Wayne and Claire Horton Odyssey Fellowship
Preliminary Portfolio

Alex Gagliano

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Alexander Thomas Gagliano

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School Address:
4800 Heather Drive Apt. F/H
Blacksburg, VA 24060

Home Address:
20744 Dewberry Court
Ashburn, VA 20147

OBJECTIVE*:* To use my undergraduate degree to go into Peace Corps or Teach for America teaching math or science immediately following my studies in order to make others passionate in astronomy. Next, to attend graduate school for astrophysics and eventually become an astronomy and astrophysics professor at the university level.

EDUCATION:

Virginia Polytechnic Institute & State University (Virginia Tech), *Blacksburg VA* *2013-Present*
B.S. Computer Science, Applied Computational Math
Minors: French, International Studies, Physics Minors
GPA. 3.90/4.0. Dean's List Fall 2013, Spring 2014

Academy of Sciences*, Sterling, VA* *2009-2013*
Magnet program for Loudoun County students providing advanced courses in science, math, and research.

Stone Bridge High School*, Ashburn, VA* *2009-2013*
Advanced Studies Diploma
Graduating top 5% of class.

RESEARCH & MODELING EXPERIENCE:

Student Researcher, Cerro-Tololo Inter-American Observatory, La Serena, Chile. *2015*
Advisor: Dr. Katherine Caleida, CTIO REU Coordination Head
- Analyzed astronomical data and developed programs in C++ while working in the field with astrophysicists

Lab Technician, Animal and Poultry Sciences Lab, Blacksburg, VA. *2014-Present*
Advisor: Dr. Jen Bradley, Department of Animal and Poultry Sciences
- Enhanced ability to analyze experimental data
- Gained significant experience in applied research

Designing a Third-Generation Survey for Gravitational Microlensing Events. *2011-2013*
Advisor: Dr. Jeremy Schnittman, NASA Goddard
- Determine efficiency of exoplanet detection for different binary parameters
- Created error analysis model in IDL using χ^2 Goodness-of-Fit tests

Waste Not, Want Not: Putting Recyclables in Their Place. *2013*
Advisor: Duke Writer, Moody's M3 Competition
- Developed in a team of five a model for cities to determine optimal recycling strategy using recycling data from various U.S. Cities

All Aboard: Can High Speed Rail Get Back On Track? *2012*
Advisor: Duke Writer, M3 Competition
- Created a cost-analysis of proposed high-speed railway for each US region based on yield per mile, annual ridership data, and commuting volumes (in 14 hours)
- Presented findings in an analytical paper

LEADERSHIP & COMMUNITY SERVICE:

Vice President, Virginia Tech Crew Team *2014-Present*
- Team captain responsible for motivating and instructing team of ~40 peers
- Organized and implemented team fundraising events
- Oversaw maintenance of all equipment and scheduling of practices and regattas

Student Alumni Associate, Virginia Tech *2014-Present*
- Maintained alumni relations through reunions and other alumni events
- participated in various community service initiatives throughout Blacksburg

Vice President, French Club *2012*

President, Sunshine Squad Improv Troupe *2011-2013*

AWARDS AND RECOGNITION:

National Society of Collegiate Scholars *Awarded 2014*
- Honors organization dedicated to recognizing high scholastic achievement
- Members must have a GPA of at least 3.4 and place in the top 10% of their class
- Requires completion of community service events such as food drives and tutoring.

Norrine Bailey Spencer Strong Start Award *Awarded 2014*

1st place in Astrophysics, 4th in Presentations 2012 International Space Olympics *Awarded 2012*
- 2 week International Research competition in Korolyov, Russia
- Required presentation of research in front of panel of judges, formal written research paper, and rigorous math and science examinations.

***Loudoun Times-Mirror Future Leaders Scholarship* - $1500** *Awarded 2013*
- Granted to 15 students within the county "who excel in their respective field"

College Board AP Scholar with Distinction *Awarded 2012*

***Merit Finalist, Moody's Mega Math Competition* - $1000** *Awarded 2012*

National Society of High School Scholars *Awarded 2012*

Société Honoraire de Français *Awarded 2012*

National Society of High School Scholars *Awarded 2012*

International Honors Thespian *Awarded 2013*

National Honors Thespian *Awarded 2012*

LANGUAGE SKILLS:

French – *Advanced speaking and oral comprehension, intermediate writing/reading skills*

ADDITIONAL COURSEWORK*:*

ANU-ASTRO4x Cosmology – Edx.org *Started Jan 2015*
ANU-ASTRO3x The Violent Universe – Edx.org *Started Jan 2015*
6.00.1x Introduction to Computer Science and Programming Using Python – Edx.org *Started Jan 2015*

ADDITIONAL INTERESTS*:*

Photography, banjo, biking

VirginiaTech
Division of Student Affairs

Major General W. Thomas Rice
VTCC Rice Center for Leader Development
Office of the Deputy Commandant for
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30 Nov 2014

To the Horton Odyssey Fellowship Selection Committee

I am delighted to offer my highest and unreserved recommendation in support of Alex Gagliano's application for this prestigious Fellowship. Having served in leadership positions for over forty years, working with and mentoring hundreds of young leaders, there are a few who stand out among their peers, and I would place Alex in the top five percent of those. I fully support his pursuit of this Fellowship and endorse his application in the strongest terms.

