**Maple Scholars Projects for Summer 2018**

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Latino Students on SST

**Maple Scholars Proposal for Summer 2018**

**The Experience of Latino Students on SST**

**Jan Bender Shetler, Department of History**

**Description:**

The 50th Anniversary of SST gives the Goshen College community the opportunity to both celebrate the program as well as to evaluate and look toward the future. One of the biggest changes on GC’s campus since 1968 is that about a quarter of our students are now Latino. Some of them are first, second or even third generation immigrants from Latin America, including a number of DACA or undocumented students. Because our Latino students already come with cross-cultural experience in a white majority school and community their experience on SST is different than majority students. In addition, a larger percentage of Latino students opt for the SST alternative instead of the international semester because of immigration status, family obligations or not seeing the benefits of the program. Clearly the SST program, as well as the on-campus alternative, has to better meet the particular needs of Latino students. Perhaps it means doing better at explaining the goals and benefits of the program, orienting students better, working more deliberately with SST leaders to take into consideration the Latino experience, or helping students reflect after they return and making the most of it in their opportunities going forward. The first step in that evaluation process is to interview to a variety of current Latino students and alums who have been on SST to find out about their experience: before, during and after. Why did they choose to go or not, what was their SST experience like, how was it different from majority students, how has it benefited or affected them after? Student and faculty together will design the interview questions, identify students and carry out the interviews. An important component of the research will also be talking to Latino students who did not choose to go on SST and find out what their experience was like in comparison. Interviews will be transcribed and coded for qualitative analysis. From these interviews we hope to build a set of observations and perhaps recommendations for the GC community.

**Background expected:**

The student should have some background in the Social Sciences and/or Humanities (History, PJCS, BRP, Sociology, Psychology, English) and preferably in qualitative research methods, but this can be taught. Ideally the student would be Latino/a and with experience on SST. But more than anything the student should have a warm personality that will facilitate good interviews, be conscientious, self-disciplined, detail-oriented and curious.

**Anticipated Results:**

I hope to complete at least 25 interviews, as well as have most of the them transcribed and coded by the end of the session. We would be able to produce at least some preliminary observations and recommendations.

**Agreement with Mentor Responsibilities**

I will be available for regular meetings with the student and attendance at the Friday session.

Maple Scholars Faculty Proposal (Summer 2018)

SST Storytelling Project

Duane Stoltzfus

Communication Department

*Description*:

Goshen College is preparing for a yearlong celebration of the 50th anniversary of Study-Service Term, which began in the fall of 1968, when 52 students stepped onto Greyhound buses bound for Miami. There, they boarded planes for Guadeloupe, Jamaica, and Costa Rica. Since then, nearly 8,000 students have participated in the program, going to Belize, Cambodia, China, Costa Rica, Cuba, Dominican Republic, Haiti, Honduras, Indonesia, Nicaragua, Peru, South Korea, Tanzania, and other countries. In the early years, Goshen College was a pioneer in sending students to live abroad. Since then, many college and universities have added international education to the curriculum. Unlike most schools, though, Goshen College favors developing countries; deep immersion, in which students live with host families for their entire stay; and service combined with study.

Beginning in the fall, the college anticipates a series of events related to SST, recognizing, among other things, the many ways in which these thousands of participants and the college itself have been shaped through this study abroad program. The events may include academic conferences, musical performances, art displays, theater shows, reunions – and storytelling. This research project is intended to gather stories on video from a diverse group of SSTers. We’ll look for diversity in ages of participants, in countries represented, in experiences shared.

Participants will be invited to share digital story submissions of several minutes. Sometimes that story may simply be a powerful memory that stands alone. More often, we’ll look for meaning and connections that have become apparent, if only with the passage of time. We’ll be especially interested in knowing about the impact that SST had on them personally or professionally or on their communities. Some storytellers may talk about how SST enhanced their careers or redirected their path; others may share about relationships formed abroad that have continued to this day or about a journal entry or letter that remains a keepsake.

The student collaborator will help to shape the research project. Together, we will consider how best to solicit stories from around the country, if not the world; what the criteria for stories should be; how to create stories with depth; how to include visual aids; and how best to frame the stories for most effective sharing.

*Background expected*:

The ideal student candidate and collaborator will have a keen interest in the subject – that is, hearing stories about SST experiences from across the years. The candidate should have participated in SST or have plans to do so. The candidate should also have at least some experience in digital design or video production, or both, and a willingness to learn.

*Anticipated results*:

By the end of the summer, we would expect to have:

* dozens of stories that reflect the breadth, depth and variety of SST experiences
* a site for sharing those digital stories online
* plans to share some of the stories at an event on campus

*Agreement with mentor responsibilities*:

I agree to serve as a mentor for a Maple Scholar student. I will be present throughout most of the summer and available to meet at least several times a week. At the start of the summer we’ll set a schedule. I expect the student collaborator to put in full-time work on the project for the duration of the eight weeks. I may be away for a week or so but will prepare the student to carry on independently during that time.

