duke of Northumberland. His mother saw to it that he was educated at Oxford. He became a chemist of some renown, and was the youngest member to be inducted into the Royal Society. But despite his academic and scientific accomplishments, James was never acknowledged by his biological father, a fact that left him embittered with the aristocracy and all they represented. As such, Smithson was very taken with the notion of democracy as he watched both the French and American revolutions unfold. Through an inheritance from his mother and some luck investing, or some say gambling, Smithson became a wealthy man.

When he died in 1829 James Smithson did something extraordinary. As far as we know he never set foot on U.S. soil. Yet he willed his entire fortune, roughly equivalent to \$500K, to the United States of America to establish an institution to be named for him, and I quote "... for the increase and diffusion of knowledge."

When the news of the funding arrived here in the States, Congress was not immediately taken with the idea of accepting this British money. But after an extended political battle (sound familiar?), in 1846 then Senator John Quincy Adams prevailed, and by an act of Congress, the Smithsonian Institution was born.

**So lesson number one: treat people, especially your family, with respect or suffer the consequences.**

**And lesson number two: philanthropy counts. Remember that when you are successful.**

Now once the funds were accepted, this new Smithsonian Institution needed to be built from the ground up. What would best fulfill the dictate of the will to use these funds for increasing and diffusing knowledge? It was not immediately apparent. Should this new institution be a research institute? a collection? a museum? a library?

The evolution of the organization was based upon the vision of a series of Secretaries coupled with serendipitous opportunities that presented themselves over time.

The first Secretary, Joseph Henry, was a researcher - a physicist- and so the mission of the Smithsonian began as a research Institute. The second Secretary, Spencer Baird, was an ornithologist and a natural history collector; and so began what today is the largest collection in the world. The National Museum of Natural History alone has 127 million objects, which are joined by 10 million additional objects ranging from a Gilbert Stuart portrait of George Washington, to the Hope Diamond to the space shuttle Discovery.

Each succeeding Secretary has put his mark on the institution.

Today the Smithsonian is comprised of 19 museums and 9 research institutes, the National Zoo and the remarkable Smithsonian Libraries. The newest member of the Smithsonian family, the National Museum of African American History and Culture, will join the family of Smithsonian Museums in 2016, taking a proud position on the Washington D.C. Mall beside the National Museum of American History. To appreciate the significance of this latest addition, consider that in the 1860's Abraham Lincoln would go over to the Smithsonian Castle to visit his friend Secretary Joseph Henry. Together they would watch the Civil War troops across the Potomac River. Who at that time could imagine a major museum dedicated to the history of African Americans being prominently featured on the nation's Mall?

**Lesson number three: Be open to changes in perspective. Anticipate the future looking very different than it does today.**

When most people hear about the Smithsonian they think Washington D.C. and the great iconic museums on the Mall. But, as I have already mentioned, the Smithsonian goes beyond the Mall, way beyond. One of those remote Smithsonian units is the

the Smithsonian Tropical Research Institute (I will refer to it as STRI) located in Panama.

STRI got its start when the Panama Canal was being built at the turn of the 20<sup>th</sup> century. A group of Smithsonian scientists from Natural History conducted a survey of plants and animals in the tropical forest that was to become a lake when the project was finished. With the completion of the canal, an island – Barro Colorado Island - stood in Lake Gatun revealing the area of the earlier survey, - and the Smithsonian was invited to stay. Now, more than 100 years later, Barro Colorado Island is the most studied tropical forest in the world. The Smithsonian has 400 scientists and staff resident in 9 locations throughout Panama and each year as many as 1000 scientists and students from around the world visit, to study every element of this unique suite of ecosystems.

Clearly, no one could have imagined the possibilities when first Congress laid eyes on the will of James Smithson.

**So lesson number four: When presented with an opportunity be open to the possibilities. They may be far more expansive than you can imagine.**

What follow are few more stories about STRI, which are relevant to your commencement today.

