



# CONS 127

# Observing the Earth From Space

# Outline

- Introduce the TAs
- Introduce myself
- Course structure
- Learning objectives
- Tips and tricks for success
- Start Position Lecture if we have time



# Evan Muise (Head TA) – evan.muise@ubc.ca

- Undergrad in Environmental Science from Dalhousie University
- Currently a grad student in the Integrated Remote Sensing Studio
- Big fan of remote sensing, data science, and conservation
- TA'd CONS127 last year
- Has a dog named Shadow





# Leanna Stackhouse

- Philadelphia, Pennsylvania, USA
- Undergrad: University of Delaware
  - BA Geological Sciences
  - Graduate Certificate in Geomatics
- MSc in Forestry with the IRSS
  - Analyzing streamside vegetation and riparian buffer integrity using LiDAR
- Assignments 1 & 4
  - [leannast@mail.ubc.ca](mailto:leannast@mail.ubc.ca)



Tristan Douglas

[tjdoug@mail.ubc.ca](mailto:tjdoug@mail.ubc.ca)

*TA for assignments 2 & 3*

- Undergrad in molecular biology
- MSc in Earth and Ocean Science
- Currently a PhD student in the Integrated Remote Sensing Studio
- Research interests: microalgae, estuaries, shorebirds, drones, satellites

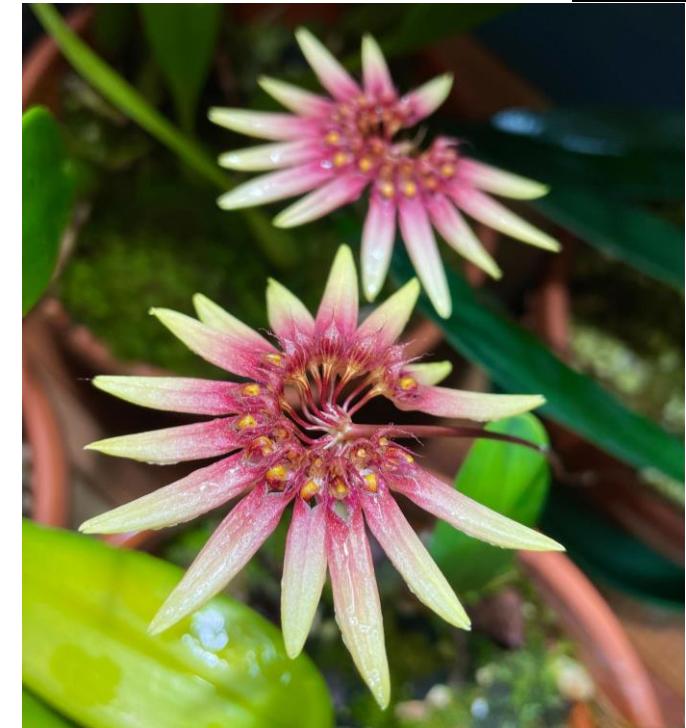
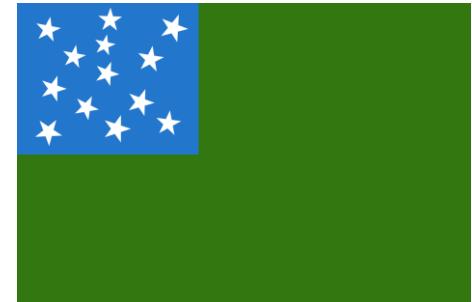
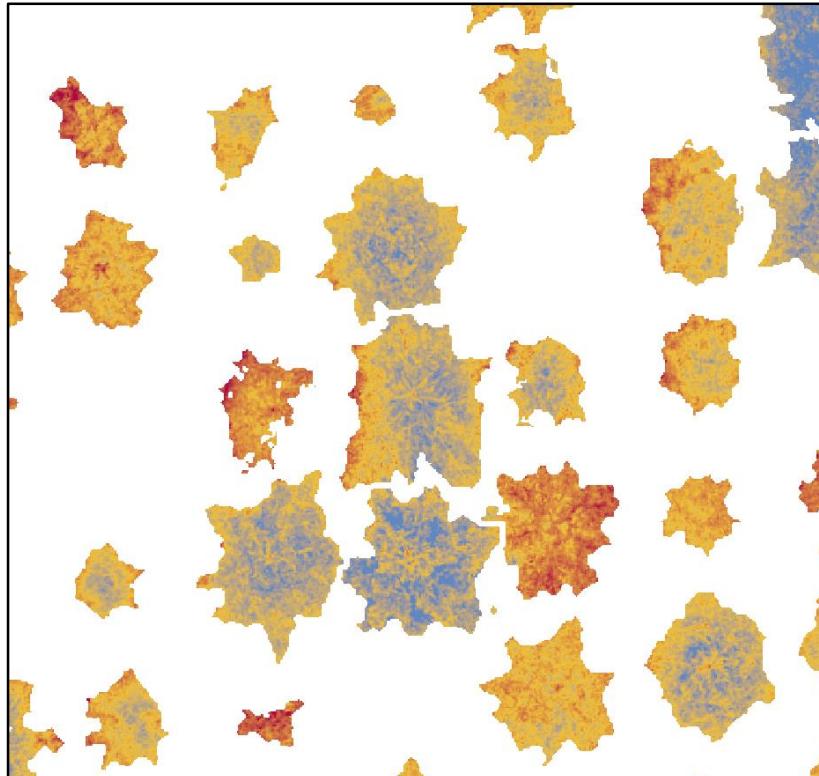