WGCS 60th Anniversary

**Maple Scholars Proposal for Summer 2017**

**An Oral History of WGCS Radio**

**Jason Samuel, Communication Department**

**Description:**

BACKGROUND

Goshen College’s radio station, WGCS, was granted its license for operation on October 2, 1958. It has been an integral part of campus and Goshen community for six decades. WGCS serves the greater community with a distinctive radio voice. WGCS also serves Goshen College by providing an on-air product that supports the college’s core values, programs, and mission.

WGCS, colloquially known as 91.1 The Globe, has achieved unprecedented success on the state and national levels. The radio station has been named “College Radio Station of the Year” four times (2012-14, 2016) by the Indiana Association of School Broadcasters, “Radio Station of the Year” (2013) by the Indiana Broadcasters Association, “Best College Radio Station in the Nation” twice (2011 and 2013) by the Intercollegiate Broadcasting System, and the Broadcast Education Association’s “Signature Station” in 2017. In addition, Goshen College students have received over 300 individual awards at state and national competitions.

Along with the success of the radio station there are several hundred heartwarming and historically relevant stories that have contributed to the formation, growth, and overall success of WGCS. Radio station listenership continues to increase as do fundraising dollars and overall impact to the community it serves. This success and popularity is a valuable component of Goshen College history and should be documented and celebrated in a scholarly manner.

PROJECT SCOPE

I am proposing for this summer to research and create a series of audio stories that can stand alone as two-minute vignettes and also be linked together as one long form audio documentary between 48 and 58 minutes in length. The programs will detail the creation, evolution and success of WGCS. Those who had a direct impact on the day-to-day operations will be interviewed. Stories spanning the past 60 years will include content from key stakeholders on campus and from larger Goshen community. We will research history and milestone events prior to the summer and choose stories that uniquely relate to the WGCS historical record.

UNIQUE CREATIVE OPPORTUNITY

This project will highlight untold stories deep within the history of WGCS in a comprehensive manner that is scholarly and entertaining. Hundreds of Goshen College alumni and friends have contributed to this rich history. We will give them a voice, both individual and collective.

**Background expected:**

The Maple Scholar student would need to meet the following requirements: (1) Have taken two or more of the following courses: Intro to Radio, Radio Operations, Writing for Media, Digital Design, Principles of Public Relations (2) Be at least a second-year student (3) Have interest in broadcast journalism, public relations or marketing, and story telling (4) Ability to work well in group settings and be self motivated (5) Have a US driver’s license.

**Anticipated Results:**

SCHOLARLY BENEFIT

The discipline of journalism has seen tremendous changes and shifts in the last decade. That said WGCS and the broadcasting industry are still important communication platforms to Goshen College and the greater community. We would like to answer a few questions such as:

1. What are the unique untold stories from the WGCS history?
2. Who are the people and what were their roles in shaping the station over the years?
3. How will we make these stories interesting to our audience and valuable to the college?
4. How do we link a series of audio stories that form a relevant and reflective timeline?

INTERDISCIPLINARY BENEFITS

This project will give both the professor and the student interdisciplinary experiences within the field of Communication. The power of story is a valuable tool in many disciplines. Opportunities to use one area of study in another are always encouraged in our field because they all relate to each other. The student and professor will have a finished project that could be adapted to other media. This will be the first audio timeline to chronicle the WGCS story.

STUDENT BENEFIT

In addition to many of the benefits already mentioned, the student will practically implement theories learned in department courses. Our media student will also leave the project with portfolio material to use for future employment or internships.

GOSHEN COLLEGE BENEFIT

Goshen College will gain more community and public relations exposure as the stories are aired for broadcast on WGCS in the fall with a special event to be held during Homecoming Weekend in October 2018. The timing is also significant due to the original airdate of October 2, 1958. It is also possible that the stories would be made available on the Goshen College website for future on-demand listening and copies could be stored in the Mennonite Historical Library.

**Agreement with Mentor Responsibilities**

I agree to carry out the responsibilities laid out in the Faculty Proposal Guidelines. I will also meet with the student at various points of the week’s assignment to guide the planning phase, interview/production phase, and the post-production phase. In addition, I will meet with the student to evaluate their work and examine aspects of the processes.

PROJECT EXPECTATIONS

The student is expected to have a completed documentary and accompanying visual aids by the end of the Maple Scholars term. This includes all research, production, and post-production.

