

Bioinformatics session

A two-day workshop for
bioinformaticians and molecular
biologists with focus on the TSO500
pipeline in InPreD



Overview

1. Setup
2. Development & Collaboration
3. Nextflow
4. tso500_nxf_workflow
5. Python

1. Setup

Create a GitHub account

- go to <https://github.com/> and click on `Sign up`



Create a GitHub account

- enter your email

Welcome to GitHub!

Let's begin the adventure

Enter your email*

→ coder@inpred.no

Continue

Create a GitHub account

- set a password

Welcome to GitHub!

Let's begin the adventure

Enter your email*

✓ coder@inpred.no

Create a password*

→ ••••••••



Continue

Create a GitHub account

- choose a username

Welcome to GitHub!

Let's begin the adventure

Enter your email*

✓ coder@inpred.no

Create a password*

✓ ••••••••••

Enter a username*

→ inpredder

Continue

Create a GitHub account

- choose email preferences

Email preferences

☐ Receive occasional product updates and announcements.

Continue

Create a GitHub account

- solve the puzzle



Create a GitHub account

- create your account



Create a GitHub account

- find the activation code in the email you received



Here's your GitHub launch code, @inpredder!



Continue signing up for GitHub by entering the code below:

40619601

Open GitHub

Create a GitHub account

- select the desired options

This will help us guide you to the tools that are best suited for your projects.

How many team members will be working with you?

☒ Just me

☐ 2-5

☐ 5-10

☐ 10-20

☐ 20-50

☐ 50+

Are you a student or teacher?

☒ N/A

☐ Student

☐ Teacher

Continue

What specific features are you interested in using?

Select all that apply so we can point you to the right GitHub plan.



Collaborative coding

Codespaces, Pull requests, Notifications, Code review, Code review assignments, Code owners, Draft pull requests, Protected branches, and more.



Automation and CI/CD

Actions, Packages, APIs, GitHub Pages, GitHub Marketplace, Webhooks, Hosted runners, Self-hosted runners, Secrets management, and more.



Security

Private repos, 2FA, Required reviews, Required status checks, Code scanning, Secret scanning, Dependency graph, Dependabot alerts, and more.

Create a GitHub account

- choose the free plan

Free

- > Unlimited public/private repositories
- > 2,000 CI/CD minutes/month
Free for public repositories
- > 500MB of Packages storage
Free for public repositories
- > 120 core-hours of Codespaces compute
- > 15GB of Codespaces storage
- > Community support

Continue for free

1. Setup

Be added to InPreD organisation at GitHub

1. Resources

- [Getting started with your GitHub account](#)

2. Development & Collaboration

Short `git` introduction

- distributed version control system
- tracks history of changes committed by different contributors
- every developer has full copy of project and its history

Short `git` introduction

Basic `git` commands

`git init` : initialises new git repository

`git clone <repository url>` : creates local copy of remote repository

`git add <file/s>` : stage new or changed files (anything that should be committed to the repository)

`git commit -m "feat: my new feature"` : commit changes to the repository

Basic `git` commands

commit message conventions

`<type>[optional scope]: <description>`

- `feat` : new feature
- `fix` : patching bug
- `refactor` : code change that neither is neither feat nor fix
- `build` : build system related changes
- `perf` : improving performance

commit message conventions

`<type>[optional scope]: <description>`

- `chore` : code unrelated changes, e.g. dependencies
- `style` : code change that does not change meaning
- `test` : changes to tests
- `docs` : adding/updating documentation
- `ci` : continuous integration, e.g. github actions