# Samuel Grubinger

**Assignments 6 & 7**

**PhD candidate**

**samuel.grubinger@ubc.ca**



# Julia Fast

j.fast@oceans.ubc.ca

## About Me

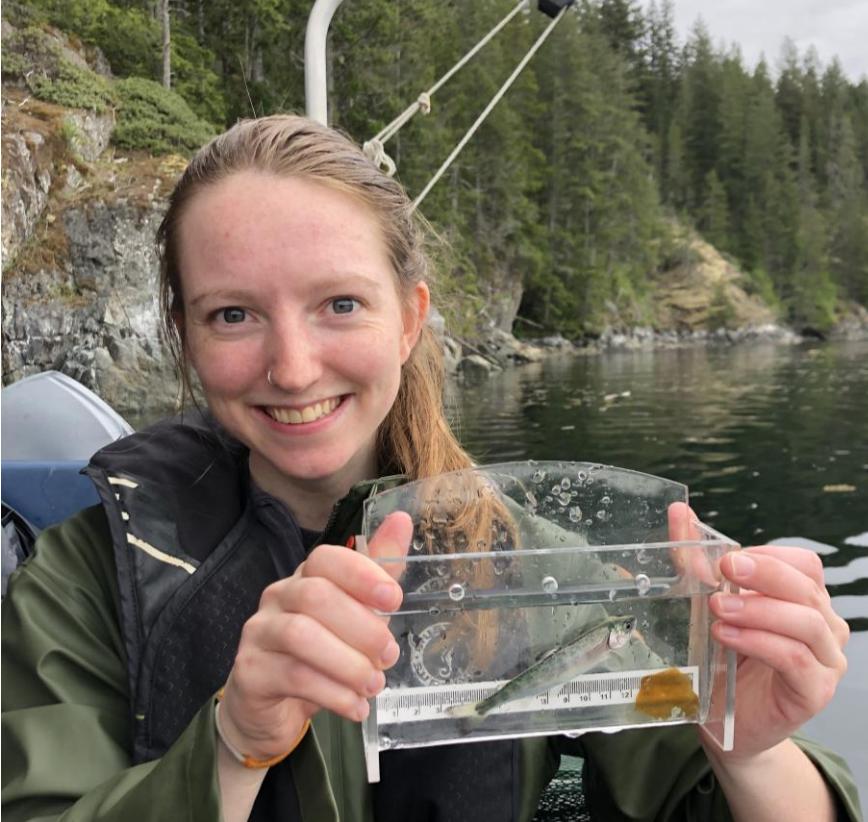
### TA for Assignment 7

**Hometown:** Originally from  
Toronto, ON

**Undergraduate Degree:** Biology  
and Environmental Science  
(Dalhousie University)

**Current Program:** MSc in Oceans  
and Fisheries

**Hobbies:** Being outside!!  
(climbing, skiing, backpacking)



# Teaching Assistants Summary

- Evan
  - Contact for all general course inquiries
  - Blog posts
  - Exam & mid-term
- Leanna
  - Assignments 1 & 4
- Tristan
  - Assignments 2 & 3
- Samuel
  - Assignments 5 & 6
- Julia
  - Assignment 7



# Bit about me

Chris Colton, MSc.