PROJECT FEASIBILITY

Each week will be structured with clear target goals in order to keep the research and project goals on time. A list of potential interview candidates and basic storyline will be constructed prior to the start of the eight-week Maple Scholars session in order to have a strong foundation and clear direction for student and research project. A strong story and structure will assist in workflow and maintain direction while allowing for edits and adjustments to timeline and structure. The expectation would be for the student to work 34 hours each week on the assigned research project. Most tasks would be able to be completed during normal weekday business hours but some tasks may require occasional weekend and evening commitments based on interview schedules and calendar appointments.

**Community Clean Water Project**

**Maple Scholars Proposal 2018**

**Citizen Science as a model to both gather data and educate the public**

**Ryan Sensenig,Professor of Biological & Environmental Science, ES Program Director**

**Jeanette L. Shown, Associate Professor of Computing Science, Math Department**

Description

The collaboration between biological and environmental science and computing science strives to create a fulling functioning, real-time engaging website that is updated with weekly samples from the Elkhart River. This website will also allow the user to dig deeper into the data and look for temporal trends. The website would also discuss the ecology of the Elkhart river and educate students and citizens of Elkhart County on how to interpret the data.

From a computing science perspective the Maple Scholar will learn how to program an interface for the daily upload for the data, and then program and embed the programming for the website that will allow visitors to explore the data and learn how to understand it and be able to become educated on the ecology of the Elkhart river.

Background expected:

Computing Science : Programming I and some web development, programming with servers and an interest in environmental science.

Anticipated Results:

A fully functional database that is easy to port over data gathered by Goshen College students and is made visually and physically accessible to the Elkhart community. The Maple Scholar will have learned about:

1. Important environmental aspect of water quality and measurement
2. Creating a database to port data into on the server side
3. Creating a web environment which serves the data in a downloadable usable format
4. Developing a website which visualizes data in an educational framework

Agreement With Mentor Responsibilities

Ryan Sensenig and Jeanette Shown will fully comply with the requirements for Mentor Responsiblities.

**Game Theory**

**Maple Scholars Proposal for Summer 2018**

**Game Theoretic Models of Power, Cooperation, and Fair Allocation**

**David Housman, Mathematics**

**Description:**

The first veto by a United States President was against a bill apportioning congressional representatives to states. The United Nations Security Council passes measures by simple majority but five permanent members can veto any measure. Some European parliaments have representatives assigned based on votes for a political party. Some New York State county councils have members with weighted votes because they represent different numbers of constituents. How can voting power be defined and distributed fairly in these types of situations? After each decennial census, states must create districts of roughly equal population sizes for each representative. How can states avoid political gerrymandering of district boundaries?

Under what circumstances will self-interested individuals cooperate with other self-interested individuals? This is a central question underlying attempts by scholars to understand how cooperative behavior has evolved in humans and other organisms. One model that has been extensively studied has been repeated play of the two-player Prisoners’ Dilemma game. How can this work be extended to other situations and more players?

By collaborating, several cities can save money on upgrading their water treatment facilities. What is a fair way of allocating the savings? Several people have inherited an estate, but they differ in their opinions about the worth of each item in the estate. What is a fair way of allocating the estate? Different sportswriters have different rankings for college football teams. What is a fair way of melding these different opinions into a single ranking? In these situations, do the agents involved have incentives for stating their true costs, valuations, or rankings?

Game theory is the mathematical study of situations of conflict and/or cooperation. In this research, students develop a mathematical model of a situation, define fairness properties or rules of engagement, suggest solution concepts, determine solutions for their specific situation, and/or provide appropriate interpretations. Students may extend, modify, or rely on previous work done by students or results found in the mathematics, economics, biology, and political science literature, or students may begin with a totally new situation, model, properties, rules, or methods.

**Background Expected:**

A student participant should have the ability to read, critique, and write mathematical proofs. For some research areas, the student participant should have the ability to write computer programs to explore possibilities. Knowledge of an application area of interest would be beneficial.

**Anticipated Results:**

Development of new mathematical results communicated via a written report, which may be submitted to a journal for publication, and an oral presentation at one or more professional meetings.

**Agreement with Mentor Responsibilities:**

(a) Agreement: I agree to carry out the responsibilities of a Maple Scholars mentor as described in the proposal guidelines.

(b) Description of my intended interaction with students: During the first week of the summer, I typically meet with my students a few hours each day to explore possible research problems and approaches. Before the student’s first seminar presentation, I require the student to present to me and I provide feedback for improvement. During the remainder of the summer, I am available to meet with my students almost daily and we negotiate how often we will definitely meet. I have had students who wish to meet for one to two hours daily for the entire program and some students who I have met with for a couple of hours each week. I have been able to take my students to one or two mathematics or game theory conferences during the summer where they have been able to present their work and interact with other faculty and students having a more narrow disciplinary focus.

