

# Introduction to GitHub and version control

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# Course Overview

- Part 1 – Introduction to GitHub (~50 minutes)
- Break (~10 minutes)
- Part 2 – Hands-on Workshop (~50 minutes)

# Part 1 - Introduction to GitHub

- Overview
- What is Version Control?
- What is GitHub?
- PMEL & GitHub
- How would you use GitHub?
- Introduction to the GitHub Web Interface

## Part 2 – Hand's on Workshop

- Access to GitHub
- Working in an existing repository
- Using the project management tools
- Issue Tracking
- Creating a Wiki
- Creating a repository
- Other Tools
- Further resources

# GitHub and Version Control

AN INTRODUCTION

# Part 1- Overview

- Topics covered:
  - What is Version Control?
  - What is GitHub?
  - PMEL & GitHub
  - How would you use GitHub?
  - Introduction to the GitHub Web Interface
- Topics **NOT** covered:
  - How to use Git (that's next week)
  - Pull Requests
  - How to program in any language
  - How to use GitHub within your group
    - PMEL may need a staff therapist to help with this struggle
  - Best practices, to include:
    - Directory structure
    - Naming conventions
    - CamelCase vs. snake\_case
      - I prefer the DunderR\_\_BactriaN\_\_CaSE
    - Tabs vs. spaces
    - vim vs emacs.

# What is version control?

- Version control (aka revision control) is a way to capture the different states of a file(s), document(s), code, etc. through the life of a project.
- Can be manual process (the time-honored “folder method”)
- Major corporations use software version control tools to accomplish this
  - Allows for streamlined version control
- Version control software tools examples include:
  - Git (Distributed model)
  - Subversion (Client-server model)
  - Mercurial (Distributed model)
  - CVS (Client-server model)

# What is version control? Pro's and Con's

## PRO'S

- Keeps a log of changes to NOAA work we do
- Allows for teams to collaborate on software and documentation
- Allows user to roll-back to previous states if bug is introduced
- Allows for development techniques such as automated test and continuous integration to be used
- Provides a central location and backup of important projects
- Helps us to meet NOAA Public Access to Research Results (PARR)

## CON'S

- There *is* a learning curve
- Repositories strength can be influenced by their weakest contributor



## What is GitHub?

- Cloud-based hosting service for version control using Git.
  - Website with access to:
    - Code version control
    - Issue tracking
    - Project management tools
    - Wiki
  - Both Private and Public repository access
- Full versioning
  - History of document(s) and/or source code

# GitHub



GitHub Logo and Octocat courtesy of github.com

## What GitHub is NOT

- The magic bullet for all your project management needs
- A backup server for all project files that we generate
- Not a permanent hosting location for PMEL data

# ~~GitHub~~



GitHub Logo and Octocat courtesy of github.com

# GitHub Pro's and Con's

## PRO'S

- Easily accessible and discoverable location for maintaining project files
- Allows for easier community access and collaboration with trusted partners (Saildrone, etc.)
- Forces best-practice discussions to happen at a lab level (code, project management, etc.)
- Prevents the loss of information and resources caused by departed employee.

## CON'S

- Not maintained on our servers (unless we run Enterprise edition)

# NOAA/PMEL & GitHub Policy

- DOC/NOAA Approved
  - PMEL has corporate account
    - 3<sup>rd</sup> year of GitHub usage
    - >60 people with account access in PMEL
    - 96 Repos currently
- Account managed by Data Integration Group
  - Karl Smith and Eugene Burger are the admins
- PMEL pays an annual fee to allow private repositories
- We need to meet NOAA policy
  - More later



# NOAA GitHub Policy

- Please Do
  - Not commit anything with PII
  - Use our government disclaimer on readme.md file
  - Manage collaborators
- What we will help with
  - 2 Factor authentication
  - Repository syncing
- What we need to work out
  - Git secrets
- Repos need to be created in:
  - NOAA-PMEL page
  - NOT in personal page

# How would *you* use GitHub?

- Software developers
  - Most traditional user of GitHub in PMEL
  - Software repository for project version control
  - Working primarily with Git client through command line or gui tools
  - Common access point for distributed team and collaborative projects
  - Issue tracking tool is extremely useful for tracking software bugs, enhancements, questions and project management

# How would *you* use GitHub?

- Scientists and Data Visualizers
  - Project code repository
  - Project documentation
  - Use Jupyter notebooks to display test and project data in GitHub webpage (previously rendered only)
  - Use project management tools during the course of a project
    - Track individual phases of algorithm and code development
    - Track progress of data cleaning and analysis
  - Use issue tracking tool to provide feedback on methods, findings, sensor failures, etc.
  - Open science collaboration

# How would *you* use GitHub?

- Research scientists, PIs, engineer and technicians
  - Access software tools, instrument firmware/software releases through website
  - Access and modify project documentation
  - In-field access of wiki, documentation, issue tracking via web or smart-phone app



# Questions?

- If you're not interested in attending the hands-on workshop, thank you for attending!
- If you will be attending the hands-on workshop, we will resume after a 15 minute break.

The background is a dark blue gradient with several bright blue horizontal lines. A large, faint, stylized number '1' is visible in the background, with a greenish-blue glow at its base.

# Hands-on with GitHub

LET'S GET OUR FEET WET

# Link to workshop repository

- Link to workshop repository
  - <https://github.com/NOAA-PMEL/PMEL-training>
- Link to workshop worksheet
  - [https://github.com/NOAA-PMEL/PMEL-training/blob/master/0-Workshop/workshop\\_guide.md](https://github.com/NOAA-PMEL/PMEL-training/blob/master/0-Workshop/workshop_guide.md)

A stylized, abstract illustration of a plant with long, pointed leaves, rendered in shades of blue and green, set against a dark blue background. The plant is positioned in the upper right quadrant of the slide.

# Thank you

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