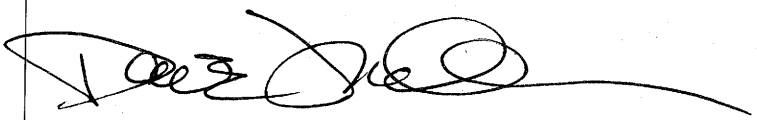
Alex first came to my attention sixteen months ago when he enrolled in a Freshman Honors Seminar which I had the pleasure to lead. I found him to be an exceptional student; intelligent, inquisitive, confident, prepared and always making substantial contributions to the discussions. He became a leader in the class and I was very much impressed by his eagerness to learn. His high GPA speaks for his academic abilities, but I am equally impressed with his open and honest desire to broaden his experiences through service to others.

I came to have such a high regard for Alex that, when he asked if I would offer some advice to him as he developed his portfolio for this Fellowship, I was very pleased to have the opportunity to work closely with him. Over the past four months, as I've come to know Alex more fully, I find him to be an excellent candidate for this Fellowship. He has designed a program that will bring together his multitude of interests and talents, broadening his knowledge of the world and other cultures, and at the same time offering these in service to others.

Alex has done an admirable job of weaving his many interests in such a way that his proposal directly addresses all of the requirements specified by the Fellowship. With respect to international travel, he plans to go not only to Gabon, but also to Chile where he will work with an astronomy team on related research. While not part of this proposal, he sees it as an opportunity that will help prepare him for what he proposes to do in Gabon. Regarding cultural awareness, his program will explore Gabonese life in several related disciplines, including myths about astronomy, how indigenous musical instruments influence cultural beliefs, documenting through photography the social differences of the Gabonese and how the rain forest influences their daily lives. Addressing the requirement to attempt a project of meaning for both the student and host country, Alex's project directly supports the International Astronomy Union and the Astronomical Society of Gabon's stated goals of inspiring the next generation of astronomers in French speaking countries. It also provides rich opportunities for Alex to pursue and broaden his interests in astronomy, music, culture, language, teaching,

international travel and the study of ecosystems. Perhaps the most significant impact this project will have for Alex is a deeper understanding of the relationship between engineering and culture; how one affects the other and that neither can be done well in isolation.

I strongly believe that Alex has all the qualities one would look for in an ideal candidate for this Fellowship, and that he has crafted a program that is worthy of this honor. I am certain that he and his program would be a great credit to the university and the Fellowship. I recommend him without reservation and urge your positive consideration of his application.



Dave Miller, Ph.D.
Colonel, U.S. Army (Retired)
Deputy Commandant for Leader Development
Virginia Tech Corps of Cadets
Blacksburg, VA

Proposal Background

Science foundationalism assumes science to be an objective study of the forces at work in the physical world. Ongoing studies, however, have suggested that science is culturally grounded, and that societal factors determine how science is studied and understood.[1] In Gabon, a Francophone country in western equatorial Africa, these postmodernist critiques of the objectivity of science are well portrayed. A significant portion of Gabonese people have a firm belief in black magic and a cultural foundation of mythology; as a result, science culturally based in Western society has often been dismissed in the traditional rural villages east of the coastal cities of Libreville and Port-Gentil. In 1998, for example, after an Ebola outbreak arose in northeastern Gabon, a citizen of the region stated: "This was not a disease…we were attacked by powerful spirits of darkness."[2]

In 2013, a solar eclipse occurred which could be seen throughout Gabon and central Africa. The eclipse created a newfound fascination in the public with the sky and science in general. If this curiosity could be fostered into a passion for scientific studies, there would be a greater emphasis placed on education and technological advancement in the country, as well as a collaboration between African countries and other Francophone countries in promoting astronomy research. This development is a primary focus of the International Astronomical Union's Office for Regional Development, as "the prevalence of communications in English leaves much of the francophone world aside, particularly regarding activities and materials aimed at children or for secondary education and the general public."[3] Astronomy is an extremely effective method for inspiring kids to study math, science and technology because it is one of the most apparent sciences, especially in impoverished countries. In sharp contrast to chemistry or biology, where a lack of resources significantly inhibits a study of the discipline, lack of light pollution in underdeveloped areas aids in the viewing of stars and planets and makes stargazing-based astronomy both cheap and popular. As a result, astronomy can be used as a mechanism for improving education, literacy, and general quality of life in a country.

The path of the 2013 Solar Eclipse, which passed directly through Gabon, lower left.

[1] "Specter of Inscrutable Ebola Virus Haunts Africa". (1998, November 1). Retrieved November 26, 2014, from http://articles.latimes.com/1998/nov/01/news/mn-38175

[2] The University of Alabama. (n.d.). Retrieved November 27, 2014, from http://anthropology.ua.edu/cultures/cultures.php?culture=Postmodernism and Its Critics

[3] OAD workshop "A French language expertise centre?". (2013, January 1). Retrieved November 27, 2014, from http://www.astro4dev.org/activities/pan-african-eclipse/oad-workshop-french/

In order to promote astronomy and other science education, however, not just in Gabon but around the world, it is crucial to first understand the culture of the region and the context with which the material is taught. These factors will ultimately determine how the education is received. To implement lasting teaching programs such as that in Gabon, a synthesis of the information being taught and the beliefs of the society where it is taught must be formed. In gaining a better understanding of Gabonese society and the French language, the heritage of the society may be preserved while access to education is improved.