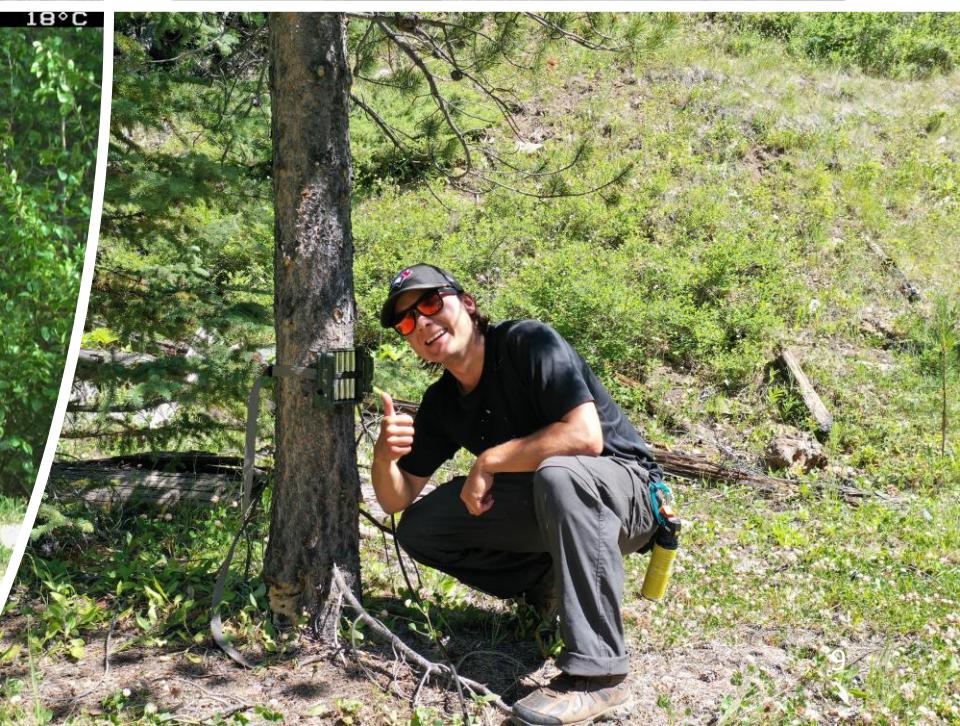
Lecturer

Faculty of Forestry

[chris.colton@ubc.ca](mailto:chris.colton@ubc.ca)

Room 2223, Forest Science  
Centre

2424 Main Mall



# All Material is in Canvas

- PDF of each lecture notes
  - Will post before start of lecture
- Additional videos / You Tube links for each theme
- Canvas has access to all:
  - Assignments
  - Blog posts
  - Exams (mid-term and final)
  - Zoom links



# Assignments and Blogs

- Seven Assignments in total
- Will be introduced by the respective TA
  - In class (or pre-recorded video)
- You have 1 – 2 weeks to complete each assignment
  - Submit on Canvas
- Six blog posts
  - Marked for participation
  - But Evan will go through them to ensure you have followed instructions
    - And provided evidence of sufficient effort to complete them



# Exams

- Administered through Canvas
  - Final and mid-term are 100% online
- Mid-term exam is Tuesday February 14<sup>th</sup>
  - Available during class time (5-6:30pm)
  - Time limit of 90 mins to complete mid-term
- Final exam date is TBD by UBC
- We will release more info on mid-term and final exam closer the date
  - Including practice questions
  - Format
  - Etc.