(c) My expectations for students: Mathematics involves a mixture of divergent and convergent thinking. Some of the most important ideas occur while taking a shower or hiking through the woods. So, I am fairly flexible about when and where students work; however, I do expect full-time effort: 40-plus hours per week and no other major time commitments. If possible, I expect students to participate in one or more professional meetings where they can present their results.

**Additional Information:**

I have mentored over seventy undergraduate students in summer and/or academic year research (see list at http://www2.goshen.edu/~dhousman/ugresearch/ugresearch\_complete.htm). Gina Richard, a Maple Scholar in 2008, won an award at Math Fest, the national summer meeting of the Mathematical Association of America, for a presentation of her research. Seth Unruh, a Maple Scholar in 2009, published "Envy-Free Divisions" in the *Rose-Hulman Undergraduate Math Journal*, Vol. 10, Issue 2, 2009, which can be accessed at <http://www.rose-hulman.edu/mathjournal/>. Several of my students have been selected by their peers to be the public presenters during the Maple Scholars Celebration.

The summer of 2017 was an ideal version of what can happen during the Maple Scholars program. Christian Bechler and Kenan Bitikofer found a draft paper written in 2016 which claimed to have solved a long-standing problem in “cake cutting.” Aziz and Mackenzie claimed to have devised an algorithm that used a bounded number of steps to ensure that any number of people share a cake in an envy free manner. Christian and Kenan implemented and tested parts of the Aziz and Mackenzie algorithm. What appeared at first to be bugs in their code turned out to be a flaw in the algorithm and proof provided by Aziz and Mackenzie. Christian and Kenan finished the summer by constructing a five person example in which the Aziz and Mackenzie algorithm would stop before completion. Upon receipt of the Bechler and Bitikofer paper, Aziz and Mackenzie responded with a revised paper they claim addresses the difficulty.

**Maple Scholars Proposal for Summer 2018**

**Religious Socialism**

**Justin Heinzekehr, IR/Bible & Religion**

**Description:**

Pew Research data has shown a new openness among millennials to the term “socialism,” which for decades has been castigated in U.S. politics as the root of all evil. In its current manifestation, the Cold War ideas of Marx and Mao have given way to the language of the 99% and the 1%. Many younger voters in the United States are now finding in this movement a platform to express deeply held social and moral values. Although socialism has traditionally been branded an anti-religious movement, we should recognize this “new socialism” as part of a religious trajectory with roots in early and monastic Christianity, the Radical Reformation, Social Gospel, and other communitarian movements. The history of religious socialism casts new light on a number of the central themes in contemporary discourse.

This proposal provides an opportunity for a student researcher to collaborate on a book project tracing the religious roots of social thought in the United States. The book is tentatively entitled *Religious Socialism*, and will be co-authored by Justin Heinzekehr and Philip Clayton, Ingraham Professor of Theology at Claremont School of Theology.[[1]](#footnote-1) The book will trace the new socialist movement back to its biblical sources, explore intriguing alliances between secular and religious socialism in the last two centuries, and conclude with the Occupy Movement and its impact on the Bernie Sanders presidential campaign.

Student research may cover such topics as:

* Elements of social/communitarian thought in the New Testament.
* Justification for sharing of goods in monastic or Radical Reformation communities
* Connections between religious values and secular justice in American communitarian movements (Social Gospel, Catholic Worker, etc.)
* Religious or quasi-religious rhetoric of Occupy, Black Lives Matter, and/or Bernie Sanders’ campaign

The student will also help to organize research material, help to identify themes and structure for chapters, and collaborate in the writing and editing process.

**Background expected:**

A successful student collaborator will have research experience and interest in a related field (religion, history, PJCS, etc.). Preference will be given to juniors and seniors who have demonstrated excellent research and writing skills.

**Anticipated Results:**

By the end of the Maple Scholars project, our goal is to complete the research phase of the book, outline all chapters in detail, and draft a portion of the text. We anticipate publishing the book by spring of 2019. In the event that the book is published, the student researcher will be credited for his or her involvement.

**Agreement with Mentor Responsibilities**

I have read the Maple Scholars Mentor Responsibilities and agree to fulfill the responsibilities outlined in that document. I agree to meet with the student on a daily basis and to provide clear expectations for the student’s work. Dr. Clayton will also provide periodic feedback and direction as a co-author, which will give the student further exposure to “real-life” academic collaboration. Research would be subdivided by chapter so that topics are focused and limited by a specific deadline. I expect the student to work approximately 40 hours per week, most of which would occur during regular business hours (8 am to 5 pm).

Goshen Spotlight

**Maple Scholars Proposal for Summer 2018**

**Goshen Spotlight Documentary: The Goshen Schindler’s List**

**Kyle Hufford, Communication Department**

**Description:**

BACKGROUND

The last five years the Goshen Spotlight project has provided students opportunities to not only explore their own discipline but experience a variety of disciplines across the college. This project has also provided a service and benefit to our local community.