Photography, with the ability to document many different scenarios with a fine level of detail and consolidate many different aspects of culture into a single image, is an important tool in this endeavor. Photography has long been used as a form of visual anthropology due to its resolution, which allows for the study of a region without ambiguity associated with verbal or written description.[4] As a result, a study of Gabon through the use of photography would prove a great aid in the preservation of its culture. This would be extremely meaningful in Gabon, as the traditionally oral basis of Gabonese culture has resulted in its limited study.

Proposal

This proposal is comprised of three major components. The first phase is my work in Libreville promoting astronomy outreach and education. The second is my study and photography of the musical culture of Gabon; and the third component is my photography of the rainforest of Gabon. During this trip, I hope to achieve the following goals:

1) Attain fluency in spoken and written French
2) Increase my awareness of Gabonese culture, specifically mythology, music, and biodiversity
3) Apply my computer science studies to introductory astronomy lectures
4) Gain significant experience in teaching and education
5) Study astronomy cultural differences around the world
6) Promote Francophone collaboration in STEM fields
7) Discuss the potential for future U.S. and Gabon collaboration programs

Phase I

During this phase of the proposal, I will conduct interviews with various citizens of Libreville in order to garner a greater appreciation of the ethnoastronomy of Gabon, the myths and beliefs associated with astronomy and astronomy education. Specifically, I will ask individuals about their thoughts toward the 2013 solar eclipse that was visible in Gabon and equatorial Africa. The information gleaned from these interviews will be released in the form of a blog or other publication, so that future astronomy efforts in Gabon and in surrounding areas may be aided and informed by this work. In order to conduct these interviews, I will submit a proposal of my work to the Institutional Review Board of Virginia Tech for approval.

[4] Collier, J., & Collier, M. (1986). *Visual anthropology: Photography as a research method* (Rev. and expanded ed.). Albuquerque: University of New Mexico Press.

The information gathered from these interviews will be used in preparation for the 2016 Francophone astronomy workshop of Gabon, a joint partnership between French-speaking teachers and undergraduate researchers from around the world to discuss methods for integrating computer science and astronomy into science curricula. Within this workshop, astrophysics lectures will be given by various undergraduate participants in the hopes of creating a community of Francophone astronomy researchers and promote future collaboration. I will present one of these lectures, in French, using my work with astrophysics through computer science at the Goddard Space Flight Center in Greenbelt, MD and at the Cerro-Tololo Observatory (CTIO) in La Serena, Chile. My lecture will likely be an introduction to computer science and programming in Python for analysis of astronomy data. Dr. Patrice Okouma, the head of the Gabonese Astronomical Society, will assist me in this lecture. Because the workshop will likely take place in October of 2016, my lecture will be recorded and then played during the workshop after I am gone. While I am at Nommo Astronomia, I will be working with the astronomical society there to coordinate the workshop, discuss effective teaching strategies based on my discussions with other workshop leaders, and determine relevant computer science astronomy tutorials for the student participants of the workshop to complete. I will also be participating in community outreach events to promote the workshop, such as stargazing. My work in the region will be aided by Dr. Okouma, and we will be in constant contact leading up to and during my stay in Gabon. Another aid in this work will be Dr. Jay Pasachoff, the head of the astronomy department at Williams College and a member of the IAU Astronomy Education and Development Division. Dr. Pasachoff traveled to Gabon in 2013 to lead workshops on the solar eclipse, and has agreed to assist me while I am there. Finally, I contacted Dr. Connie Walker, head of a similar astronomy outreach program in Chile. While I am in Chile this spring at the CTIO, I hope to meet with her and discuss her workshop to help me prepare for my work in Gabon.

My involvement in the workshop will be based heavily in promoting the computer science involved in astronomy research. This follows the growing shift of the role of an astronomer toward big data analysis and away from direct observation. As detection technology has grown more advanced, astronomers have been flooded with data from automated telescopes that they can no longer analyze by hand. The Large Synoptic Telescope, for example, that will become operational in Chile in 2018, will gather one gigabyte of data every two seconds[5]. To help keep astronomy relatable to the lay man and interesting to teach to children, computer science is crucial to develop new algorithms that can make sense of the data gathered. This will ensure that results can be communicated and understood by all. In addition, many modern telescopes release raw data online for anyone to access. Using computer science, people from all around the world can participate in cutting-edge astronomy data analysis without having to travel to a large observatory and collect the data themselves. My courses in computer science at Virginia Tech, coupled with independent coursework through Edx.org, will provide me with the computer science skills I will need for the workshop.

[5] Wall, M. (2010, October 11). Astronomy Overload: Scientists Shifting From Stargazing to Data Mining. Retrieved December 31, 2014.

