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The Lovely Invader: A Documentary on Lonicera Research

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The Lovely Invader: A Documentary on *Lonicera* Research

A Capstone Project Submitted in Partial Fulfillment of the Requirements
of the Renée Crown University Honors Program at Syracuse University

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and Renée Crown University Honors

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Honors Capstone Project in _____ Television, Radio and Film _____

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Date: _____ April 22, 2009 _____

ABSTRACT

For over a year a half, I followed Steve Maheux, a Biology major, throughout his journey to conduct a research study on honeysuckle, an invasive plant. He posed a question regarding the possibility of predicting the occurrence of an invasive plant based on certain environmental factors: soil depth, soil pH, neighboring plants and other aspects that would make up an ideal environment for this menacing plant. The focus of my documentary was to show what true research looks like in all of its tedious glory. Research isn't fancy. It often doesn't make for "sexy film," but it is vital for those revolutionary results that change the way we understand our world. So often we see documentaries that gloss over the research. I wanted to introduce a non-science-oriented audience to the steps that actually make up a research project – the mechanics of how scientists and researchers come to their conclusions.

Steve's research produced inconclusive results. While results may be the crucial factor for the scientific community, they aren't always for the actual people involved in the research. Therefore, while I wanted to focus on the details of Steve's research project, I also wanted the audience to see what motivates a person to engage in a research project and how they deal with inconclusive results. Something draws people to research and it isn't the endless hours of data analysis in a lab or spending one's life searching for the answer to a question that may not even exist. To me, science is engaging because it involves people dissatisfied with merely existing in the world around them – they yearn to know the processes and systems they are a part of. In my documentary, I wanted the audience to see those two tracks: the hard science of the research project itself and the personal story of a student who had questions about a plant and sought an answer.

This project began by sitting alongside Steve as he studied other scientific papers on invasive plants – I read the papers to gain knowledge of the area. I kept in touch with him as he revised his own research plans and learned of the various stages of setting up a research project. I spent a month during the summer of 2008 in Syracuse to film Steve working in Green Lakes State Park. During the fall of 2008 and spring of 2009, I continued to film him both in the field and the lab as he began to analyze his data. Throughout this process, I became fascinated with the idea of the actual person conducting the research, as opposed to the results of the study. With footage of both my interviews with Steve and the year following Steve throughout his process, I began to piece together a film that focused on the human story that will always tread alongside research.

Overall, this project represents the desire to pair science and film in a meaningful and educational way. Sometimes documentaries only show the "pretty pictures" of science and nature. I endeavored to go beyond that, not only focusing on the specific details of the science involved in research, but also the discipline that is required and cultivated during those studies. Scientific enquiry is fascinating and I hope that scientists always continue to ask those questions, even when, like Steve, their first attempts don't return dramatic results.

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REFLECTIVE ESSAY

Introduction

I used to see a great chasm between science and art. Sometimes I felt I was taught to view them as disparate entities and had to choose which mold I fit into. I guess I view myself in the middle of these two extremes, not quite belonging to one side or the other – I'm not a typical Biology major because half my days are spent working in the film and TV sector, but still I don't quite blend in with other Television, Radio and Film students because I find the realm of science equally satisfying, albeit extremely different. I guess I'm in a fortunate place because I can see the connections between the two worlds in the avenue of scientific communication. Documentaries like Planet Earth or nature documentaries from NOVA are fascinating to watch and have made science engaging. It's possible that hard science is just badly publicized, so to many people it's unappealing. However, I find science rather intriguing, like a puzzle, but one in which you don't begin with all the pieces or the picture on the box for guidance.

That must be what always pulls me back to science – the puzzle. One of the most interesting moments in my science education can be attributed to a lesson on BT Corn by Dr. Ramesh Raina here at Syracuse University. Corn borers were destroying corn crops, and people looked to scientists for a solution. The scientists developed a method to genetically modify the corn so that these corn borers couldn't eat through the corn stalks. Because the general public was uneasy with

eating genetically modified food, the scientists engineered a chemical process that got rid of the pests, but would only occur in the green parts of the plant. Since we only eat the corn kernels, the problem was solved. I find that fascinating! I enjoy learning about that type of creativity: the application of known science to solve a new problem.

It was hard to believe that this fascination was mine alone. I set out to find a capstone project that would allow me to share my passion for both science and film with others.

The Beginning

Whenever I tell someone about this project, I always start with the same story. My advisor in the College of Arts and Sciences, Dr. Larry Wolf, and I were sitting in his office my sophomore year, discussing how scientists are very good at communicating their findings to other scientists; however, there is often a breakdown in communication between them and the general public. We discussed how people with a background in both communications and science would be beneficial to help bridge the gap between these two communities. I found myself discussing the same problem with my advisor in the S.I. Newhouse School of Public Communications, Dr. Sharon Hollenback. I realized I could be a factor in the solution to that dilemma so I tried to figure out a way to blend my knowledge of both fields in a positive way.

While thinking about scientific communication, the one thing that struck me was that I had seen few documentaries focusing solely on research. Why is that? Is it because research is often perceived as boring or a pain-staking and long process that may conclude yielding no results? Perhaps. Research is the foundation of science and at the center of all scientific breakthroughs – how is that not stimulating? I knew of a student who was doing research in a professor’s lab and began toying with the idea of creating a documentary based on his research.