Over the last five years we have learned what works and what doesn’t in our process to capture these stories. In 2015 we expanded our scope and diversity within our community to reach areas we had not before. The last two years we took a whole new approach to this project by creating new educational opportunities through a long format documentary that has had lasting power beyond Maple Scholars’ summer term.

One fact remains over the course of the projects, there are an endless amount of heartwarming and intriguing stories in Goshen.

PROJECT SCOPE

In 2017 we embarked on a documentary project to tell the story of a Goshen Jewish family who saved over 13 families from the Holocaust. This documentary project proved to be too daunting to do over the course of two months. As we discovered more aspects of the story it became evident more research was going to be required to do the story justice. The Holocaust was one of the most horrific moments in our human history and we want to be sensitive to this topic and give it the time and effort it deserves. We also want to tell the story about how Goshen was connected in a small way to this historical tragic event.

I have taken this project on as a professional project. I will be working on it leading up to the summer and continuing the work that was done last summer.

A long form documentary will allow the student to focus on one topic for the summer term and be immersed in the research and telling of a singular story. The length of the documentary will be between 20 and 40 minutes.

UNIQUE CREATIVE OPPORTUNITY

Local news outlets like Goshen News and the local TV stations are good at representing the current news of the day. However, they don't always have the resources or interest in covering the stories of our community. This project would attempt to highlight a story that few have heard before and at the same time contribute to the discipline of documentary storytelling. No other organization is creating long form video packages focused on our local Goshen community.

**Background expected:**

The Maple Scholar student would need to meet the following requirements: (1) Have taken DMP I & II or the transferred credit equivalence. (2) Be at least a second year student. (3) Have interest in journalism and story telling (4) Ability to work well with others in group settings and also be a self motivator. (5) Have a US drivers license.

**Anticipated Results:**

SCHOLARLY BENEFIT

The discipline of journalism has seen tremendous changes and shifts in the last 10 years. Goshen Commons itself is an effort to provide a different kind of journalism in an alternative format. Convergence is becoming more and more important in the field of communication. We would like to answer a few questions such as;

1. What unique untold stories are in our community?
2. Why have these stories not been told?
3. What about these stories will relate to an audience?
4. How do we tell a story that connects and is interesting?

INTERDISCIPLINARY BENEFITS

This project will give both the professor and the student interdisciplinary experiences within the field of Communication. Opportunities to use one area of study in another are always encouraged in our field because they all relate to each other so well.

The major interdisciplinary benefit is the research and qualitative study that goes into every story. As we saw in past years, for every story gathered there is an opportunity for the student to learn and research a topic they never approached before. Their work educates the public on their story’s topic.

STUDENT BENEFIT

In addition to a lot of the benefits already mentioned the student would get to practically implement theories learned in classes. Our media student will also leave the project with portfolio material to use for jobs or internships.

GOSHEN COLLEGE BENEFIT

Goshen College will gain more community exposure and good PR as Goshen Commons becomes more popular. It is also possible that if a process is developed and in place for Goshen Commons to have video content that this can be continued after this project is over.

**Agreement with Mentor Responsibilities**

I agree to carry out the responsibilities laid out in the Faculty Proposal Guidelines. I will also meet with the student at various points of the week’s assignment to help them in the pre-production planning phase, the production phase and the post production process phase. In addition to this I will be meeting with the student to evaluate their work and how the processes can be improved.

PROJECT EXPECTATIONS

The student is expected to work with the professor for 35-40hrs a week. Be self motivated. Perform assigned tasks in a timely and professional manner. This includes all research, production, post production and audio. Ability to manage time and projects is a must.

PROJECT FEASIBILITY

Each week will have goals and milestones to hit in order to complete the project in time. A full story outline will be finished prior to the start of Maple Scholars. Some filming and research will also be finished before June. This gives us time during the week to implement an evaluation process so we can improve on our workflow and style. Expectation would be 30hrs a week on the assigned video. Some of this time is going to be in the evenings and weekends.

Artificial Intelligence Meets the Graphic Novel

**Maple Scholars Proposal for Summer 2018**

**Creating an Interactive, Intelligent Graphic Novel, Using Tools from AI and Visual, Literary Analysis**

**Jessica Baldanzi, English**

**Jeanette Shown, Math and Computing Science**

**Description**

The project is a mash up of the rise of the graphic novel, with its increased focus on visual literacy, and the evolving technology of Machine Learning and Artificial Intelligence.

We have novels that engage us, and continue that engagement over many years. We have computer games that use “dumb” AI to interact with players, or react to the player's choices in scenarios.