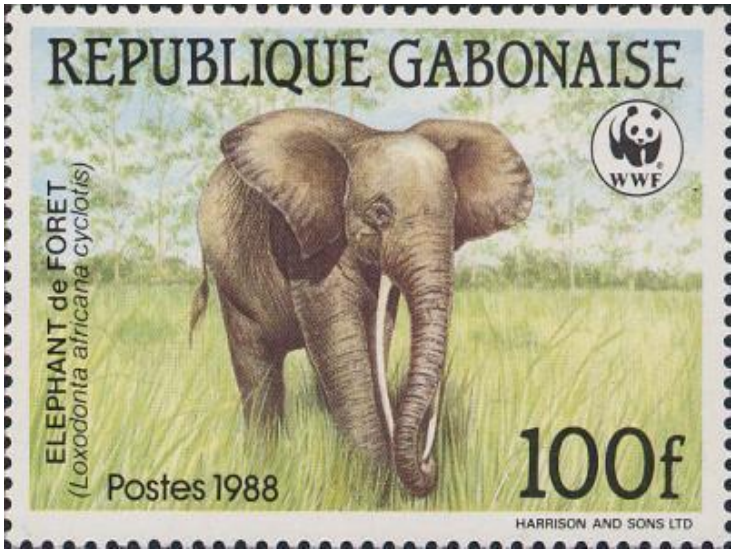
A Ngombi, an arched harp used in African festivals and ceremonies.

Phase II

During the next phase of my proposal, I will document the musical culture of Gabon through photography, specifically the use of two stringed instruments: the Obala and the Ngombi. As a banjo and ukulele player, I have a strong appreciation for these instruments. In traditional Gabonese culture, each sound of each instrument calls a different spirit, and each instrument represents a specific ceremony. These instruments are typically seen as a method of communication between the human world and the spirit world. As such, they play a key role in understanding the culture of Gabon, but very little documentation exists on them. I will be in contact with the French Cultural Center in Libreville to stay updated on musical festivals and events for the summer of 2016. According to the 2013 schedule, the three musical festivals that will take place during my time in Gabon will be the Fête Des Cultures, Saison Danse Gabon, and Fête de la Musique. These festivals all highlight a different aspect of Gabonese culture, but all will feature live Gabonese music.

Phase III

Finally, I will travel to Lopé National Forest and photograph the biodiversity of the rainforest, specifically the elephant, gorilla, and monkey populations there. The country of Gabon is approximately 80% rainforest and its national parks contain some of the greatest biodiversity on the planet, a point of great national pride. It will be important to bring greater awareness to the beauty of this region before it is destroyed by poachers and construction.



A Gabonese stamp celebrating the elephant population in the national rainforests.

In addition, I will analyze how the rainforest is incorporated into Gabonese culture for the villagers who live nearby. For example, the rainforest at Lopé contains the oldest stone carvings in central Africa[6]. I will be staying at Mikongo, a camp within the park, during this part of the trip. My tour through Lopé will be aided by Ghislain, a regional tracker. At the recommendation of Laurel Marburg, who lived in Gabon in the past, I will give Gabonese villagers hardcopy Polaroid photographs of themselves to keep in exchange for the ability to photograph them with my digital camera during this and the other phases of my proposal.

[6] *Gabon: Country study guide.* (2002). Washington, D.C.: International Business Publications USA.

The French language is an extremely important aspect of my trip. In 2012, English became the state-mandated official language of Gabon as, according to a state official: "When you leave the French-speaking space, if you don't know English, you are almost handicapped"[7]. This decree poorly reflects the demographic of Gabon, where nearly 80% of people are French speakers, but was done to portray Gabon as a part of the English-speaking community of international partners and collaborators[8]. The encouragement of Francophone research and education allows the country to retain its French heritage without that being an impediment to technological advancement and international collaboration. While in Gabon, I will speak primarily French. I prepared for my language studies in Gabon through French classes at Virginia Tech. I am minoring in the language, and have participated in a French-English tandem program to improve my conversational French. The French dialects spoken in the villages of Gabon are closer to Parisian French than in many other West African nations, according to a photographer who traveled along the coast last year, so I expect to acclimate to the French dialects of Gabon with relative ease.

Safety Concerns

There has, in the past, been instability in Gabon in the time leading up to major elections. The elections for the National Assembly of Gabon are predicted to take place in December of 2016, four months after my stay there. Although it is improbable that I will face any danger because of this, I will remain in contact with the US embassy for Gabon and ask that they keep me notified of political changes so that I can return to the United States if it becomes necessary. Gabon has also been the site of several Ebola outbreaks in the past due to the lack of preventative medicine in many of the rural villages, but as the current epidemic is not expected to extend into 2016 and I will be spending most of my time in the city of Libreville, it is unlikely to be a problem.