I am forever indebted to Steve Maheux, the student conducting original research. Steve was kind enough to let me follow him around in both the field and lab. I have never participated in research and the whole process was completely foreign to me. Through him I was able to see how a research project is developed, how it changes and how it is ultimately accomplished. It is a tedious and challenging process. Before Steve even began researching, both his location and focus of his study changed several times. At first, I was supposed to spend three weeks of the summer at Great Smoky Mountain National Park because that was where Steve would be doing his research. Then the project moved to the Adirondack Mountains and finally settled in Green Lakes State Park in Fayetteville, New York.

I knew Steve was doing research on invasive plants; and while I knew what an invasive plant was, I had never studied them. As I prepared myself to film Steve in the field, I thought about what an invasive plant might be like. The name makes

it sound like this evil creature that usurps both space and nutrients from the native plants. Well, that is exactly what it is, minus the evil intent of course. Sometimes invasive plants are brought to different places by people, and we are completely unprepared for the consequences of these actions. There I was, expecting a malevolent plant, only to find out that Steve was studying honeysuckle: a beautiful plant with bright red berries and white, yellow or pink flowers. It turns out that these characteristics are precisely why honeysuckle is so widespread. Their attractive features make them appealing to many bird species, the main distributors of honeysuckle seeds. Through Steve I learned of the necessity to stop invasive plants from taking over and pushing out the native species. I was fascinated by his study which would allow him to potentially predict where honeysuckle would grow next.

What amazed me most was that Steve's research could have a direct effect on "real science" - this was more than just a project for academic credit. I knew students participated in research studies at Syracuse University, but I didn't realize how much these students positively contributed to the scientific community and our knowledge of the world as a whole.

Filming

My time spent at Green Lakes Park was exciting and different from anything I had ever experienced. Steve conducted his research in an expanse of farm fields that had been abandoned at different times. It was intriguing to see remnants of

stone walls and foundations overgrown with vegetation or to see trees actually growing around a barbed-wire fence. It was also captivating to stand on a little path and see earlier abandoned fields on one side, completely overgrown, and on the other side the fields almost completely clear, sprinkled with a few bushes. I guess I always think of Man the Conqueror taking over the natural world and turning it into a synthetic one. At Green Lakes you could see the complete opposite. It was a reminder that nature will always persist, and it was remarkable.

There are images from that place that I will never forget, beautiful and almost impossible to describe. But it was also amazing to observe how much a place could change in a span of a few weeks. I remember walking through the fields and finding the grass up to my shoulders after a period of intense rain. At first, while working in the fields, I thought the silence would be eerie, until I realized that the fields were buzzing with activity. Deer and other animals would come within feet of us as we worked. The sounds of insects and the wind blowing through the grass and shrubs would fill the air. I felt rejuvenated and enjoyed the opportunity to steal away to the fields for a few hours at a time and escape the city. While filming Steve at work in the field, I really endeavored to capture what I found so fascinating. But it's extremely hard to capture what I felt. I hope that as people watch the film they sense a glimpse of what it is like to be a small creature in a vast sea of nature. Usually we walk around completely absorbed with our own little worlds, but it is nice every once in a while to be reminded of just how small we really are.

My Focus

My overall goal was to create a documentary that focused on research, but didn't gloss over the real science involved. I wanted to target a wide-ranging audience who may or may not have an interest in science. As I discussed with both Dr. Wolf and Dr. Hollenback, the science community knows what is going on within the science community. I wanted to extend that knowledge out to the general public.

When setting out to create the documentary, the question that I wanted to explore was "Why is this research necessary?" We often hear about breathtaking research such as the scientists who developed a process to completely re-grow a human trachea with stem cells. That's amazing, but I will bet that it didn't work the very first time the scientists tried it, and their success was definitely dependent on previous research. Research occurs continuously, constantly contributing to those dramatic findings. Often it goes unheard of because of dead end or unexpected results. Yet these findings do play a large role in overall research because it keeps scientists asking questions and progressing towards an elusive solution. These questions often lead to research that yields the desired results and further hones scientists' knowledge of our world. As Steve says, "No result is technically a result."

Steve's research had a similar outcome. He sought to discover a way to predict where honeysuckle would grow next by finding what constitutes its ideal environmental conditions. His results merely told him potential reasons why honeysuckle grew in certain areas. These results may not be the exact findings he was hoping for, but they are one step in overall invasive plant research. Steve's study may further define what scientists know about this plant and its relationship with other biota. The fact that research is self-perpetuating is fascinating to me. I wanted other people to recognize its importance.

Putting the Film Together

Documentaries are interesting pieces of film because they feel so incredibly counterintuitive to me. I was used to scripted pieces where you work laboriously to develop a story from scratch that is both compelling and touching. Not until you have a perfected script do you begin working on selecting actors, locations, costumes, etc. You get to choose every element of the story and weave it together. The scripted pieces I had worked on before were an attempt to appear realistic. Putting together a documentary was a struggle for me because you capture reality and strip everything away to reveal the story beneath. That story in itself can be extremely difficult to find as each bit of reality can have several potential storylines.