Basic `git` commands

`git status` : overview over untracked, modified and staged changes

`git branch` : show local branches

`git merge` : merge branches

`git pull` : load changes from remote counterpart

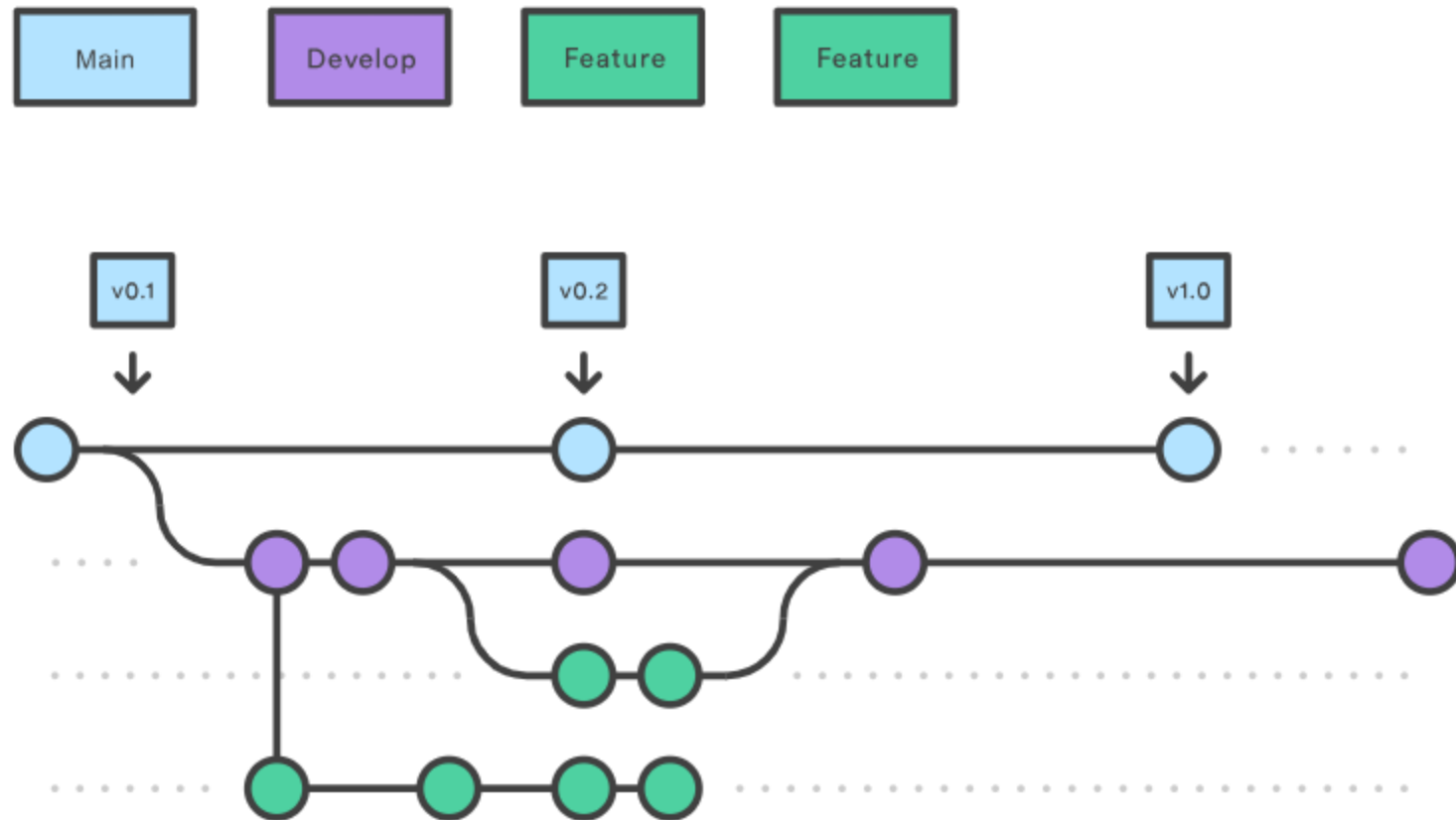
`git push` : upload changes to remote counterpart

2. Development & Collaboration

Branching model: simplified Gitflow workflow

- start with two branches to record project history: `main` and `develop`
- each new feature resides in its own branch (feature branch)
- feature branch is generally created off latest `develop` commit
- upon feature completion, feature branch is merged into `develop`