Picture References

http://en.es-static.us/upl/2013/11/total-eclipse-path2013-november-3-africa.jpg

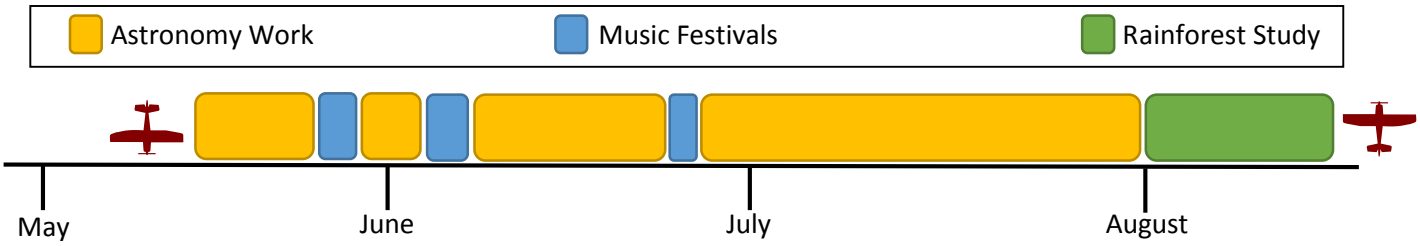
http://digital.library.unt.edu/ark:/67531/metadc47562/small/

http://www.pibburns.com/cryptost/gab637.jpg

[7] "Sacre Bleu! After More Than 120 Years Of French Domination, Gabon Adopts English As Official Language." (2012). Retrieved December 27, 2014.

[8] Leclerc, J. (2014). Gabon. Retrieved December 31, 2014.

Itinerary



Date	Event	Location
May 15	Leave IAD Dulles Airport	Dulles, VA
May 16	Arrive in Libreville, Gabon Head to Nommo Astronomia Site travel by taxi/foot	Nommo Astronomia, Libreville
May 25-27	La Fête Des Cultures travel by taxi/foot	French Cultural Center, Libreville
May 28 -June 4	Astronomy Workshop Prep	Nommo Astronomia, Libreville
June 5-7	Saison Danse Gabon travel by taxi/foot	French Cultural Center, Libreville
June 8 -20	Astronomy Lectures	Nommo Astronomia, Libreville
June 21	Fête de la Musique travel by taxi/foot	French Cultural Center, Libreville
June 22 - August 1	Astronomy Public Outreach	Nommo Astronomia, Libreville
August 3-4	Arrive at Lopé National Park travel by train	Mikongo Camp
August 3-13	Treks through Lopé	Mikongo Camp
August 13-14	Leave Lopé National Park	Mikongo Camp
August 15	Arrive Libreville, Gabon travel by train	Libreville, Gabon
August 15	Leave Libreville, Gabon travel by plane	Libreville, Gabon
August 16-17	Arrive IAD Dulles Airport	Dulles, VA

Because the French Cultural Center (CCF) and Nommo Astronomia are both in Libreville, I will be participating in the music festivals listed during my astronomy work with Dr. Okouma[9]. The trips to the musical events will be day excursions, so if I am hosted by Nommo Astronomia I will be returning there the nights of the festivals to sleep. If they are unable to host me, I will be staying at a *case de passage* (similar to a hostel) in the city. After August 1st, I will travel to Mikongo camp for the third phase of my project, photographing the Lopé rainforest.

[9] The musical events and event dates listed are taken from the CCF 2013 calendar of events and are subject to change.

Budget

Transportation:

Plane Tickets, Dulles IAD <-> Libreville, Gabon.....$1,722 – $1,912

Train Tickets, Owendo <-> Lopé.....$162

Taxi to nearby villages outside of Libreville.....$100

Lodging:

In Libreville (possible host by workshop institution).....$0-$700

In Lopé National Park.....Included in guide costs (below)

Food:

2 cans/meal x 3 meals/day x 90 days.....$1,350

2x GNC Whole Food Enhanced Multivitamin 60 pack.....$50

2x 15 pack PowerBar Protein Plus Bars.....$42

MSR MiniWorks Water Filtration System & Iodine Water Tablets.....$165

Other Expenses:

8x iOptron iExplore 50AZ Telescope.....$192

Guide through Lopé and stay at Mikongo camp (10 days, 10 nights).....$2,011

Sunscreen, hat, and insect repellent.....$50

Travel Insurance.....$500

Vaccinations and Medications.....$600

10x Polaroid 600 Film Pack (8 exposures).....$214

Visa.....$200

Personal Spending Money.....$450

Emergency Fund.....$1,000

Total Cost of Trip.....$8,808-$9,698

Creative Supplement

To better visualize the components of my plans in Gabon and how they relate to one another, I have portrayed them as celestial objects in a galaxy. My proposal is comprised of two different solar systems, and the central stars of these solar systems represent Astronomy and African Culture, respetively. These stars are blue-white and so are the hottest stars in the universe, signifying my strong passion in each of these subjects. Around each of these stars orbit various planets representing different components of my proposal. The two solar systems are held together by a black hole at the center of the galaxy, representing teaching, the preservation of French culture, and the desire to bring the two solar systems together. Some planets feature moons, contacts that I have made who will assist me in different phases of my project. Two asteroids are depicted in the visual, signifying considerations which may derail parts of my trip. The first is the spread of disease into Gabon such as Ebola which, depending on the severity, could terminate my stay there. The second is political instability leading up to elections, as politicians vying for power can create a dangerous situation. Although unlikely to effect my proposal, these will be closely monitored during my time in Gabon. Finally, the surrounding gas cloud within the galaxy is representative of the French language, which will penetrate all aspects of my trip and help me to attain a greater fluency of the language.