When filming I wanted everything to seem as natural as possible. Because I have been following Steve's research project from the very beginning, I have been

fortunate to witness almost everything first hand. I have enjoyed experiencing a process like this because it is truly genuine. Steve didn't present me with some polished front after the project had been completed – I've seen confusion and second attempts at certain points in the research. I now have a well-rounded view of research in general. I like that raw quality of it all. If you go through my unused footage, you will see those little unpolished gems and I think my education throughout this process and the film itself, are both much better off because of experiencing everything with Steve along the way.

The hardest part of this process was to decide what story to tell. Steve's research had inconclusive results. When I found out, I began to panic because I thought my film relied solely on Steve's "revolutionary results." Talking with my Honors Reader, Professor Doug Quin, enabled me to see the human story behind the research. With a little additional filming and interviews with Steve, I was able to capture that story on film. The idea of doing a profile of a student conducting research instead of focusing on the research itself slowly began to fascinate me and I was excited to tell Steve's story.

Dr. Hollenback says that documentaries are an "editor's art" as opposed to a "director's art" and I found that to be true when I began to edit my film. I had spent close to a year filming Steve and that resulted in hours of footage. Removing or including particular clips of that footage can create an entirely new angle for the story. It was challenging because there were many parts of Steve's

interview that I found particularly engaging, but didn't quite follow the story I was telling. I decided to include a few of them as bonus materials because I found them too interesting to keep to myself.

When I begin working on any editing project, it's all about what feels right. I guess I can't compare it to any other creative art form because, in my opinion at least, you don't have some magnificent inspiration that pours itself out onto the page or becomes a music composition, etc. It feels much more systematic to me. You have your footage, your sound clips, all the little pieces, and you have to bring it together into one cohesive entity. Of course, there are editing techniques I have picked up along the way, but there is no formula to piecing any film together. For some reason, you just get that sense when your edited piece flows smoothly.

The edit suite where I have worked on this project is about five feet by four feet – pretty much a closet. You sit in front of the computer for hours finding the right segment of film, adjusting the clips so the pacing is right and much more. What I enjoy most about the process is how fully immersed I can become. I look up and suddenly the windows are dark as several hours have passed; it's almost as if time disappears when you enter that little room to edit. It's satisfying to be able to escape every other stressor in my life and place my focus on one thing. I usually have so many thoughts jumping around my head during the day that it is nice to pour my concentration into one avenue. Generally, when I work on any other type

of project or homework I have to have music on, but when it comes to editing film, I need total silence. Every once in a while a blip of sound from the clip will play, but other than that it is completely calm. I think it must be because while I'm manipulating the clips on the computer, I am also thinking of every other possible way I could be editing the segment. I allow every section of my mind to wrap around the project at hand, whereas with other work I am constantly contemplating something else.

While editing this film it has been especially exciting to go back and see how much I have gleaned during this process. I view footage from Green Lakes State Park and I remember what Steve knew then and what he was attempting to learn. I remember how the project loomed in front of us both. With lab footage, I see Steve learning new techniques for the first time, and me learning vicariously through him. I have learned so much and I enjoy being able to go back and see that transformation.

Making Research Interesting

Research...how do you make that exciting to watch and learn about? If we were all interested in research and finding scientific solutions, we would all be scientists, but we aren't. When figuring out how to edit the film, I had to think about what would be most interesting to watch. First of all, research involves lots of time and repetition – two things that are definitely not engaging on film. I wanted the audience to see what Steve's research actually entailed. Why do you

test the soil's pH? Why is identifying all the plants within the quadrants important? What does that tell you? Each little step of the research process is vital to the results. I find myself unsatisfied with documentaries on scientific studies when they gloss over the actual scientific methods, assuming we are either too asinine or uninterested to want to hear about that part.

Therefore, I decided the best way to go about editing the film was to cut each process down to a few seconds – get the idea across, explain why certain things happen and move on. The action itself is not as crucial, but the reason for which it is carried out certainly is. The most important thing to keep in mind is whether or not each segment contributed to the overall piece.

What I have Learned

I have a new-found respect for all scientists who conduct research. As I said before, I had never participated in research and the strength of character it takes to persist through a study astounds me. I am especially impressed with Steve. I have been with him every step of the way over this last year and half that he has been working on this project. I witnessed his perplexity at times and his determination to continue working when he was confronted with obstacles. It makes me wonder what it would feel like to spend several years on a project only to find no results. It amazes me that so many researchers dedicate their lives and careers to a single focus in the scientific world. Their tenacity is surprising and admirable.

As much as I was surprised by the research process itself, I wasn't prepared to see the parallel between film production and research. I always thought of film and science as completely separate entities. Research is tedious, time-consuming, and methodical – the exact way I would describe film production. Both require vast amounts of preparation time and dedication to one's subject even when things don't seem to be turning out the way it was originally intended. Nonetheless, each side must maintain a willingness to continue working despite the complications that have a knack for arising. Like participating in research projects, editing a film requires concentration and patience. As Dr. Hollenback reminded me, both a documentary filmmaker and a scientist have a goal and both are trying to discover and understand something new about this world. Overall, it was surprising to learn that both disciplines were more related than I had previously thought.

My Inspiration and Influences

I have never created a documentary before, and I've watched several documentaries for inspiration along the way. *Plant Earth* and *NOVA* documentaries certainly were the films I attempted to parallel. It was a grand ambition, but, nonetheless, they definitely were sources of motivation. They set the standard for excellence in documentary filmmaking and were a great place to find insight and instruction in this field.

