Syllabus for PLSCI 4940 – Fall 2018
Digital Technologies in Science Communication

Thursday: Lecture – 1:25P – 2:40P  Classroom, Plant Science Building, Rm G10
Lab - 2:55P – 4:25P  Lab Plant Science Building, Rm G09

Instructor: Carlyn S. Buckler
Office: 118 Plant Science
Office hours: Noon – 1:00 PM Wednesday and by appointment
E: csb36@cornell.edu
P: 255-3666

I. General Information:

As scientist we need to do more than write proposals and do research. Our funding, collaborations, and much of our innovations depend upon a science literate voting public – we must be able to communicate our science in a manner that allows us to work across disciplines, cultures, and to various stakeholders. Digital Technology and Science Communication will cover the most current digital technologies (DT) for use in science communication, as well as a look forward to new technologies being developed for science education, collections management, and other aspects of science research and outreach. Basic skills/resources will be covered to understand, design and develop products using augmented and virtual reality, 3D design and printing, online resources, website production, and more. This course is "hands-on" and includes several small projects as well as a capstone final project.

*** You do not need prior experience with any of these technologies to be successful in the course ***

We will discuss using DT to increase inclusion of diverse audiences, accessibility for those with disabilities, and to help those with different learning styles to understand science in novel ways. Students will have access to lab space and resources for prototyping, testing, and development of digital resources.

II. Class Structure:

Lecture and Lab: We will usually start with a lecture/discussion section, where we digest the readings/media assignments, have guest speakers, and/or have a lecture on a special topic. The lab component will be time for you to (a) get to know and work with the resources we have, including computer software, 3D printers, etc., (b) work on your projects, and (c) for those of you who are willing, mentor those who may have different skill sets than you, and may need help with something they are unfamiliar with.

Class participation in discussions is very important, and a significant part of your grade. The metrics for quality of input are that each participant will:

1. remain open minded, giving all the benefit of the doubt
2. come to class able to discuss the readings/media assigned
All comments are:
3. respectful and kind
4. concise
5. helpful to the discussion

**Weekly Assignments:**
Most weeks there will be a list of readings/podcast/video to consume. **By midnight the day before class** please email a Word Doc of your thoughts on the readings, to include:

- Are the authors credible?
- What did you think about the information? Any questions, thoughts?

Not a tome, here, please – just 50-100 words is more than fine for the whole assignment for a given class meeting. I want to see where you are with the content, and what we need to focus on in class discussions. You will be graded on these assignments.

**Final Project:**
The final for the course will require each student to develop and implement a digital resource that interprets a scientific phenomenon, research question, or presents a novel way for the public – or a specific demographic – to understand science. All projects must be pre-approved by the professor. You must go through at least two iterations and get feedback on each from the class and the professor. On the last day of class each student will give a formal presentation describing/showing the product, explaining in detail the process of developing the resource, iterations, pros and cons of the methodologies, and its relevance to the public understanding of science.

**Course grading:**
- 50% Class Participation/Assignments
- 15% Midterm Project
- 35% Final Project

**Due dates:**

- 13 September – bring to class a figure to 3D print
- 20 Sept – Elevator Talk Presentaions AND First Draft of Final Project Due – present to class
- 04 October – Presentation of Citizen Science Projects
- 18 October – Completed detailed outline of final project due – present to class
- 28 November – Final projects due – presentation day

**III. Inclusivity Statement**

We understand that our members represent a rich variety of backgrounds and perspectives. The School of Integrative Plant Science is committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

- share their unique experiences, values and beliefs
- be open to the views of others
- honor the uniqueness of their colleagues
- appreciate the opportunity that we have to learn from each other in this community
- value each other’s opinions and communicate in a respectful manner
- keep confidential discussions that the community has of a personal (or professional) nature

Use this opportunity together to discuss ways in which we can create an inclusive environment in this course and across the Cornell community

Please be respectful of the classroom learning environment and your fellow students by:
- turning your cell phones to “silent” in class,
- not texting or e-mailing during class,
- not reading the paper, or sleeping in class,
- arriving on time and not leaving early,
- consuming food outside of class/lab time, and
- using your laptop only for notetaking.

