Welcome to the lab!

Dr. Alexandra Bezler

September 2024

My scientific journey

Lecturer
- EPFL, Switzerland

Scientist
- UNIL, Switzerland
- EPFL, Switzerland

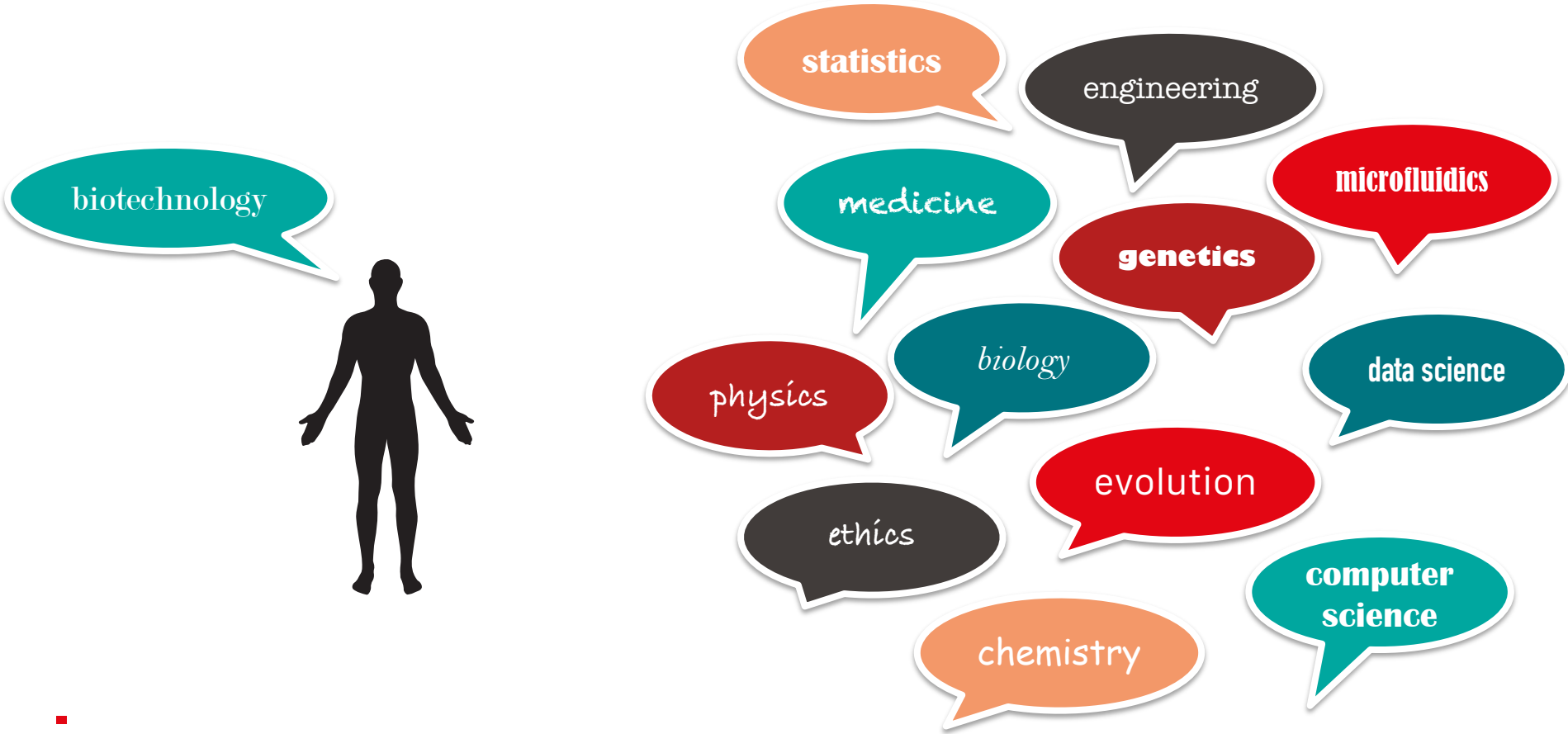
PhD
- EPFL, Switzerland

Research Internships
- Syndey, Australia
- FMI Basel, Switzerland
- EMBL, Heidelberg, Germany
- LionBiosciences, Heidelberg, Germany

MSc Biotechnology, Mannheim, Germany

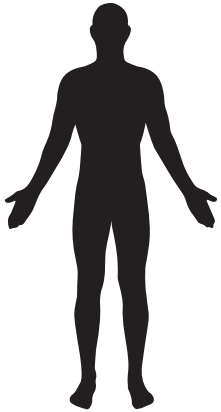

Greetings to all of you who made the journey enjoyable!