In addition to actual documentaries, Alton Brown, the creator and star of "Good Eats" on the Food Network was also a major source of inspiration. His love for

the science behind food led him to create an educational and extremely entertaining cooking show. He was a cinematographer who discovered one day that cooking shows were rather boring and set about changing that. While he might seem like an odd source for inspiration, he blends science and entertainment into a wonderfully cohesive and educational show. I definitely respond to that. As a fellow science and film lover, it was exciting to see what he did with his passion for both disciplines.

I am, as my dad likes to say, “a product of my environment and upbringing” and therefore have been influenced and positively affected by many people and experiences. Those experiences have helped steer me down this path, and have both directly and indirectly added to this project. My parents are my number one source for inspiration. They encourage my ideas, they challenge me to think and expect me to succeed. Without their help, guidance and support I would never have been able to complete this project.

Also, this project would not have been possible without the professors that taught me both the craft of filmmaking and the love of science. Interestingly enough, science used to be my least favorite subject of all and I was absolutely dead-set against ever pursuing something in that realm. Dr. Lynn Martens was the first teacher to make science too intriguing to pass up. Her passion for science and enthusiasm for teaching has forever touched my life and she is the first educator to encourage me to keep science a part of my life despite whether or not I make it

my career. My professors here at Syracuse University have continued to fuel my fervor for scientific learning. Their teachings kept me asking questions about the world and that is what ultimately led me to this project. My advisors for this project have been exceptionally supportive and this film has evolved and improved with their advice and assistance. Dr. Wolf especially kept the idea of science communication fresh in my mind and inspired me to be the solution to the gap in communication between scientists and the general public. Dr. Hollenback was a source of motivation throughout this process. She always encouraged me to look at my project from several different perspectives and challenged me to excel. Professor Quin helped me find direction for my film. He was extremely supportive and encouraging, even when I felt I didn't have a focus for my documentary. I found the heart of my film while discussing the human story behind research with him. His positive attitude about my project, even when I didn't feel it deserved it, kept me going. I will be ever grateful to him and all my advisors for the support they gave me throughout this process.

I was fortunate enough to receive the Marcus-Wise Fifty Year Friendship Award which enabled me to stay in Syracuse during the summer to begin filming my documentary. Without the award, I would never have been able to capture Steve's field work, and I am so thankful for the kindness bestowed by the Honors program and the families responsible for the grant.

Impact and Scope

When I decided I would do a documentary on undergraduate research, I didn't quite know where it would take me. As I reflect on the two years I've spent on this project, I find that I keep focusing on the idea of bringing communication students from Newhouse and science students from the College of Arts and Sciences together. There is fascinating research going on at this university, but few outside the science community would know it. I guess I envision either a separate major or a set of classes where both communication students and science students come together to focus on making these findings known to the general public and university community. On a purely entertainment level, perhaps this group of students could produce short videos that merely put a fun spin on certain science lessons. Those in turn could be useful to entry level science classes, while giving hands on experience to communication students looking to write for or produce videos. I know I have always enjoyed hands on projects that had a larger implication than just being handed in for a grade. Documentary film students could do profiles of professors here at the university. We are blessed with outstanding scientists like Joseph Chaiken who developed a non-invasive way of testing blood sugar in patients using lasers and Michael Cosgrove who developed a way to battle leukemia by reprogramming cancerous cells into normal ones. So many other professors here at Syracuse University have had a profound impact on the scientific community and the public, yet go unknown by many.

I am not naïve enough to think I am the only student out there with various academic interests. I would hope other students would find ways of pursuing both disciplines that interest them, never having to decide between one and the other. I would love to think that other students might be inspired by my project to develop a Capstone that brings those contradicting interests together.

Conclusion

This project has had a profound impact not only my development as student, but also as a person: a beginning filmmaker and a science-enthusiast. There have been challenges and times when I thought this project would never come to fruition, and at the same time, moments of absolute excitement and wonder. This project represents the culmination of my four years here at Syracuse University and I can think of no better way to have spent my last year than to work on a project that utilized every bit of knowledge I have acquired at this university.

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APPENDIX

DOCUMENTARY SCRIPT

AUDIO	VIDEO
<p>NARRATOR: Research is happening everywhere. Scientists are constantly seeking the answers to questions about our world, posing hypotheses to slowly chip away at what we don't understand about the environment we live in. But something beyond just the fascination with science draws people to research. At Syracuse University, hard working undergraduate students engage in research projects that cover a multitude of interests. Steve Maheux is one such individual, a senior Biology major whose love for both science and nature began long before his academic career at Syracuse University.</p>	<p>Panning shots of Green Lakes Park Still photo of dandelion</p> <p>Panning shots of Green lakes Park</p> <p>Still photo of Hall of Languages Still photo of Lyman Hall</p> <p>Steve walking in Thornden Park</p> <p>Steve walking in Green Lakes Park</p>
<p>STEVE: I guess I first got interested in science, probably in high school, when I really started deciding what I wanted to study when I got to college. I wanted to pick something that would challenge me and something that would sort of be left wide open. I feel like science can never end and that was a huge draw for me. It was something I could get into and move towards making a difference and I would never be too late.</p>	<p>Steve interview shot</p> <p>CU of box of slides CU of slide on microscope</p> <p>Steve at microscope Steve interview shot</p>
<p>NARRATOR: An interest in science and discovery led Steve to consider research.</p>	<p>Steve walking into Fridley lab</p>
<p>STEVE: Research was a product of what I was learning in science. Maybe even what I wasn't learning. And not because of bad professors or bad text books, that wasn't the case at all. It's just the things that I am studying now really haven't been learned yet. They haven't been documented, they haven't</p>	<p>Pan of lab</p> <p>MCU of Steve at computer</p>