IV. Course goals: By taking this project-based course, students will:

- demonstrate an understanding of current digital technologies (DT) and their use for communicating science to the public
- apply appropriate application of digital technologies for education and outreach, collections management and research
- utilize the potential of DT to reach underserved and underrepresented audiences, including rural audiences and those with disabilities
- appreciate the basics of the return on investment for various digital technologies and when/how to hire an outside technology provider
- show proficiency in understanding the needs of various audiences with respect to understanding science

V. Class Calendar and Learning Resources:

Class 1: 23 August 2018 – Introduction – The Role of Science Communication in Society – How can I fulfill that role?

We’ll run over the major themes of the course - assignments, projects, final presentations; why it is imperative for scientists to know how to communciat the value of the research they do, how to evaluate the efficacy of communication, what digital tech can do for your outreach, and we’ll take a virtual tour of the resources we have in the department, and on campus.

Readings/Media:
Class 2: 30 August 2018 – Digital Technologies in Science Communication: Cultural and Practical Implications of DT

Readings/Media:

Read Preface and Part I; Ch 1, pgs., xi - 18

Class 3: 06 September 2018 – 3D Printing in Science Communication, and How to give a talk the public will understand

Readings/Media:
"Will 3D Printers Change the World?” Read all six (short) articles from the NYTimes; http://www.nytimes.com/roomfordebate/2014/08/11/will-3-d-printers-change-the-world?emc=edit_th_20140812&nl=todaysheadlines&nlid=67628922


Read the article and watch the video:

Go to the Smithsonian site below and muck around... Look at one or more of the objects in the 3D collections and think about how one might use this resource for the public understanding of science. Projects? Pros? Cons?
http://3d.si.edu/tour-browser
Class 4:  13 September 2018 – AR and VR in Collections – Guest Speaker

Dr. Anne Basham, founder of Arium Technologies and Head of AR at IDigBio, will
zoom in to talk to us about using AR to make collections more accessible. We’ll get to
play with the AR resources she has produced for Libraries of Life. Bring your iPad,
Smartphone, etc.

We’ll also:

- work in the labs today learning Meshmixer/AutoCAD, and
- discuss what makes a really good presentation.

Readings/Media:
Get to Know IDigBio  https://www.idigbio.org/  Come with questions for our guest
speaker on how you might use such technology for your research, inquiry, etc.

Take a look at resources from the Smithsonian; I’ll bring in some VR googles and we can play
https://www.smithsonianmag.com/science-nature/cant-picture-world-devastated-climate-
change-these-games-will-do-it-you-180952104/

And….  
- Bring in an object to 3D print. I’ll give you the specs in advance
- Look over Meshmixer  http://www.meshmixer.com  Download (free to students) if you’ve
got the space/resources on your computer. Go over the tutorials, muck around… what is
intriguing about this software? What would you like to do with this? How can this help us
communicate science? For Whom?

Class 5:  20 September 2018: Elevator Talk Due! AND First Draft of Final Project,
Lecture: Understanding ROI’s for Technologies

- Presnet your Barbershop talk!
- We’ll work on our 3D prints and Meshmixer in the Lab
- Let’s look at the return on investment for digital technologies, and how to hire a
  DT contractor to design and develop your technology for you

Class 6:  27 Septmeber 2018: Citizen Science and the Public Understanding of Science;
or, How can I help people understand climate change, evolution, etc., without freaking them out?