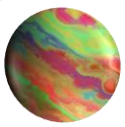
The different characteristics of each planet stem directly from the characteristics of its representative concept and are described in greater detail in the diagram below, in which the planets are split up into the two primary solar systems. The planets featuring an orange description orbit the "Astronomy" star, and those with a purple description orbit the "Culture" star.

In both solar systems, the color of the planet represents the relevant phase of my project corresponding to the concept. The first phase, my astronomy work in Libreville at the workshop and interviewing to learn of astronomy mythology, is red. The second, in which I am photographing the instruments of the region at musical events and festivals, is blue. The third phase, a documentation and photography study of the biodiversity of the rainforest of Gabon, is green. Planets that fit into more than one of these categories are colored accordingly.

Next, the size of each planet signifies my experience in the concept. For example, because of my research at the Cerro-Tololo Observatory in Chile, the Goddard Space Flight Center in Maryland, and my current work at the Animal and Poultry Sciences Lab at Virginia Tech, the planet representing research is the largest in its solar system whereas African mythology is the smallest. It is my objective during my stay in Gabon to make larger the planets which are small – to gain experience, knowledge, and understanding in the areas listed so that I may grow as a student, a teacher, and as a person.

The general eccentricity of orbits represents the variability of the plans for that particular concept. In general, the orbits of the planets within the "Astronomy" solar system are less eccentric than the "African Culture" solar system, because I will be collaborating with a well-established organization and a similar program has already been implemented in the past. The planets within the "African Cultures" solar system follow a more eccentric orbit because of the greater freedom and uncertainty associated with these plans.

Finally, in the "Astronomy" solar system, the distance each planet orbits from the central star signifies the importance that concept will have in the astronomy aspect of my proposal. For the "African Culture" solar system, the high eccentricity of orbits prohibits a similar analysis, as the planets can pass very far and also very close to the sun at different points in its orbit. As a result, the eccentricity of each orbit was modified to represent the variability of each aspect of my plans with reference to each other.



Research

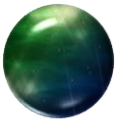
This falls into all three categories of my project, so it is red, green, and blue. It is also the largest planet in the solar system because of my research experience, and the closest to its sun because of its great importance to my proposal.

Computer Science

Computer science is a feature of the first phase of astronomy education, and so is red. It is second closest to the sun due to its importance to the astronomy workshop in Libreville and is smallest because of my lack of experience in the subject, which I will use my studies at Virginia Tech and on Edx.org to improve.

Community Outreach

As a requirement for my work in Libreville and for documenting music culture, this planet is blue and red. It is not as large a focus as the other planets, so is furthest from its star. My contacts aiding me in this area are Dr. Patrice Okouma, head of *Nommo Astronomia*, Dr. Connie Walker, head of an astronomy outreach program in Chile, and Dr. Jay Pasachoff, who traveled to Gabon in 2013 to promote the solar eclipse.



Photography

Photography is blue and green because of its importance in the music and rainforest components of my proposal, largest because of my experience with photography compared to the other planets, and is the least eccentric in its orbit because I will be able to photograph regardless of how my plans change. This planet is lensing a distant galaxy. Jean-Baptiste Dodane, who photographed the people of Gabon during a biking trip last year, has helped me to prepare for this aspect.