<p>been explored. So I wanted the opportunity to go out and figure out something on my own</p>	<p>Steve interview shot</p>
<p>NARRATOR: Steve's research project grew out of his intrinsic love of plants and nature. As a child, his parents encouraged him to play outside often and there he discovered a passion for plants.</p>	<p>Shot of light through the trees</p> <p>Steve sitting on bench in Thornden Park</p>
<p>STEVE: I always had this fascination with plants in that you can watch a plant, much like anything else, but you can watch it grown and change over time. You can actually nurture it. And you can do that with animals, but I feel like there are so many plants and they are all right here and we don't know anything about them. Everybody gets so excited about the animals, but the plants are really fascinating. I mean, they turn sunlight into pure energy. It just, it seemed really fascinating to me.</p>	<p>Steve interview shot</p> <p>Pull out still photo of Steve taking pictures of plants</p> <p>CU of honeysuckle berries</p> <p>Still photo of Steve holding plant</p> <p>Butterfly on flower</p> <p>Panning still photo of Steve in fields</p> <p>Steve interview shot</p> <p>Panning up shot of trees in sunlight</p> <p>Steve interview shot</p>
<p>NARRATOR: This love of plants led Steve to discover a passion for ecology and a desire to study them in the lab. He designed a research project specifically targeting invasive plants.</p>	<p>Steve looking at dried plants in the lab</p> <p>CU of plant in hand</p>
<p>STEVE: Invasive plants are sort of an interesting topic to me because they're here and for some reason they're kicking out all the native species.</p>	<p>Steve interview shot</p>
<p>NARRATOR: This interest in studying invasive plants led Steve to Green Lakes Park in Fayetteville, New York after a professor suggested the location.</p>	<p>Panning up shot of path in Green Lakes park</p>
<p>STEVE: The project at Green Lakes Park really focused on two adjacent fields. There was an eastern field and a western field. Both were abandoned farming fields. The western field had</p>	<p>Steve interview shot</p> <p>Pull out still photo of Steve in between fields</p> <p>Panning shot of tree around fence</p>

<p>been abandoned slightly earlier than the eastern field.</p>	<p>Steve interview shot</p>
<p>NARRATOR: Steve noticed substantial differences among the two fields he had chosen to study and ultimately decided to explore the growth patterns of <i>Lonicera</i>, commonly known as honeysuckle.</p>	<p>Still photo of Steve in the field</p> <p>Panning shot of clear field</p> <p>Still photo of honeysuckle</p>
<p>STEVE: I focused mostly on honeysuckle because it was the most prevalent. And it was the largest difference between the two adjacent fields I was studying. And the western field was completely overrun with honeysuckle and the eastern field barely had any. And as far as I could tell there was no good reason as to why. I didn't see any reason why the eastern field shouldn't have had just as many honeysuckle as the western field if the only difference between them was a little bit of time. And it provided an easy question and an interesting question – Why would that be?</p>	<p>Honeysuckle still photo</p> <p>CU of honeysuckle berries</p> <p>MCU of honeysuckle berries</p> <p>Still photo of western field</p> <p>Dissolve to still photo of eastern field</p> <p>Steve interview shot</p> <p>Panning shot of western field</p> <p>Steve interview shot</p>
<p>NARRATOR: In order to study the differences between the eastern and western fields, Steve ran a 210 meter transect in between the two fields. At four points along that transect, each 50 meters apart, he ran additional 120 meter transects out into each field. Each side of the transects had 10 60 by 60 cm plots, for a total of 80 plots within both the eastern and western fields.</p>	<p>AE animation of field set up</p>
<p>STEVE: In each plot I took the total number of species composition, what percentage of cover gave to the ground so if you were to shine a light above the plot, how much shade would there be because of this plant and you give it a percentage value. I did that for every plant in every plot.</p>	<p>Steve working in the field with quadrant</p> <p>CU of quadrant going to ground</p> <p>Steve identifying plants in the quadrant</p> <p>Over the shoulder shot of Steve identifying plants</p>