We are now also beginning to have comics and graphic novels that “speak back” to us in increasingly complicated ways, engaging readers beyond our traditional understanding of reading. We’re interested in exploring the ways that the very personal relationship of the reader, book, and author can be heightened through a computer-enabled interaction.

Comics and graphic novels are a central and fast-developing and form of media in our culture, and an increasing emphasis on the visual makes them an even more powerful cultural influence. The new Ms. Marvel, for example, a Pakistani-American teen named Kamala Khan, enacts a very familiar story of a teen trying to juggle family, school, and her social life. Given our current culture’s continuing gender inequalities and religious polarization, a figure such as Khan has a unique potential to engage readers, especially young readers, and accomplish educational goals, as well as an interest in and compassion for people different than them.

How can we use AI to increase this already strong educational potential? How does this enhanced reader-content interaction change literature, and how does it likewise change the purpose and nature of AI?

This summer, we will explore the junction of both fields. Learn about literature of graphic novels and the intersection of AI by creating your own enhanced novel.

**Background expected**

Computer Programming side: Programming I and willingness to learn AI. English: Basic familiarity with comics and graphic novels and some creative writing background required. Engl 235 The Graphic Novel and/or at least one GC Creative Writing course preferred, but not required. Our ideal would be two students, one with programming expertise, and one who has taken English 235, The Graphic Novel.

**Anticipated Results**

A short graphic novel with AI enhancements, which could be published online from the Goshen College website.

**Agreement with Mentor Responsibilities**

Between the two of us, we agree to carry out the mentor responsibilities. (Jessica will be in and out of town over the summer, but will remain e-accessible except for travel days.) This type of project requires close collaboration in the early weeks, with bi-weekly check-ins later in the project as students complete their work. Students should expect to put in full eight-hour weekdays to complete the project.

Animation

**Maple Scholars Proposal for Summer 2018**

**Exploring Basic 2-D & 3-D Animation**

**Randy Horst | Art Department**

**Description**

Two years ago, Stop-Motion Animation was the focus of my Maple Scholars project toward the goal of introducing it as project in my Figure Drawing class. The result was the successful inclusion of Stop-Motion into my 2017 Figure Drawing class. The following proposal continues that move toward adding new animation media to Goshen College.

The Art and Computer Science and Information Technology departments are in the process of proposing a new multi-discipline-based Game Development minor. An important component of that program will
be a new Animation course strategically placed between traditional introductory classes in Drawing and Figure Drawing and the Computer Science and Information Technology Game Development classes.
This Maple Scholars project focuses on exploring 2-D and 3-D animation software and processes in preparation for that Animation class. Many art departments now offer Animation courses and we continue to get inquiries about such a course from prospective students.

I am proposing a Maple Scholar project where a student and myself would explore the current software, hardware, and production options for creating 2-D and 3-D animations. The long-term goal is to create an Animation class that serves the Game Development minor, but also functions as a stand-alone course for students interested in digital animation. The computer lab in VA22 already offers a studio and hardware resources necessary to make animation a new feature of our program.

The student will spend approximately the first third of the project familiarizing themselves with examples and features of 2-D animation. They will spend the second third of the project familiarizing themselves with examples and features of 3-D animation. The student will spend the last third of the project creating an animation toward a goal of their own choosing (ex., a stand-alone narrative animation, animation toward computer game development, etc.). Additional issues may include exploring the appropriate process and steps for developing animation concepts and storyboards.

**Background Expected**

This project is suitable for current sophomore, junior, or senior students interested in exploring 2-D and 3-D animation. The student should have some experience with vector and pixel-based digital media (such as Illustrator and Photoshop) and/or experience with digital video. The ideal student will also have some traditional studio training in drawing or painting.

**Anticipated Results**

The student will be researching 2-D and 3-D animation and selecting the most cost-effective and production-effective method appropriate for Goshen College students and art classes. This information will be shared during the weekly colloquia meetings. Once methods have been explored, the student will create at least one 2-D or 3-D animation guided by their research as well as trial and error. Progress on creating this/these animations will also be shared at the weekly colloquia meetings. The completed animation will be shared at the program finale activities.

**Agreement with Mentor Responsibilities**

I agree to carry out the responsibilities of a Maple Scholar Professor. I anticipate establishing two to three weekly meetings with the student depending upon their progress and needs. Activities may also include collaborative efforts in creating a 2-D and 3-D Animation. I expect the student to average around 30 hours a week on the project activities outlined above. Maple Scholar supply/equipment funds assigned to the project may be used to purchase software/apps as needed by the student for the completion of their 2-D/3-D Animation research and final project. Workspace for the student will be available in the Visual Arts VA22 Computer Lab.

