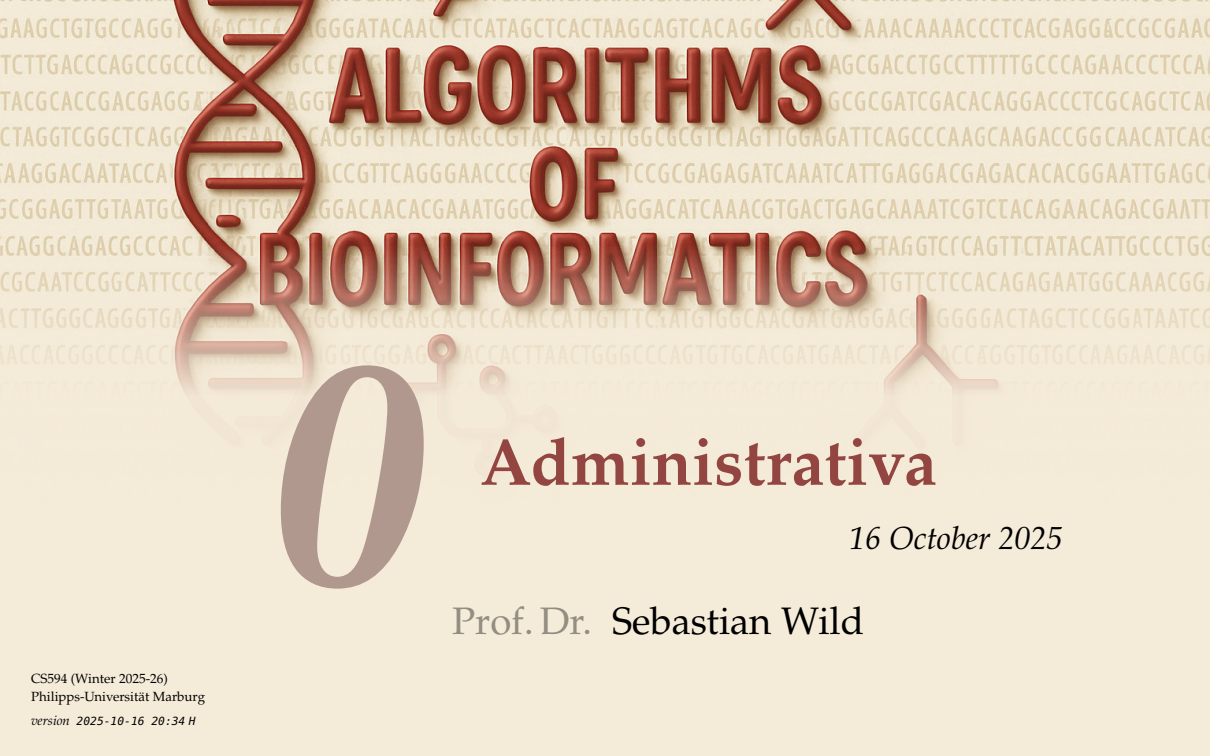




ALGORITHMS OF BIOINFORMATICS

Administrativa

16 October 2025

Prof. Dr. Sebastian Wild

Goals for Today

- ▶ give you some detail on **what** this module covers

~> so that you can decide whether to keep it

↖ if it is an elective module for you

Algorithms of Bioinformatics

- ▶ inform you about **how** AlgBio is run
- ▶ inform you about how AlgBio is **assessed**

Welcome to CS 594 – Algorithms of Bioinformatics

- ▶ Dozent: Prof. Dr. Sebastian Wild

Mehrzweckgebäude, Raum 05 D 16

wild@informatik.uni-marburg.de

Tutor: Mohammed Omer omerm@students.uni-marburg.de

- ▶ Module website: www.wild-inter.net/teaching/algbio

→ your first address for any infos on CS 594

- ▶ *Campuswire*: collaborative Q&A (more on this later)

also used for announcements

→ please register via link from the ILIAS announcement

<https://campuswire.com/p/GEFF103D2>

PIN 1583

- ▶ *Slido*: student response system for formative feedback → bring a smart device to class!

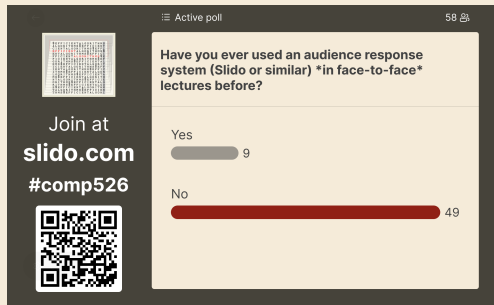
- ▶ Final mark: 100% final exam

Admission to exam: 50% of points from exercise sheets

Audience Response System: *Slido*

- ▶ Goal: Collect immediate, formative feedback
 - ▶ Stay focused and engaged! (“active learning”)
 - ▶ Quick feedback (for you individually) if you are on track.
 - ▶ Quick feedback (for me) whether (most of) you are on track.
- ▶ Slido has 2 useful features:

1. Quick Polls



The screenshot shows the Slido interface for a quick poll. On the left, there is a QR code and the text "Join at slido.com #comp526". The main area displays the poll question: "Have you ever used an audience response system (Slido or similar) *in face-to-face* lectures before?". Below the question, there are two horizontal progress bars. The "Yes" bar is grey and shows 9 responses. The "No" bar is red and shows 49 responses. The top of the interface shows "Active poll" and "58" participants.

Join at
slido.com
#comp526

Have you ever used an audience response system (Slido or similar) *in face-to-face* lectures before?

Yes 9

No 49

2. Audience Questions



The screenshot shows the Slido interface for audience questions. On the left, there is a QR code and the text "Join at slido.com #comp526". The main area displays a list of questions under the heading "Q&A". The first question is from "Sebastian Wild" and asks "How can I ask a question in class?". The second question is from "Anonymous" and asks "I'm a bit unsure, I'd rather ask this anonymously.". The top of the interface shows "Q&A", "Popular", and "2" questions.

Join at
slido.com
#comp526

Q&A

Sebastian Wild
How can I ask a question in class?

Anonymous
I'm a bit unsure, I'd rather ask this anonymously.

What to expect in AlgBio?

- ▶ algorithms with a (micro)biology backdrop
- ▶ **not** extensive material from biology
 - ▶ but various bits and pieces
 - ▶ inspiration from and pointers to further reading
- ▶ methodology: design and analysis of algorithms, mathematical proofs

Overview of the module

Goals:

- ▶ survey algorithmic contributions in computational biology (and apply your algorithms toolkit!)
- ▶ learn selected terminology and mechanisms of molecular biology
- ▶ know strengths and flaws of bioinformatics methods and judge their suitability
- ▶ prepare you for working on current topics of bioinformatics

Units: (preliminary plan)

0. Administrative

1. Puzzle from the Lab

2. Hidden Messages

3. Comparing Sequences

4. Assembling Genomes

5. String Matching

6. Suffix Trees

7. Googling Genomes

8. RNA Secondary Structures

9. Phylogenetic Trees

Assessments

- ▶ **Module mark** = mark in final exam
- ▶ **Final exam**
 - ▶ written or oral examination
- ▶ **Exam Material:** everything covered in lectures (except marked “~~≠~~ exam”) everything covered in **tutorials** and exercise sheets
- ▶ **Admission requirements to final exam**
 - ▶ ≤ 2 exercise sheets with 0 points in your group (not handing in implies 0 points)
 - ▶ $\geq 50\%$ of available points in sum over all exercise sheets

stay tuned ...

Tutorials

▶ *Exercise Sheet* (Übungsblatt)

- ▶ released on module website
- ▶ to be **handed in**

- ▶ handin on ILIAS
- ▶ in **groups** of 3–4 students

- ▶ practice problems
- ▶ enhancement problems

▶ in *tutorials*

- ▶ discussion of selected solutions

▶ **Marking**

- ▶ Mainly for your feedback
- ▶ Serious attempts will yield partial credit even if unsuccessful

*Use the tutorials to **practice** your thinking!* = Don't cheat yourself!

*“If I tell you to run 10km,
it isn't because I want you
to be 10km away from me.”*

Generative AI

We live in exciting times!

LLMs (ChatGPT, DeepSeek etc.),
Media (Midjourney etc.), GitHub CoPilot, ...

- ▶ Generative Artificial Intelligence (GenAI) is amazing!
 - ▶ full of flaws (hallucination, bias, copyright, data privacy, cost, ...)
 - ▶ and yet ... often helpful, surprisingly versatile
- ▶ Why not use for everything?
 - ▶ Need for *deeply skilled* humans here to stay (for now anyways)
 - ↪ **Skill comes from practice!** (We still teach mental arithmetic in primary school!)



assessments designed for upskilling *humans*

↪ For our assessments:

*Don't take away the **thinking!** = Don't cheat yourself!*

Acceptable use:

- ▶ preparatory research
(≈ Wikipedia)
- ▶ proof reading
(spelling, grammar)

Unacceptable use: (not exhaustive!)

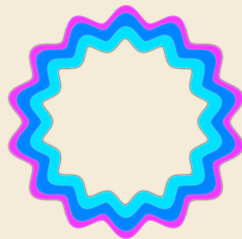
- ▶ use generated parts w/o acknowledgment & citation
- ▶ tools to paraphrase others' work to pass as own
- ▶ generated parts with inappropriate prompt,
e. g., "write me a conclusion for this essay"

What is Campuswire?

Campuswire is an online space for lectures

1. ***Class Feed***: questions on material
2. ***Chatrooms***: structured social space
similar to Slack or Discord

We use Class Feed for **collaborative Q&A**



Join via link on website:
campuswire.com/p/GEFF103D2

Use in browser
campuswire.com/c/GEFF103D2
or via app
campuswire.com/download

Using PIN 1583

- ▶ Ask ***public*** questions
 - ▶ “Why is $\lg(n^3) = \Theta(\log n)$?”
 - ▶ “Will there be classes on regional holiday X?”
- ▶ ***Answer*** your peers’ questions!
 - ▶ Know the answer? → put it in!
 - ▶ Know a partial answer? → Post it, others can build on it, instructors can endorse it!
 - ▶ Found a helpful answer (or question)? → Vote it up!
- ▶ Ask ***private*** questions
 - ▶ if your question might contain “spoilers” for assessments
 - ▶ if you feel the answer is only relevant for you personally

How to Campuswire

- ▶ Our goals for Campuswire Q&A:
 1. **be fair** Same answers for everyone
 2. **learning by teaching** *You* work out most questions (collectively)!
 3. **be inclusive** posts can be anonymous; you can take your time to ask and answer

- ▶ Therefore, we instructors will
 - ▶ redirect you to Class Feed for questions,
 - ▶ wait before answering, to give other students a chance to answer first,
 - ▶ explicitly mark good answers (and questions!) as such

ILIAS

- ▶ Official announcements
- ▶ Hand-in of exercise sheets
- ▶ Announcement of marks

... what can be on the public module website
goes to the public module website!



Exam Question Gallery

- ▶ We jointly collect a **pool of exemplary exam questions**.
(just a shared Google Doc, link on module website)
- ▶ *You add **your** questions to it.*
- ▶ I will give feedback which questions are realistic.
- ▶ *... and we will pick one if there's sufficiently many good ones!*

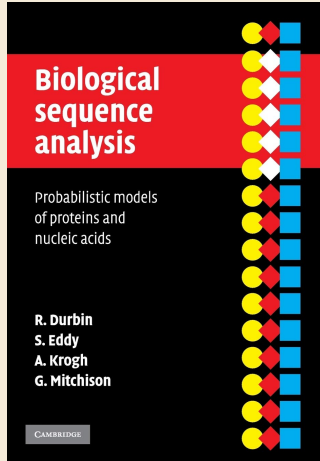
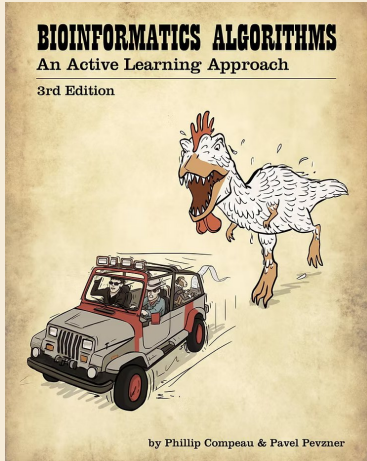
↪ great resource for exam preparation

↪ We will answer selected questions in recap session (last week of classes)

- ▶ Engage in this early and pose great questions!

Books and Resources

Main sources for further reading: (further listed on module website, especially informal biology sources)



Bioinformatics Algorithms also available as practical **interactive online text**
Discount codes on Campuswire!