<p>NARRATOR: Taking the total species composition and determining plant cover showed which plant had the most presence within each plot. Invasive species can grow quickly and produce big leaves that block sunlight availability to other plants, which can hinder plant growth.</p>	<p>Honeysuckle bush</p> <p>Panning up shot of large honeysuckle plant</p>
<p>NARRATOR: But in the fields of Green Lakes Park, Steve discovered a place of quiet mediation. A place for research, yes, but also an escape from the quick pace of the city nearby.</p>	<p>Wide shot of Steve looking at tree</p> <p>Steve climbing in the tree</p>
<p>STEVE: Green Lakes Park, it was a lot of fun this summer. It was nice because what I missed most about home was the opportunity to just go somewhere where there wasn't anyone. Moving to a city like Syracuse and a university like Syracuse, you're really surrounded by people all the time. Going out to Green Lakes Park was nice because I could go out there by myself and do work for hours on end. When the sun went down and the deer started coming up right past where I was working. They didn't see me so I could just sit there and watch them. After I did the 80th plot, I just sat in the middle of the field for about 45 minutes and I stood up and deer was staring me straight in the face, probably about 20 feet away. And it just walked up and it looked at me for a second and then it just kind of turned around and walked away like I wasn't even there. It kind of made me feel like I spent so much time at Green Lakes Park, it had been such a key place for me all summer, I just felt like I was part of the park.</p>	<p>Steve interview shot</p> <p>Steve walking up trail in Green Lakes Park</p> <p>Steve interview shot</p> <p>Pull out still photo of Steve in fields</p> <p>Panning shot of Steve working in the fields</p> <p>Deer looking at camera</p> <p>Steve interview shot</p> <p>Deer in the woods</p> <p>Steve interview shot</p> <p>Steve picking up quadrant and walking away</p>
<p>NARRATOR: Once the summer ended and the data was collected, Steve had to</p>	<p>Steve walking into Life Sciences Complex</p>

<p>leave the fields and return to the lab to analyze his data. But the lab sharply contrasted with the tranquility of Green Lakes Park.</p>	<p>Steve putting on gloves</p>
<p>STEVE: Spending time in the lab, for me, was definitely more difficult than spending time out in the field. I chose ecological research because I don't really care for lab time. I definitely prefer being outside and being in the field. But lab work is absolutely necessary if you are going to get any sort of conclusive results or statistical evidence.</p>	<p>Steve interview shot</p> <p>Steve sitting outside in Thornden Park</p>
<p>NARRATOR: Steve brought back several soil samples from the field, one sample taken from each plot. He wanted to test the soil's pH to determine the soil conditions in which honeysuckle thrives. He could then compare this information to the pH of soil in other parts of the field to see if honeysuckle could potentially grow there, as well.</p>	<p>Pull out shot of Steve's box of soil samples</p> <p>Shot of soil samples</p> <p>Steve weighing soil samples</p> <p>CU Steve weighing soil samples</p> <p>Steve moving to write results on paper</p>
<p>STEVE: To study the pH, in the lab, basically I took calcium chloride solution, poured it in each soil sample, I did two for each plot. So its 160 soil samples total. You shake them all up, let them sit for a while, let the soil settle to the bottom and then you use this fancy little pH meter and you stick it in the water and it gives you a reading. I did it two times for each sample. So that's 320 little dips. And then every 10 samples you have to re-calibrate the device-so you can assure you are getting consistent readings.</p>	<p>Steve interview shot</p> <p>Steve pouring calcium chloride into graduated cylinder</p> <p>CU of calcium chloride pouring into test tubes</p> <p>Steve shaking test tubes</p> <p>Steve using pH meter</p> <p>CU of pH meter in test tubes</p> <p>Steve looking down at pH meter readings</p> <p>Steve interview shot</p> <p>Zoom in shot of pH meter recalibration</p>
<p>NARRATOR: In the lab, Steve also had to identify many of the plants he encountered in the field. To identify these plants, Steve would examine the leaves, the stem or the stalk of each</p>	<p>CU of dried plant in newspaper in lab</p> <p>Steve looking at plant in lab</p>

<p>plant and find matching characteristics in plant classification manuals.</p>	<p>CU of plant book</p>
<p>STEVE: Plant identification is really important because in order to find out where the invaders were and what plants they were keeping out or allowing in, it was really important to know which plant was which. I didn't have a ton of ecological experience going into this project, so that was the biggest part of the beginning of my summer was learning all the plants. I walked around with a little flower guidebook and a little plant guidebook and if I didn't know something I either brought it back to the lab for further research or I would try to look at it in the field and figure it out there.</p>	<p>Steve interview shot</p> <p>Steve looking at book</p> <p>Steve looking at plant in lab, pressing in notebook</p>
<p>STEVE: The most difficult thing for me was finding the time during the academic year to get into the lab, to do the 160 soil samples, to get the pH for them, to do all the different things I had to do in the lab, to do the digital input and digitizing all the data. In the field I didn't have a computer, I wrote down everything and one of the big tasks I had to do when I got back to the lab was to put it all in the computer so it could be put through software programs. And the big thing for me about working in the lab, it is very tedious and time consuming. But at the same time, you know why you are doing it. You know why you are there and you just hope that all the hard work you put in leads to some sort of result.</p>	<p>Steve interview shot</p> <p>CU of Life Sciences Complex door, pull back to Steve walking out</p> <p>CU of soil samples in test tubes</p> <p>Dissolve to test tube rack full of test tubes</p> <p>Steve figuring out pH meter</p> <p>Steve interview shot</p> <p>Steve writing in the field</p> <p>CU of Steve typing</p> <p>Steve at computer with graphs</p> <p>Steve interview shot</p>
<p>NARRATOR: Unfortunately, Steve did not find the results he had anticipated. Nothing about the soil depth or pH between the fields seemed to have an impact on where honeysuckle occurred. These results, while surprising to Steve,</p>	<p>Panning shot of Green Lakes Park</p> <p>MCU of honeysuckle plant</p> <p>Steve weighing calcium chloride in lab</p>