# Grading Breakdown

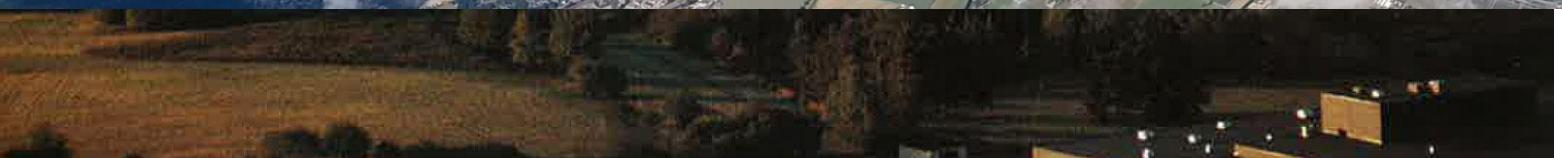
- Blog posts – 10%
- Assignments – 30%
- Mid-term exam – 20%
- Final exam – 40%



# Canvas Website



# What do you think when you hear the term



What do you think when you hear the term

## **Earth Observation ?**



What do you think when you hear the term

## Earth Observation ?





# Learning Objectives

Completing this course you will be able to:

- Describe how Earth Observation technologies can be used to understand how the Earth Environment and climate is changing.
- Understand the basis of geo-positioning technologies such as GPS and location services.
- Understand how light interacts with Earth surface materials allowing us to sense colour, and surface attributes.
- Explain the role of emerging technologies, like remote sensing, geotagging, and web-based technologies, such as Google Earth, for natural resource management applications.
- Synthesize and critique the impact location-based services, global positioning systems, remote sensing, virtual globes and web based mapping on how we perceive the Earth's environment.
- Demonstrate basic knowledge of the various geospatial technologies and how we use them, alone or together for the management of our natural resources.



# Where am I?

- How do I know where I am on the Earth?
- How is the Earth portrayed in maps and from satellites?
- How do I work out how far I have travelled?
- How do we measure distance in, and from, space?
- What is my location in my car, in a plane, on a ship?
- How does my phone know where I am?
- What is the history and basis of satellite positioning?
- Where is space?



# What can I see?

- How does light travel through Space and what can our eyes see?
- What other wavelengths are there for Earth Observation?
- What's the smallest object we can see from space?
- What other energy can we use to sense the Earth's environment?
- What does Canada look like from Space?
- What does the Biosphere, Oceans and Cryosphere look like from space globally?



# How is the Environment Changing?

- How can we observe different types of change on the Earth from space?
  - Cyclic, Abrupt, and Gradual change
- How does land change and land use look from space?
- What do the Oceans look like, and how are they changing?
- How do cities look from space?
- How can we monitor wildlife from space?