Speaking Science



Predictions on your future career:

1. Working with:



2. Speaking:

Working in a group

1) Embrace diversity

2) The team is better than you

3) Communication is key

This week

Tuesday

- Course overview
- Benchling software
- Biosafety training

Friday

- Figures and figure legends
- Electronic lab notebook

Labo intégré en sciences de la vie

Put theory into practice!

Theoretical background:

- Biologie générale BIOENG-110
- Biologie moléculaire et cellulaire I+II BIO-205 +BIO-207

Practical Work Prepares you for:

Bachelor project

Interdisciplinary projects (MAKE)

Master project

Internship

➡ **Career in Life Sciences**

Learning Outcomes

- To learn **basic techniques** in molecular biology and biochemistry
- To acquire **good laboratory practice**
- To built skills in **recording and analyzing** data
- To write a **scientific report/ poster**
- To use specific **software**
- To work in **any team**

➡ **Career in Life Sciences**

1-year Project

Fall semester

Clone pancreatic α-amylase cDNA into an expression plasmid

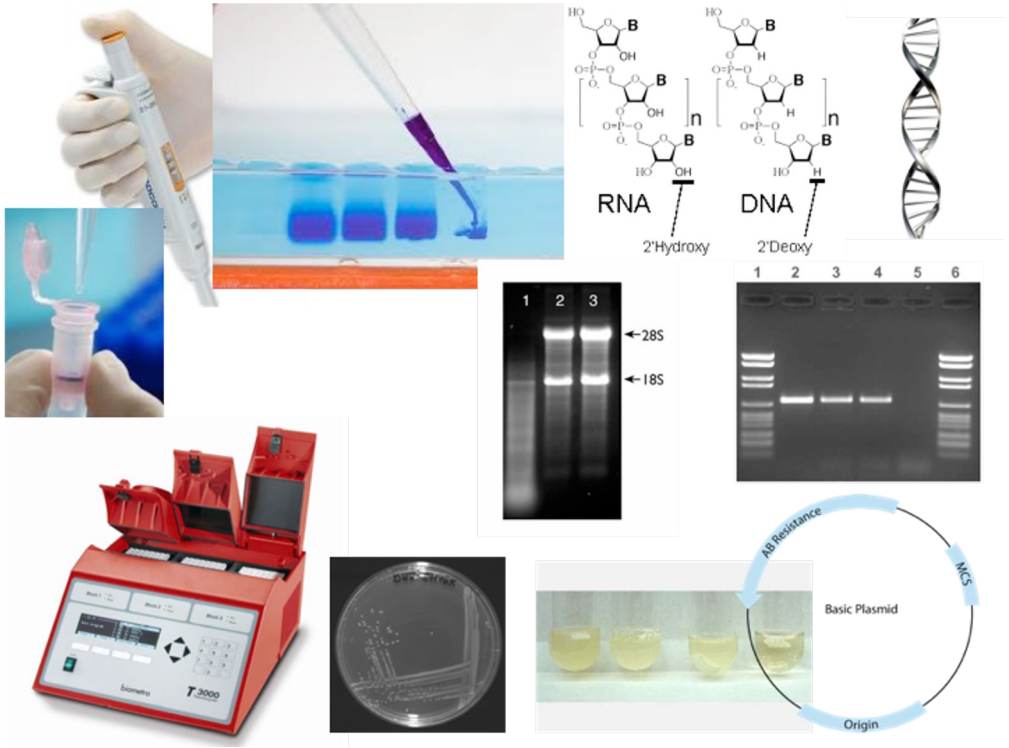
Spring semester

Express recombinant α-amylase in a mammalian cell line

Workflow autumn semester

Lab 1	Lab 2	Lab 3
Micropipetting	RNA Isolation	PCR
Lab 4	**Lab 5**	**No Lab**
Ligation + Transformation	Plasmid Isolation + Digestion	Report and Revision