Biodiversity

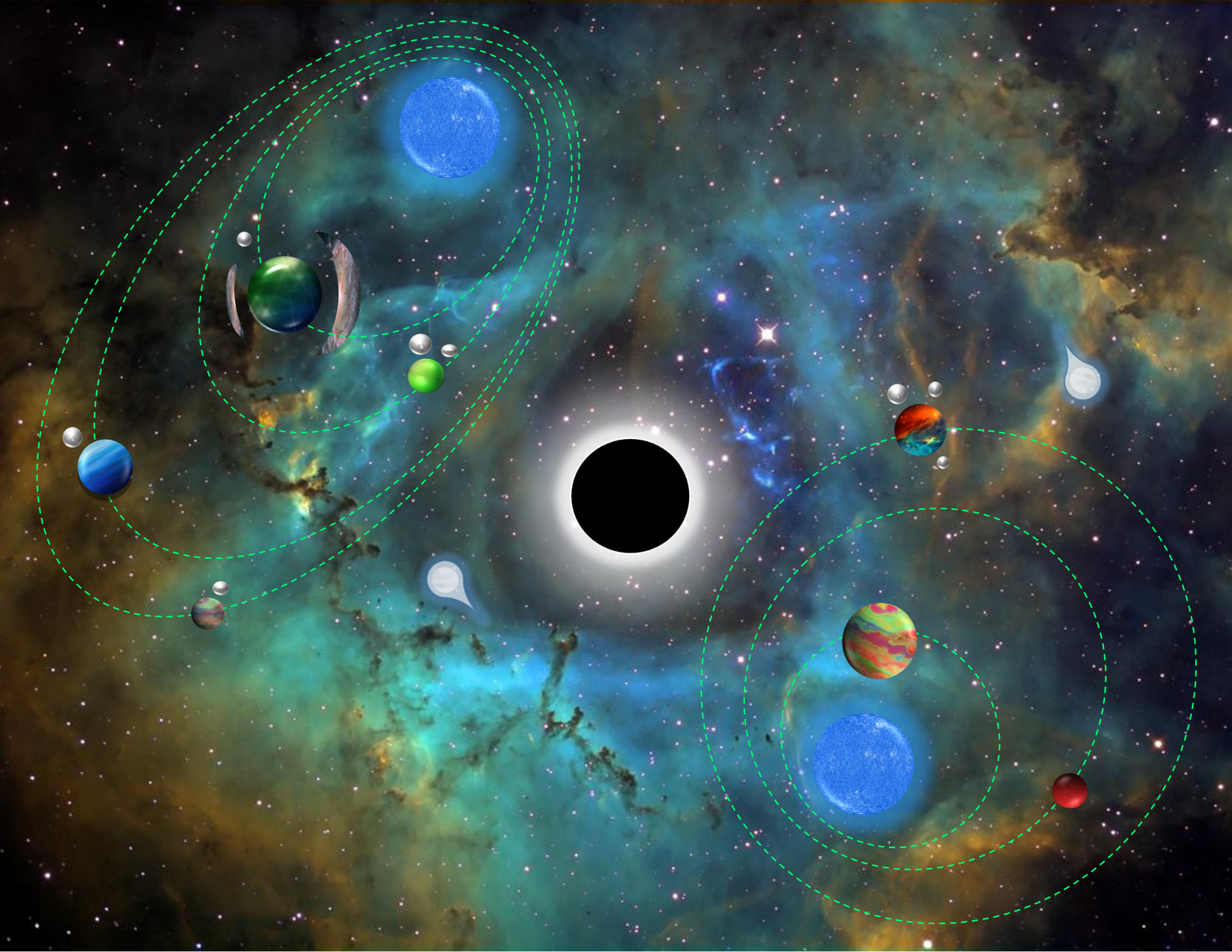
The center of the rainforest component of the trip, this planet is green. It is smaller than music because although I have experience at the elephant sanctuary in Thailand, I have less experience than with instruments. Due to my contacts with Laurel Marburg, who has already navigated Lope National Park, and Ghislain, her tour guide, these plans are less variable than my music and mythology ones.

Music

Music is the focus of the second phase, so is blue. Because of my experience with the banjo and the ukulele, it is the second largest star in the system. It is more eccentric than biodiversity because of the variability of the music festivals in Gabon. I will be in contact with the French Cultural Center (CCF) In Gabon for periodic updates on these events.

Mythology

African mythology lies at the heart of my cultural study, but follows the most eccentric orbit. If the people of Libreville do not have a strong belief in astronomy mythology, I will be traveling to various villages immediately outsdie of Libreville (of which there are many) for interviews , and with each village comes a new set of logistics and possible complications. Because of its importance in all phases but my ignorance in the subject, this planet is red, green, and blue and the smallest in the solar system. Dr. Sanlyn Buxner, having published a paper on African cultural astronomy, has been helping me in this endeavor.



Traveling has been an integral part of my life. Being in an unusual environment and uncomfortable situations forces me to practice my problem-solving skills, discover who I am, and grow as a person. In addition, being a member of the improv troupe at my high school for four years and president for two led me to seek out opportunities where I have to think on my feet in order to sharpen my mind. Below are two pictures I took during my trips.

Left: At a temple in Cambodia, my family passed an endless stream of children begging for money. This picture describes the culture surrounding Cambodian temples: each child trying to support him or herself and his/her family. This picture also creates a synecdoche where to the kids the passing legs represent tourists, and cash.

Right: While backpacking in Thailand in the summer of 2012, my family stopped at a vendor for a quick snack of mango and sticky rice. The man preparing the food, pictured to the right, was a juxtaposition of intimidating tattoos and a warm, disarming smile. His face, tattoos, and fashion sense begged further exploration, but the language barrier kept his story a mystery.

Plan of Study

Intended Major Degrees: B.S. CS, ACM
Intended Honors Diploma: Honors Scholar
Intended Minors: French, I.S., Physics
Honors, Total Credit Hours: 19, 204

Key

French | Physics | CLE | Other
ACM | IS | CS

A symbol is gold where the class is for honors credit.