Air Quality

**Maple Scholars Proposal for Summer 2018**

**TRAQR Traveling Air Quality Recorder**

**John Buschert, Physics Department**

**Description:**

Air quality in Elkhart County has been of some concern due to the presence of major industries and pollution sources upwind and also many smaller local manufacturing facilities. The EPA measures air quality fixed sites all over the country but in Elkhart County there are just two.

Last year we worked on developing a device based on a Raspberry Pi that can measure air quality and record it. Outfitted with sensors for various pollutants, temperature and humidity, in addition to a clock and GPS, it is designed to log data about the air quality anywhere it is taken. Then it connects via Wi-Fi to upload its data to a website. The plan is to make this into a more robust device and produce many of them. Mounted on people’s cars we will collect data and start to map the air quality of the county.

This year’s project will include:

1. Device. We will complete the design testing and construction of several devices. The prototype has demonstrated nearly all of the basic features. Some more work is still needed so that it properly responds to the car turning on and off by entering a kind of sleep mode. The prototype is on a temporary breadboard and needs to be built in more rugged fashion on a circuit board. Further improvements could include some type of live indicator to the driver of the current air quality such as tones or lights.
2. Web page. The web page for displaying the data in map form is working but could be improved in several ways.
3. Calibrating. The sensors will need to calibrated in some fashion by exposing them to known concentrations of pollutants.
4. Testing. We will make several TRAQR devices and try them out in various vehicles in all kinds of weather and with different W-Fi systems.
5. Data collection. Once we have useable devices we will give them to people who live in various parts of the county and drive regularly. We’ll need to keep them all in working order and watch the data as it comes in to see what patterns emerge.
6. Connections. We will try to identify others interested in our data and those with expertise to help us understand and interpret the data. As a start we will contact local, state and federal government agencies with responsibilities for air quality and monitoring.
7. Confronting. If we identify local sources of unhealthy levels of emissions, we may contact them to share what we have found and try to help them find ways to reduce the emissions.

Students will participate in all aspects of planning, designing, building, testing, collecting data, managing the system, modeling, as well as searching for others’ data and contacting other parties about our data.

**Background expected:**

Students with a variety of backgrounds will be considered but applicants should have taken General Physics and have some computer programming experience. Electronics experience would be very helpful and chemistry might be of some use.

**Anticipated Results:**

The aim is to build several such devices and test them by the end of the Maple Scholars program. The student(s) will be fully involved in the design construction and testing of the devices as well as all the other areas outlined above.

**Agreement with Mentor Responsibilities**

I agree to serve as a mentor for a Maple Scholar student. I will be directly supervising the student(s) typically by working directly with them for several hours in the morning of each weekday. I plan to be present for all or nearly all of the colloquia. I expect the student(s) to put in full time work on the project for the duration of the 8 weeks. I may be gone for a one week period but will prepare the student to carry on independently during that time.

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AlgaeTown 2018

Maple Scholars Proposal for Summer 2018

Microalgal biomass production for biofuel, feed, or food in an efficient photobioreactor

Stan Grove, Biological Sciences Department

Description: AlgaeTown is an ongoing collaborative project between students and faculty of Goshen College and Formco Inc. in Elkhart to test a unique bouyant lift photobioreactor (PBR) design. The goal is to understand how to produce microalgal biomass more efficiently than is currently possible for use as a source of biofuel, animal feed, human food, or numerous speciality products depending on which microalga is cultured. Microalgae have great potential for producing biomass faster and in a much smaller space than higher plants while using wastewater and waste carbon dioxide as resources. For these reasons, it is expected that extended use of microalgae to produce desired products will contribute to making human society more sustainable.

We have been successfully growing and harvesting a strain of microalgae isolated locally but have not yet identified the species. We wish to know this information so we can communicate properly with the scientific community interested in developing products from algae. We expect to isolate DNA and compare it to available DNA databases for the identification of the species or close relatives.

We also have a solar air system nearing completion and wish to continue the development so our outside PBR can operate off the grid. This is essential to demonstrate the potential for operation and production of algal biomass in remote locations. We expect to make final adjustments and modifications to the system so it operates completely on solar air power.

The general maintenance and operation of our three PBRs is expected to continue during the summer and be part of the Maple Scholar activities.

Background expected:

This project is open only for experienced AlgaeTown team members who already know how to operate our equipment. The background needed for this project is an interest in biology and interactions with the environment. Skills developed in laboratory courses in the sciences aid team members in reaching project goals. Research is by definition investigating the as yet unknown so an interest in working with unsolved challenges and willingness to develop new skills are very beneficial in advancing project goals. An interest in working at the interface of science and industry plus willingness to participate in a multiyear project with a diverse team operating via a relay team model in which experienced members help new members learn the basic skills needed to contribute to the project goals are essential.