<p>demonstrate the need for continuing research. Where one study might not succeed in its hypothesis, another question may be posed that leads scientists to the answer they were searching for.</p> <p>STEVE: When I first started this research project, I thought there was going to be a definite answer as to why there was honeysuckle in one field and not in the other. It seemed that there had to be some sort of scientific explanation and there is, I'm sure.</p> <p>NARRATOR: Many people would give up at such a disappointing conclusion to two years of work, yet even after finding inconclusive results in his original project, Steve is determined to investigate an underlying reason for honeysuckle growth in particular areas in Green Lakes Park.</p> <p>STEVE: There is still work being done in terms of my analysis that may lead to more conclusive results. Maybe there's not a difference between the east and the west field, but maybe there's something within that western field that encourages honeysuckle to grow in that one spot versus another and that's what I'm looking into now.</p> <p>NARRATOR: More research will be needed to fully understand this invasive specie. While these results aren't particularly exciting, they remind us that all research further defines what we know about this world and even the inconclusive results tell us something we previously did not know.</p> <p>STEVE: Most research doesn't have revolutionary results. The really solid research and ground-breaking research,</p>	<p>Steve interview shot</p> <p>Still shot of honeysuckle plant</p> <p>Still photo of Steve in field</p> <p>Steve working at computer in the lab</p> <p>Panning shot of fields in Green Lakes Park</p> <p>Shot of fields in Green Lakes Park</p> <p>Steve interview shot</p> <p>Panning shot of path in Green Lakes Park</p> <p>Steve interview shot</p> <p>Pull out shot of honeysuckle plant</p> <p>Still photo of honeysuckle flower</p> <p>Still photo of Steve walking in the fields</p> <p>Steve interview shot</p>
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is what everyone really hears about, but there are hundreds of thousands, probably millions of projects going on all around the world that nobody's ever heard of outside of the community that's doing that research. And these are things that are also very important and applicable to daily life. Research is going on everywhere all the time that may not lead to conclusive results. I've been told by many professors that no result is a result. You just have to figure out why you didn't get what you expected. There's a reason for everything and that's what really drives research forward and keeps it going.

NARRATOR: Steve's personal research not only allowed him to engage in a project involving a subject he was deeply passionate about, it also reaffirmed his beliefs that research is undeniably necessary.

STEVE: Research is important because if people stop doing research then we stop learning. And that's not even only biology, that's everything. If we stop doing medical research, then people stop living longer, people stop getting better. If we stop doing biological or chemical or physical research, then we stop learning about the world we live in. If that happens, it would make for a very sad world. There would be all these things, that we never understood, and could never understand if there was no research. So, it's important for us living our day to day lives. So many things we have, in fact, probably most things we have and we know are because of research and without it, I'd hate to think of where we would be.

Steve writing in the lab

Steve interview shot

FADE TO BLACK

ADDITIONAL FEATURES TRANSCRIPT – INVASIVE PLANTS

AUDIO	VIDEO
<p>NARRATOR: Invasive plants compete with native species. Many times they are better at getting sunlight or nutrients from the soil. Sometimes they are actually shade tolerant, meaning they can grow in limited amounts of sunlight, something many native plants are unable to do. These capabilities make it possible for invasive species to infiltrate and take over an environment, sometimes causing native species to become extinct.</p> <p>STEVE: And the most threatening thing about invasive species is that they really, they threaten the integrity of natural ecosystems. And they really lower biodiversity on a global scale. If invaders take over, all over, throughout the world, if the same invaders do it, you may increase biodiversity on a very local level because now at Green Lakes Park, it didn't have honeysuckle before, now it has honeysuckle, in addition to everything it had before. But if that happens everywhere, you really lower the biodiversity of the entire globe and that could have ecological effects, in sort of a domino effect.</p>	<p>Still photo of goldenrod Honeysuckle berries Still photo of honeysuckle flower Panning shot of Green Lakes Park vegetation Still photo of honeysuckle bush Still photo of eastern field</p> <p>Steve interview shot</p> <p>FADE TO BLACK</p>

ADDITIONAL FEATURES TRANSCRIPT – HOW RESEARCH BEGINS

AUDIO	VIDEO
<p>NARRATOR: A research project is no easy task. It requires discipline, hard work and a burning curiosity that can not be satisfied by any other means.</p> <p>STEVE: It starts as somebody making an observation and saying “How does that work? Why does that happen? Where does that occur? Where does it take place?” Or, “Why not?” or any number of questions. But it usually starts as an observation. And as you seek an answer to that observation, it can’t be helped that questions keep arising surrounding that research. You know, you may observe and find that something happens, but you may one to know what that happens. So through one research question, several others can be raised. And I’ve noticed that with my research, so it’s really great because it’s self-perpetuating and it’s an on-going discipline that really has no foreseeable end.</p>	<p>Still shot of Steve at microscope Still shot of Steve in the fields Still shot of Steve weighing soil samples</p> <p>Steve interview shot</p> <p>FADE TO BLACK</p>