The Smithsonian is not the only place fascinated with Panama. The famous architect Frank Gehry designed the BioMuseo which opened just a year ago and stands at the mouth of the Panama Canal. STRI was involved in helping develop content for the exhibits and, while it was still in construction, I was taken on a tour of this typical wild Frank Gehry building. The Executive Director of the museum gave me a presentation on the goals of the museum. It was the end of long and strenuous visit, and I was tired. The young man was going on and on delving deep into every aspect of biodiversity. Finally the STRI Director interrupted and said, why don't you speed it up. Dr. Pell is from Penn State, she's a biologist..." Well the BioMuseo Executive Director stopped in his tracks and blurted out "Penn State, I got my masters there, I love that place."

And that brings me to **lesson five: You will find Penn Staters throughout the world wherever important work is being done.**

So why the fascination with Panama? To answer this question you need a short geology lesson. There was a time when North and South America were separated, and the Atlantic and Pacific Ocean were one. When the isthmus rose creating a land bridge we call Central America, animals and plants began to migrate from north to south and from south to north, resulting in

mixing of gene pools not possible before. At the same time, marine animal and plant populations were separated into two new oceans. Over time the temperature, nutrient composition and salinity of the Atlantic and Pacific evolved. How did these changes influence the character of the life in these waters? If you go to Panama and snorkel in the Caribbean on the Atlantic side of the isthmus you will see a lot of coral, a diversity of small fish and other invertebrates. Now if you take a bush plane across the isthmus, just 50 miles, and don the same snorkeling gear and swim in the Pacific you will see less coral and a very different population of fish, much bigger. When I saw the sharks, I headed out of the water. There are some populations of fish from the same families in both oceans as well, and you can only imagine how interesting it is to use the contemporary tools of molecular biology to study how evolutionary pressures in the two environments influenced divergence over time.

So that is the background. Now for today's major lesson, which should be particularly interesting to the civil engineers in the crowd. If you have ever been to the Panama Canal you have observed large container ships carrying goods from one side to the other. What you cannot see are the even larger ships that are too big to pass through the canal. They have to travel all the way around Cape Horn to get from one side to the other. Realizing

that there was a great opportunity here, in 2007 Panama began a project to widen the canal and offer passage to these larger container ships. This project is well under way and will be completed in 2016. STRI has a small group of paleobiologists, who study this unique place and how it has changed over the geological history of the region. One of these scientists, Carlos Jaramillo, got wind of this canal project and immediately recognized the potential enormity of the opportunity. He contacted the Panama Canal Authority and sought permission to literally follow the excavation team and explore the region as it was being unearthed. For the last eight years, Carlos and his colleagues, an army of interns, visiting scientists, and students, have been turning up a treasure trove of fossils. They have found remains of a bearded dog – an extinct animal as large as a black bear that likely migrated from North America. They found fossils of a miniature camel, rhinoceros, as well as fruits and flowers that bear attributes from both North and South America. What makes this find so exciting is that it 's a once in a lifetime opportunity. When the project is completed the new canal will be inundated and NO ONE will ever have access to these fossils and their secrets again. One of the fascinating outcomes of this excavation is the realization that the long held view that the isthmus rose around 3.5 M years ago is probably wrong. Jaramillo and his



colleagues now believe that the isthmus rose much earlier, perhaps 10-20 million years ago.

The lessons learned here are many. And they bring me back to all of you. None of these discoveries could be studied or interpreted without a solid academic foundation. You all have that now, and can build upon that in the future either through your employment or additional education. But what you choose to study and how you go about it, is based upon more than just what you know and what you have learned. It's based upon being aware of your surroundings. Seize opportunities, recognize when something unique is in front of you and take the time to think about the right questions to be asking.

Each of you has the potential to study an isthmus, real or virtual. A place where ideas come together and are parsed. Where confluence and divergence form something new. You have only to ask the right questions in the right places.

May your journeys be rich and rewarding. Congratulations to you all.