Readings/Media:

- Go to: SciStarter.com - Peruse the lists and pick out a citizen science project to do
- Spend at least 2 – 3 hours involed in the project
- **Next week**, present a 5-6 minute talk on the results of your project to include:
Why did you choose this project?
Was it fairly straight forward to get involved/do the work?
Was it what you thought it would be – were you engaged?
Was there support? Costs? Feedback as you progressed?
Most important, Did you feel like you were contributing to scientific knowledge?

Class 7: 04 October 2018 - Guest Speaker; and Midterm Presentations on Citizen Science Projects

Dr. Mike Scanlon will be with us today! Mike’s research focusses on plant development and the evolution of plant morphology. He is also involved in some very interesting outreach initiatives, including “Weed to Wonder” about the evolution and research history of maize - [http://www.weedtowonder.org/index.html](http://www.weedtowonder.org/index.html) And his course, “Hollywood Biology: Biological Science in Cinema” is a course you should not miss.

We’ll also hear your presentations on your Citizen Science projects, and work in the Lab.

Class 8 & 9: Saturday 13 October 2018: Field Trip!

A whole day of the Museum of the Earth, Cayuga Nature Center, Sciencenter, Lab of Ornithology, and who knows what else…

You will get a detailed itinerary on this. We’ll meet and greet folks who work in Education and Outreach, Exhibitions, and Research. *These folks know how to communicate science to the public.*

Class 10: 18 October 2018 – AI for the Modern World – What Could Possibly Go Wrong??

Readings/Media: Do the readings/media in this order, please - they build upon each other... much like robot intelligence....


   "Our Universal Robots"
   "Engineer Intelligence"
   "Google's Robot Brigade"
   "The Army's Robot Recruiter"

Class 11:  25 October 2018 - Guest Speaker: Dr. Veronica Padovani, University of Parma, Italy: The Science of Climate Change and Architecture – Using technology to increase awareness of and science behind a UNESCO site.

Dr. Veronica Padovani will be here from Modena, Italy, to talk about the 3D printing of the high-relief structures of the Modena Ghirlandina and their relevance to the public’s understanding of climate change and its affects on various lithotypes.

We will also talk about the public understanding of science and culture through food. Go with me on this…. 

Class 12:  01 November 2018 – Guest Speaker; Resources for the Public Communication of Science.

Dr. Marvin Pritts from SIPS will talk with us about his research, teaching and extension initiatives. Marvin is involved in the Leadership minor, outreach for everyone from K-12, farmers, teachers, and plant enthusiasts (or those who don’t know yet that they are plant enthusiasts). We’ll learn how and why he integrates all this into one career. A fabulous resource for understanding science communication.

Readings/Media:
National Science Board Science and Engineering Indicators Report 2018
Read chapters 7 & 8 – kudos if you read other chapters and can come and talk to share your thoughts

You don’t need to write on these but do go to these sites and muck around, and be ready to talk about them in class:
ASTC.org
InformalScience.org
NAP.edu – National Academies Press – search Communicating Science to the Public, or he like, and see what’s available
NISE Network: www.nisenet.org
Astronomy from the Ground Up: afguonline.org

At Cornell:
Cornell Public Service Center has a ton of programs and initiatives:
https://psc.cornell.edu/students/student-programs/prek-12-outreach-programs
As does the Cornell College of Vet Medicine:
https://www2.vet.cornell.edu/about-us/outreach

Did you find any other resources? Bring them to class!
Class 13: 08 November 2018 – Guest Speaker; Work in Lab on your Projects

Sarah Evanega from International Programs at Cornell will speak to us about the IPCALS program, and working with and communicating science to diverse audiences.

Class 14: 15 November 2018 – Wrap things up; Q & A; Work on Projects/ Final Presentations

*************** Thanksgiving Break ***************

Class 15: 28 November 2018 – Final Presentations

VI. Academic Integrity

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student’s own work original to this course. Students agree that by taking this course all required writing assignments may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

VII. Accommodations for students with disabilities

In compliance with the Cornell University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so arrangements can be made. Students are
encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.