Transfer & AP Credits

Course Title	Grade	AP Score
AP French	A	4
AP Physics C - Mechanics	A	4
AP U.S. Govt. & Politics	A	5
AP Comparative Govt & Politics	A	4
AP Calculus AB	A	5
AP Calculus BC	A	5
AP World History	B+	3
AP English Lit & Comp	A	5
Dual Enrollment Calculus III	A	N/A
Adv. Standing Calc. with Trig.	A	N/A
Total Credits Accepted		

Virginia Tech Equivalent

Subject	Course	Title	Credits
FR	3XXX	French Elective	3
PHYS	2205	General Physics	3
PHYS	2215	General Physics Lab	1
PSCI	1014	US Govt. & Politics	3
PSCI	1024	Comp. Govt. & Politics	3
MATH	1205	Calculus	3
MATH	2015	Calculus with Trig II	3
MATH	1205	Calculus - Duplicate	0
MATH	1206	Calculus	3
HIST	1214	Modern World History	3
ENGL	1105	First Year Writing	3
ENGL	1106	First Year Writing	3
MATH	1224	Vector Geometry	2
MATH	1015	Calc. with Trig. I	3
Total Credits Accepted			36

Fall 2013

Subject	Course	Title	Hours
CHEM	1035	General Chemistry	3
CHEM	1045	General Chemistry Lab	1
ENGL	1624	Intro to Detective Fiction	3
GEOG	1014	World Regions	3
MATH	1114H	Elementary Linear Alg.	2
MATH	2224	Multivariable Calc.	3
UH	2984H	Freshman Honors Sem.	1
Total Hours			**16**

Spring 2014

Subject	Course	Title	Hours
ENGE	1024	Engineering Exploration	2
IS	2064	Global Econ & Politics	3
MATH	2214	Intro. Diff Equations	3
PHYS	2305	Foundations of Physics I	4
TA	2024	Introduction to Acting	3
UH	3004H	An Unexamined Life	3
Total Hours			**18**

Extracurriculars: Astronomy Club, Crew Team, Tandem French Program, Student Alumni Association (SAA)

Summer I 2014

Subject	Course	Title	Hours
CS	1044	Intro. Programming In C	3
ENGE	1114	Exploration of Eng. Design	2
Total Hours			**5**

Fall 2014

Subject	Course	Title	Hours
ESM	2014	Development Sem. ESM	1
FR	3105	Grammar, Comp, Convo	3
IS	2054	Intro. to World Politics	3
PHYS	2306	Foundations of Physics	4
PSCI	1004	Nations & Nationalities	3
Total Hours			**14**

Spring 2015

Subject	Course	Title	Hours
UH		Research Experience Chile	
Total Hours			**0**

Extracurriculars: Astronomy Club, Crew Team, Student Alumni Association (SAA), NSCS, Animal & Poultry Sciences Lab Assistant

Summer I 2015

Subject	Course	Title	Hours
CS	1114	Intro. Software Design	3
MATH	3034	Intro. to Proofs	3
Total Hours			**6**

Summer II 2015

Subject	Course	Title	Hours
CS	2114	Soft. Design & Struct.	3
MATH	3214	Calc. of Several Vars.	3
Total Hours			**6**

Fall 2015

Subject	Course	Title	Hours
CS	2104	Prob. Solving in CS	3
CS	2505	Intro. Computer Org.	3
MATH	3144	Linear Algebra I	3
MATH	3224	Advanced Calculus	3
MATH	4175	Cryptography	3
PHYS	3324	Modern Physics	4
Total Hours			**19**

Spring 2016

Subject	Course	Title	Hours
COMM	2004	Public Speaking	3
CS	1944	CS 1st Year Seminar	1
CS	2506	Intro. to Comp. Org.	3
CS	3114	Data Struct & Algorithms	3
ENGL	3764	Technical Writing	3
FR	3106	Grammar, Comp, Convo	3
MATH	3124	Modern Algebra	3
Total Hours			**19**

Intended Extracurriculars: Astronomy Club, Crew Team, Student Alumni Association (SAA), NSCS, Physics tutoring and outreach

Fall 2016

Subject	Course	Title	Hours
CS	3214	Computer Systems	3
CS	3604	Comp. Professionalism	3
CS	4804	Intro. to A.I.	3
CS	4944	Senior Seminar	1
MATH	4445	Numerical Analysis	3
STAT	4714	Statistics for EE	3
Total Hours			**16**

Spring 2017

Subject	Course	Title	Hours
CS	3304	Comparative Languages	3
CS	4104	Data & Alg. Analysis	3
CS	4214	Simulation & Modeling	3
CS	4414	Issues in Sci. Comp. Capstone	3
FR	3304	Intro. to French Literature	3
MATH	4176	Cryptography	3
Total Hours			**18**

Intended Extracurriculars: Astronomy Club, Crew Team, Student Alumni Association (SAA), NSCS, Physics tutoring and outreach

Fall 2017

Subject	Course	Title	Hours
FR	3205	French Culture & Civ.	3
MATH	4425	Fourier Series PDE	3
PHYS	3655	Intro to Astrophysics	3
PHYS	4755	Intro to Comp. Physics	3
UH	3004	Honors Colloquia	3
Total Hours			**15**

Spring 2018

Subject	Course	Title	Hours
FR	3206	French Culture & Civ.	3
FR	3314	Francophone Studies	3
MATH	4426	Fourier Series PDE	3
MATH	4446	Numerical Analysis	3
PHYS	3656	Intro. to Astrophysics	3
PHYS	5455	Quantum Mechanics	3
Total Hours			**18**

Intended Extracurriculars: Astronomy Club, Crew Team, Student Alumni Association (SAA), NSCS, Astronomy Research Assistant

I hereby certify that, unless otherwise stated, every item of this portfolio was created by me.

Signed: