Welcome to FYS3150/4150 – Comp. Phys.

- Welcome! ~~back to the university~~!
- About me:
  - Anders Kvellestad
  - Postdoc in the theoretical physics group
  - Background: Bergen → Oslo → Stockholm → Oslo → London → Oslo
  - Work on exploring new theories in particle physics

    Keywords: LHC, supersymmetry, Higgs, dark matter, statistics, coding (C++, Python, some Fortran), supercomputers, causing and fixing bugs ...
- The Teaching Team:
  - Me
  - Even Marius Storhagen
  - ~~Kaspera Gjever~~
  - David Shope
  - ~~Maria Linea Horgen~~
  - Mikkel Metzsch Jensen
  - ~~René Alexander Ask~~
  - Håkon Olav Torvik
  - Håkon Kvemmoen
  - Jørn Eirik Betten
- Who are you?
  - Study programmes?
  - Coding experience? (minimal, one language (e.g. Python), more)
    - C++?
    - Terminal?
  - Main motivation for taking the course?
    - Windows vs Mac/Linux?
    - Solve those pesky equations!
    - Learn C++ and other tools!
    - I don't know, I just like computers!
    - [insert option]

About the course

- Two webpages : UiO page and Github page
- Teaching language : English
- Programming language : C++ , plus some Python scripts
  - You can use only Python , but we recommend learning C++ , and lectures and examples will be based on this.
- Have been taught by Comp.Phys. guru Morten Hjorth-Jensen for many years !
  - I took over resp. for the course last year
  - ~~First time I'm in charge~~
  - Follows Morten's old course closely , with some personal tweaks from my side
- Philosophy : Pragmatic , learning by doing & failing
  - Will focus on concrete examples
  - Comp.Phys. is a huge field — this course is a just a first intro.
- Lectures : Thursday 8.15 - 10.00
  Friday 8.15 - 10.00
- "Lab" groups : Also Thursdays and Fridays , two-hour time slots.
  - Try to join a physical lab if possible !
  - Try not all to join the same lab ... ☺
- Requirements :
  - Two problem sets . Must be passed
  - Three projects . Each count 1/3 of grade (No final exam.)
  - We'll refer to everything as "projects".

Deadlines (subject to change!)

- Project 1 : Sep. 13
- Project 2 : Sep. 27
- Project 3 : Oct. 25
- Project 4 : Nov. 22
- Project 5 : Dec. 13

(Tuesdays, 23:59)

- Policy on extensions : "Friendly but strict"

- Collaboration is encouraged!
  - We strongly encourage you to collaborate in small groups (3 people is ideal).
  - A group hands in a joint assignment/report
  - You will learn more, and we get more time per report → better feedback!

Remember: Join ~~create~~ group on Canvas!

- Plagiarism is very serious
  - Have seen some (few!) cases in the past
  - Can have very serious consequences (e.g. loosing study rights)
  - You must:
    - Write your own text (don't copy!)
    - Write your own code, unless it's code we've provided to help
    - Always clearly acknowledge help/contributions from others
    - Properly cite articles, books, webpages, ...

- Asking questions
  - Please ask questions!
  - Any time during lectures — just cut in and ask!
  - More detailed/specific help with physics/coding
    - Primary forum: Lab sessions
    - Secondary forum: Course GitHub page
  - Personal or procedural issues: email (Can also set up meetings.)

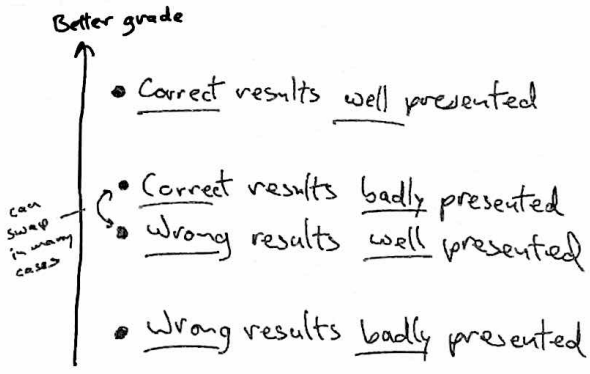
- Broad topics
  - Learn basic C++, with focus on numerics
  - Matrix operations, eigenvalue problems
  - Solve ordinary and partial diff. eq.
  - Numerical integration
  - Monte Carlo methods, simulation of stochastic syst.
  - Debugging ☺
  - Proper presentation of results

The most useful advice you'll get all year

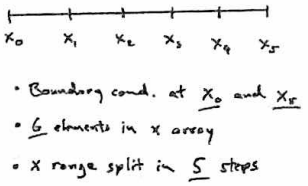
- Something you don't understand?
  - Read and think
  - Discuss with your fellow students
  - Ask us!

- Code isn't working?
  - Don't just try stuff at random!
    Rarely works, you don't learn much and difficult to trust results
  - Read documentation for the command
  - Google error message (minus project-specific content)
    Read explanations you find, don't just copy code.
  - More on debugging later...

- How you present your results matter!
  - Language
  - Quality of figures
  - Layout
  - Report structure
  - Referencing



- Spend some time with pen and paper before you start coding!
  - Rough sketch of program parts and flow
  - Sketch discretizations (avoid index mistakes!)



- Make sure you understand the quantities you present in plots and tables
  — much easier to spot mistakes!

- Read the report template we provide, + example report(s)
- And read the "Checklist for reports" page to avoid some common mistakes