LISV I:
Work with RNA, DNA, Bacteria

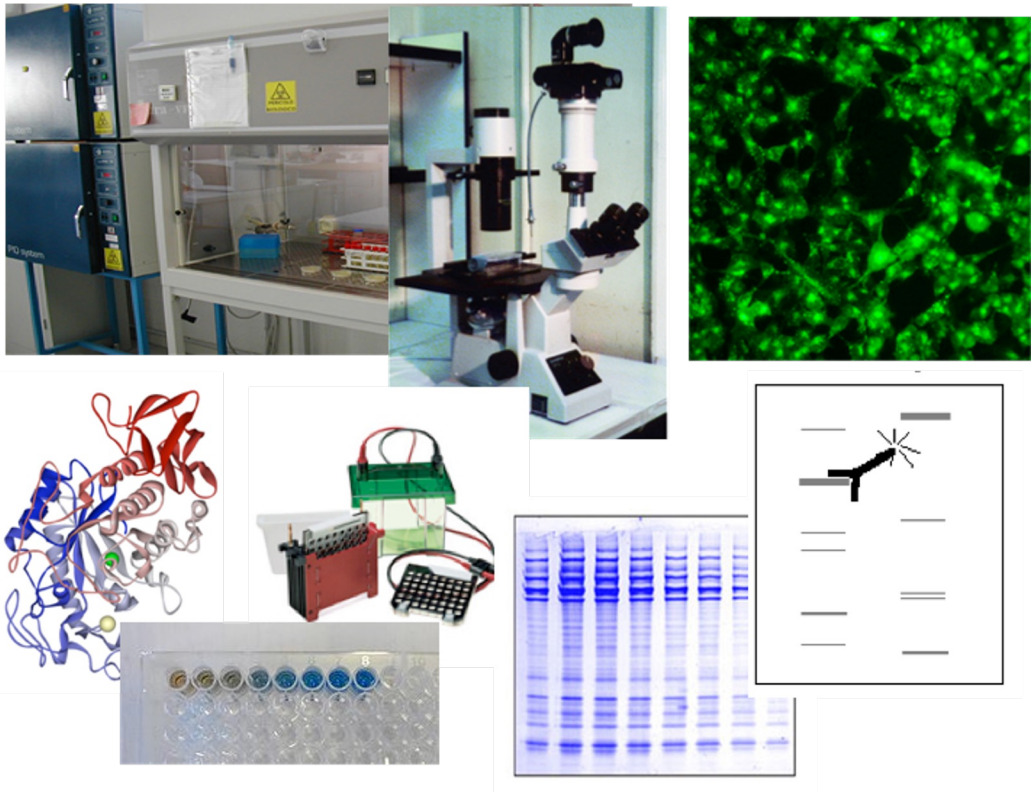


Workflow spring semester

Lab 6	Lab 7	Lab 8
Sequence analysis	Transfection into mammalian cells	Affinity purification

Lab 9	Lab 10	Lab 11
Separation of proteins by SDS-PAGE	Western blot + Activity assay	Enzyme kinetics

LISV II:
Work with Proteins, Mammalian Cells



Practical lab sessions

Lab AI0111, last approximately 3-4 hours

Break during practical: according to experiments, in agreement with your assistant

Weekly workload during semester: 6 hour per week

- exercises, data analysis, writing lab notebook and report/ poster

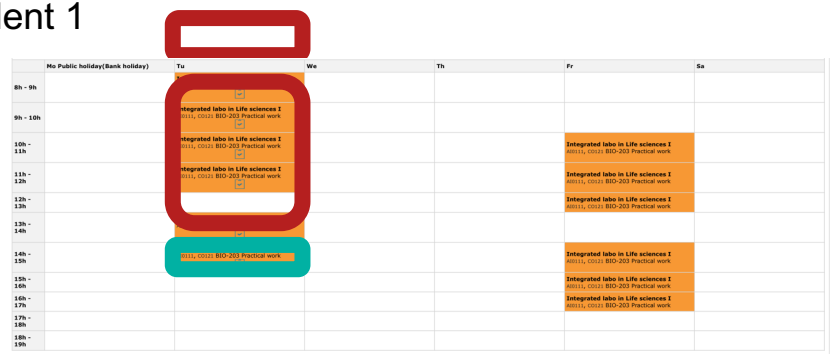
Total workload: 90 hours corresponding to 3 ECTS (BIO-203)

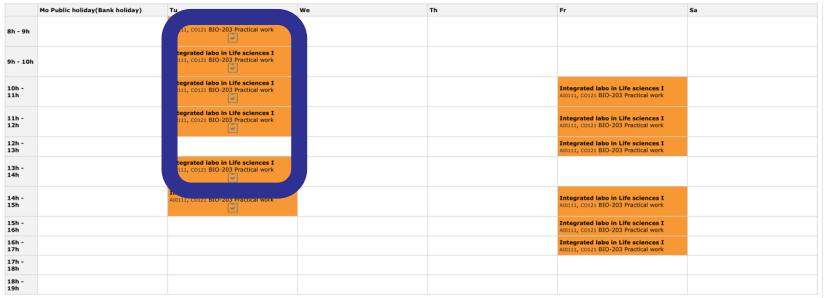
Rooms available (CO121 or DIA004; see ISA)