Anticipated Results:

Maple Scholars will develop skills in isolating DNA from microalgae and compare with information from known microalgae to obtain a molecular identification of our local strain of microalgae. Success in identification of our strain of microalgae will enable the Maple Scholar to consider preparing a report for the Indiana Academy of Science annual meeting. It is also expected that working with a variety of starter cultures, evaluating data about culture growth dynamics, examining cultures via microscopy, and operating the PBRs to perfect the process of producing microalgal biomass so others can benefit from our efforts. We expect to show that our equipment can be used to efficiently produce significant quantities of useable biomass from specific strains of microalgae and that there is a reasonable potential for marketing our system. Team members will also have additional opportunities to communicate their results in various settings with other maple scholars, collaborators, and the public in various forms to include oral reports, written reports, webpages, and social media.

Agreement with Mentor Responsibilities Mentor responsibilities are understood and supported

**Maple Scholars Faculty Proposal (Summer 2018)**

Short title:  **Mosquito Genetics**

Full title: **Identification of Mosquito and Viral Genes through Primer Generation and PCR**

**Dr. Andrew Ammons, Department of Biological Sciences**

**Description:**

The spread of human illnesses, particularly those caused by viruses, by mosquito species vectors has been a bane of human society for thousands of years. Encephalitis, malaria, dengue, yellow fever, and Zika are just a few of these diseases that have caused untold misery and suffering for millions upon millions of people.

 It is important that we have a basic understanding of how these diseases are transmitted and carried by their mosquito hosts. The study of mosquitoes and the infectious human diseases they carry involves many disciplines, from medical and tropical entomology to virology, genomics, and epidemiology. Our increasing knowledge of this disease transmission, spread, and mosquito control has saved millions of lives in the last hundred years (Spielman and D’Antonio, 2001)

 PCR (polymerase chain reaction) is an effective and vital molecular genetic tool for identifying and manipulating DNA and RNA. Through the use of sequence-specific oligonucleotide primers, we can accomplish precise targeting and amplification of genomic regions. These techniques can aid in the identification of viruses, bacteria, filarial worms, and protozoan parasites carried by mosquito vectors. In fact, recent RT-PCR experiments have successfully isolated and identified the emerging infectious flavivirus, Zika, in wild, field-caught mosquito samples collected from around the world (Faye *et al*., 2013)

For this project, the student will be expected to participate in the laboratory elements of mosquito research – setting up mosquito traps and collecting samples, rearing mosquitoes in the lab, extracting and manipulating DNA/RNA from frozen samples, and performing PCR and electrophoresis. In addition, the Maple Scholar will learn primer design and how to access and utilize online genomic databases. Other skills to be practiced might include sampling mosquito blood meals, extracting and analyzing proteins, quantification of DNA and RNA (using NanoDrop technology), microsurgery of mosquito organs (salivary glands, etc.), compound and dissecting microscopy, and dichotomous key identification of mosquito samples to species.

 **Other independent and unique projects focused on insect taxonomy or honey bee ecology, behavior, and genetics may be proposed (and is encouraged) by students. Student enthusiasm, self-motivation, and commitment to the project are a major factor in selecting Maple Scholar finalists.**

**The principal investigator’s hopes and goals for the summer** would be to have a student engage in active research, design their own experiments with guidance, and learn how to present research in a professional format.

 **Student applicants** would be aided by some biology or science background (appropriate for first year Biology majors), but this is not necessary for applying. Attendance at informal journal clubs will be necessary for the student to train in the interpretation of scientific publications.

 **The anticipated results from summer research for the participant** would be the completion of an independent research project. This project would be suitable for presentation at local or national scientific conferences. All scholars are also asked to write a research paper using the guidelines of the National Conference on Undergraduate Research. Student research may also contribute to eventual scientific publication, in which case the student would be listed as a co-author.

 **The principal investigator agrees to all mentor responsibilities as listed in the faculty guidelines.** Appropriate supervision, support, and encouragement for the student will nurture a one-on-one mentoring relationship. Any students will be treated as colleagues in the discovery of knowledge. The advisor will be available to guide, discuss issues, and train in the use of techniques, but will also try to allow the student to develop as an independent researcher designing their own project. Expectations for student scholars include working full days (and some weekends), being receptive to guidance offered by the advisor, and being passionate about doing science.

**References**

**Faye, O., O. Faye, D. Diallo, M. Diallo, M. Weidmann, and A. A. Sall (2013). Quantitative real-time PCR detection of Zika virus and evaluation with field-caught mosquitoes. *Virology Journal* 10:311.**

**Spielman, A. and M. D’Antonio. 2001. *Mosquito: A Natural History of our Most Persistent and Deadly Foe.* New York: Hyperion Publishing.**

1. Note to John and Paul: You may remember Philip as the speaker for the 2010 Science and Religion conference at GC. [↑](#footnote-ref-1)