Branching model: simplified Gitflow workflow



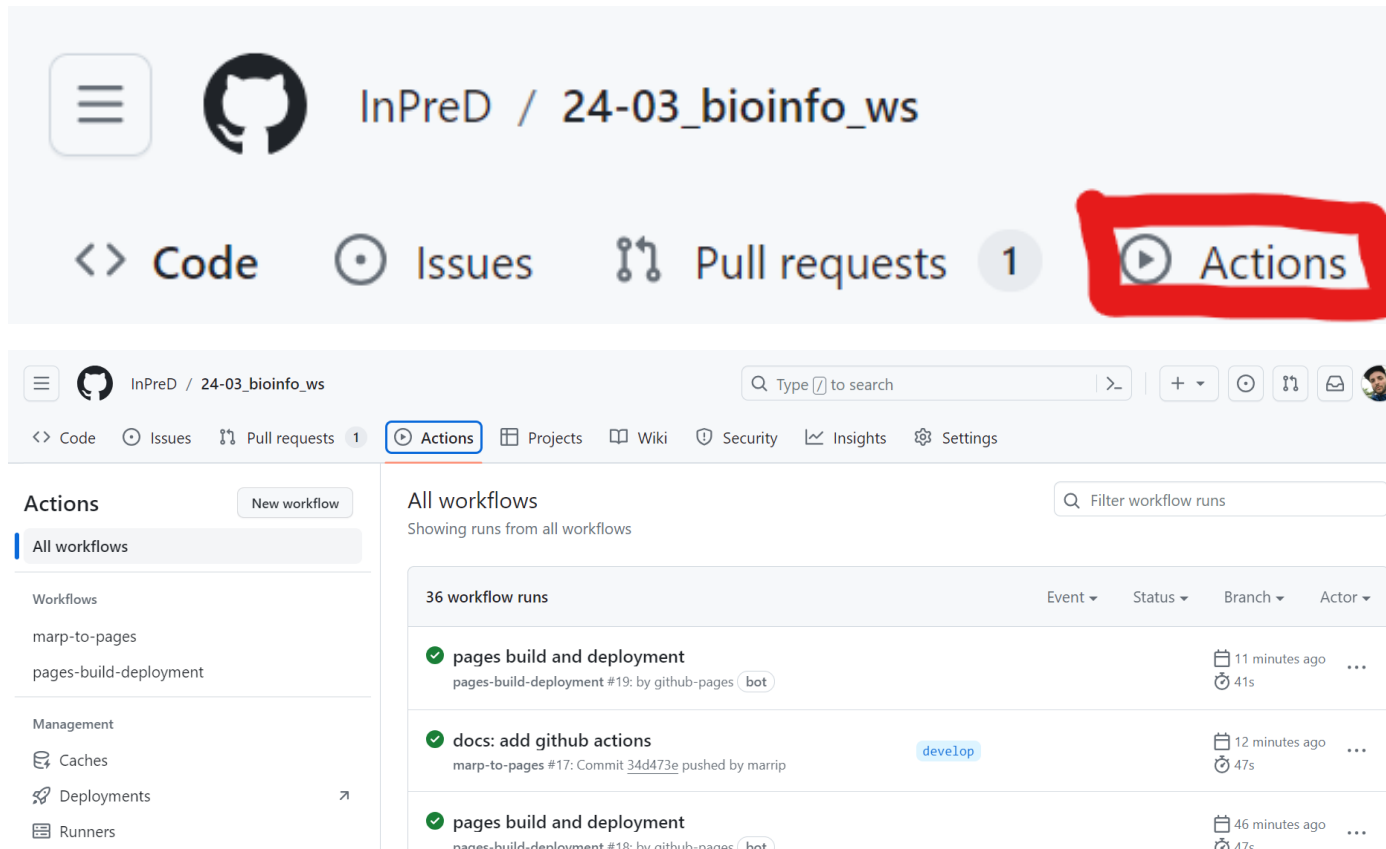
2. Development & Collaboration

GitHub Actions

- continuous integration (CI) and continuous deployment (CD)
- building, testing and deploying directly from GitHub
- set up by adding yaml instructions to `.github/workflows`

```
name: GitHub Actions Demo
on: [push]
jobs:
  Explore-GitHub-Actions:
    runs-on: ubuntu-latest
    steps:
      - run: echo "Hello world!"
```

GitHub Actions



The screenshot shows the GitHub repository page for 'InPreD / 24-03_bioinfo_ws'. The 'Actions' tab is highlighted with a red box. Below, the 'All workflows' section shows a list of workflow runs.

Actions (New workflow)

All workflows

Showing runs from all workflows

36 workflow runs

	Event	Status	Branch	Actor
✓ pages build and deployment pages-build-deployment #19: by github-pages (bot)				11 minutes ago 41s
✓ docs: add github actions marp-to-pages #17: Commit 34d473e pushed by marrip	develop			12 minutes ago 47s
✓ pages build and deployment pages-build-deployment #18: by aithub-pages (bot)				46 minutes ago 47s

GitHub Actions

InPreD / 24-03_bioinfo_ws

Q Type / to search

>_

+ ▾

⌚

🔗

✉

<> Code ⌚ Issues 🔗 Pull requests 1 ⌚ Actions 📁 Projects 📖 Wiki 🛡 Security 📈 Insights ⚙ Settings

← marp-to-pages

docs: add images for github actions #18

Cancel workflow

⋮

🏠 Summary

Jobs

build

Run details

🕒 Usage

📄 Workflow file

Triggered via push now

marrip pushed 698fa73 develop

Status

In progress

Total duration

—

Artifacts

—

main.yml

on: push

build16s

🗨

—

+

GitHub Actions

InPreD / 24-03_bioinfo_ws

Q

Type / to search

>_


+

▼

⌂

🔗

✉



<>

Code

⌚

Issues

🔗

Pull requests

1

▶

Actions

📁

Projects

📖

Wiki

🛡

Security

📈

Insights

⚙

Settings

←

marp-to-pages

✓ docs: add images for github actions #18

Re-run all jobs

⋮

🏠

Summary

Jobs

✓ build

Run details

🕒

Usage

📄

Workflow file

build

Beta

Give feedback

Q

Search logs

🔄

⚙

>

✓

Set up job

1s

>

✓

Pull marpteam/marp-cli:v3.0.2

13s

>

✓

Checkout code

0s

>

✓

Ensure build dir exists

0s

>

✓

Copy images directory (if exists)

0s

>

✓

Marp Build (README)

2s

>

✓

Marp Build (README.pdf)

3s

- pull requests (best practice)
- release and semantic versioning
- licensing

2. Resources

- [About Git](#)
- [Gitflow workflow](#)
- [GitHub Actions](#)

3. Nextflow

- general (install, best practice)
- nf-core template
- stubbing

4. `tso500_nxf_workflow`

- status
- demonstration

5. Python

- general (best practice, cli)
- unit testing (pytest)

Resources

- [github actions](#)
- [nf-core](#)
- [pytest unittesting](#)
- [semantic versioning](#)