ADDITIONAL FEATURES TRANSCRIPT – RESEARCH CREATIVITY

AUDIO	VIDEO
<p>NARRATOR: The tedious nature of research leads some to dismiss it as a completely methodical discipline lacking originality. While certain techniques are used repeatedly and processes revisited while researching, Steve believes that research possesses a certain kind creativity.</p> <p>STEVE: I think that research itself is a creative process. I mean, it just makes sense. Sure some of the things that people do and some of the skills you use in the lab are consistent because that's what works, but scientists do take what they know and apply it in creative ways and I think the same thing goes for even the creative field. I mean, in the creative field, in the media, things like that, people don't, every single thing is not a new idea. A lot of times it's a new spin, it's a new twist on an existing idea. It's a new way to look at something that is already there. And that's, for me at least, that's essentially what research is. It's a new way to do something because if you do it the old way, then it can be boring, then it can be old. Just like the media, research has things that are fresh and new and sexy. It's just not as visible to the general public.</p>	<p>Steve working in the lab</p> <p>Steve interview shot</p> <p>FADE TO BLACK</p>

WRITTEN SUMMARY

Description

The idea for this film stemmed from the desire to explore scientific communication. I set out to create a documentary on university research being conducted by a peer because I was interested in the concept of research that usually goes unheard of by the general public. All research contributes to scientific discovery, but sometimes each study results in only a small advancing step. The research I followed did not have a ground-breaking result and I was inspired to create a film centering on that seemingly uninteresting concept. Research is a slow, methodical process that can end in completely unexpected results, but those undesired outcomes can actually enable scientists to have a greater understanding of our world. My intent was to draw focus to research that may not have a revolutionary outcome and likewise show how such research does have an essential purpose. I also wanted to focus on the underlying motivation a person must possess in order to create and follow through with a research project. The people involved in such studies are drawn to research for all kinds of reasons and I wanted to do a profile on one such individual.

The Process

For over a year and half I followed Steve Maheux through his research. I observed the initial stages of his project where he studied scientific papers on invasive plants to gain knowledge not only of what other studies had been done,

but also to find direction for his own project. Likewise, I read papers to immerse myself in the language of the research and to learn about invasive plants, biodiversity and other studies related to conservation efforts. I watched as Steve decided to study the invasive species *Lonicera* (honeysuckle) and determined which question he sought to answer with his research.

Steve decided to study two abandoned farm fields in Green Lakes State Park in Fayetteville, New York after observing the plethora of honeysuckle in one field and the absence of the invader in the other. Since the fields were abandoned only a few years apart, he hypothesized that the variance in honeysuckle occurrence could be attributed to differences in soil depth between the two fields. I filmed Steve measuring soil depths and calculating plant cover within pre-determined transects in the fields. I also captured his analytical work in the lab, including plant identification and soil pH testing. These factors determine the environmental conditions honeysuckle thrives in and which native plants honeysuckle was living among. These features also determine the differences between the eastern and western fields in the park, something that came into play when Steve decided to concentrate on only one field later in the research study. In the end, Steve's research led only to the fact that more research was necessary in order to understand honeysuckle's presence in one field over the other. The hypothesis he went into the project with, soil depth predicting where honeysuckle would grow, resulted in not being the determining factor in honeysuckle growth or spread.

Throughout the project, I would talk to Steve about both his progress and the process of his study. I was able to catch moments of uncertainty and determination at times as Steve was learning new methods, research techniques and biology itself during his research project. My personal goal was to capture every facet of the research project in order to show the viewers what research truly encompasses and how such research is vital to all studies in the scientific community.

Once the research was completed and the data was analyzed, I interviewed Steve for his reflections on the whole procedure. I wanted to hear about how he changed and grew over the course of the study and what the project taught him about his own motivations and passions. It was interesting to hear him speak of what he knew going into the project, his expectations and the questions he wrestled with, as opposed to the knowledge with which he now leaves this project. The questions he sought to study certainly were not explicitly answered and ironically enough, led to more questions. This perfectly demonstrates the self-perpetuating nature of science that Steve often spoke of and experienced.

While the hard science of the project was definitely important to film, my intent was also to capture the person behind the research. People are not drawn to research because they relish the idea of a life of tedium. For Steve, his desire to research plants stemmed from his intrinsic love of nature and plants. Working in the fields proved to be almost meditative to him and even after working in them

all day, he would still stay to watch the sunset because he loved being lost in that world. With documentaries, the true story grows, almost organically, throughout the filmmaking process. The individual behind the research became my story. The goal when editing the piece was to weave the human story alongside the research itself to show how each step in the research project had a greater impact than just on the scientific community.

Significance

Overall, this project brings together both my majors in one cohesive entity. It represents the fine balance between art and science, while also highlighting how they are both simultaneously alike and dissimilar. Many of the disciplines acquired in research are present in film production. Likewise, the tedious nature of filmmaking is ever present in a research study. Mainly, I endeavored to explain a research study in a more personable way – something intended to be more palatable to a less science-oriented audience.

This film is significant, not only in the light that it is one of the few films I have encountered that focuses on the true process of research, but also because it draws attention to undergraduate research at Syracuse University. The students at this university are both fortunate enough and talented enough to be able to create their own projects or work on other professors' research projects throughout their undergraduate career. I feel their efforts should be publicized in some way.