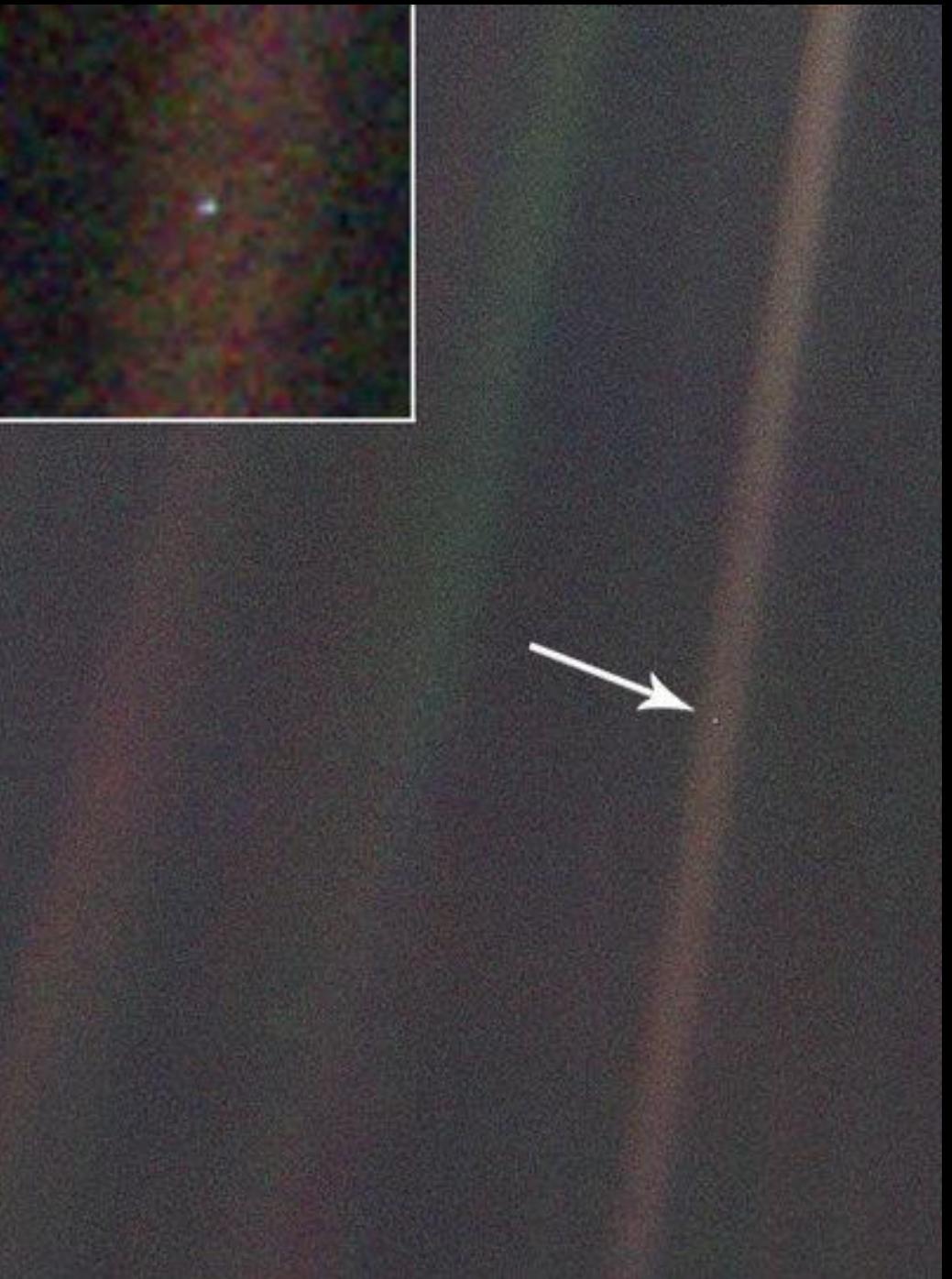
# What is the Future?

- What are the new frontiers of earth observation data?
- How can we use drones and drone imagery in earth observation?
- How can we use earth observation data to understand and quantify the human footprint?



- Called “the most influential environmental photograph ever taken”
- It was taken on December 24<sup>th</sup> 1968 from Apollo 8 mission from a moon orbit





Taken in 1990 by NASA's Voyager 1 spacecraft, the "pale blue dot" photo shows what our planet looks like from 4 billion miles away.

The pale streak over Earth is an artifact of sunlight scattering in the camera's optics.

It inspired the quote “the pale blue dot”



# What patterns can we recognize on this image ?

- Can we name some cities ?
- Is it all urban environments ?



# Tips and Tricks for Success in this Course



High School Teacher: I'm going to make this class difficult to prepare you for college.

College Professor: \*plays slideshow full of memes\*

# Succeeding in this Course

- Come to lectures
  - Ask me questions
- Do the assignments
  - Ask/post questions for your TA
- Do the blog posts
  - Participation marks
- Do the practice questions we provide for the mid term and final



# That's it for Introduction!

- Any questions?



# Extra Slides



# Star Trails

- On earth, star trails are caused by the rotation of earth
  - In the northern hemisphere, if you point your camera north
  - The centre of the circle created is the north pole
- On the ISS star trails are caused by rotation of the ISS
  - The centre of the circle here is the centre of rotation of the ISS (aka its poles)



# Star Trails

- If you change the angle of the photograph
  - You'll see differently shaped patterns