How to distribute the work

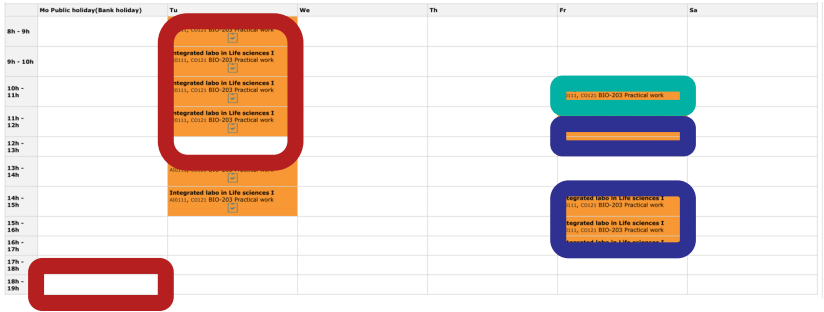
Example group A/C:
Distribute work during week

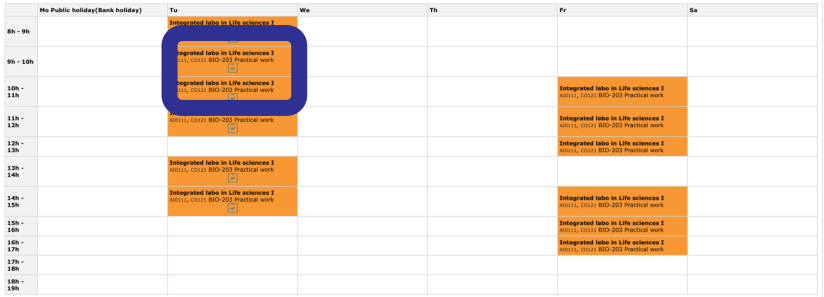
student 1





student 2





Teamwork

Lab work

- Share tasks among group members, rotate responsibilities

Questions & Exercises

- Discuss with fellow students/ assistants

Lab report/ poster

- Group members are expected to equally contribute

Conflict within the group?

- Inform your assistant or course instructor

Lab Safety Rules

Wear a lab coat (provided)

Wear gloves during experiments

Wear goggles when indicated

Wear long trousers & closed shoes

Tie up long hair

No food and drinks in TP lab

Clean up before you leave

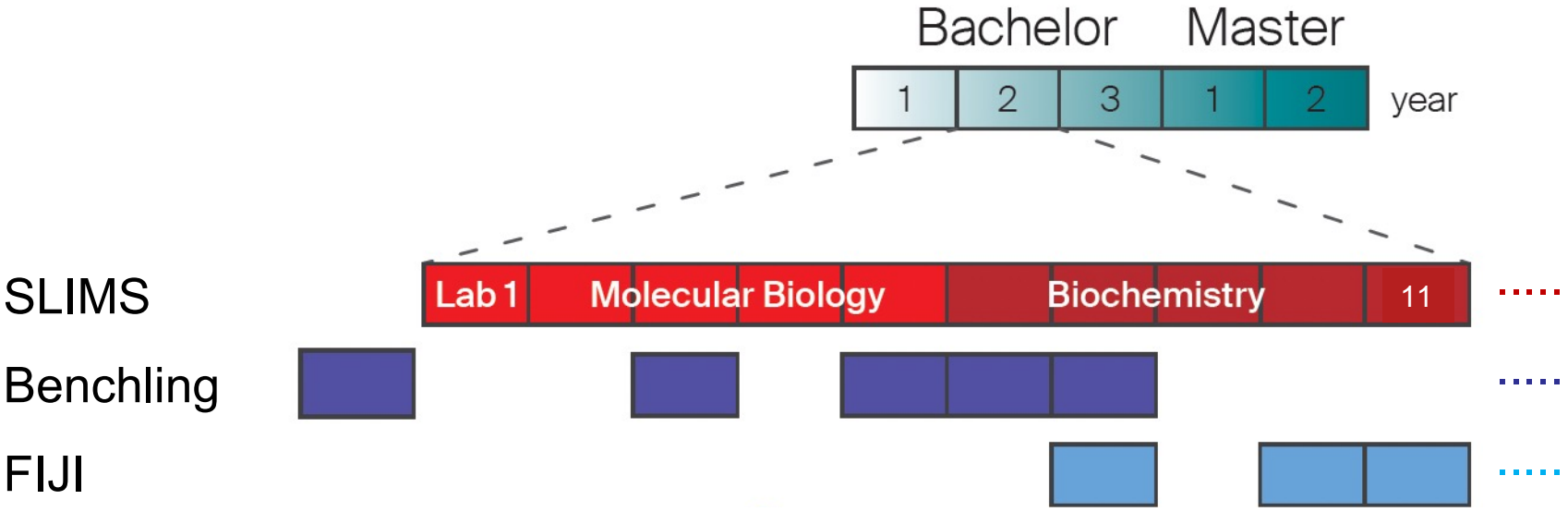
International Team of Assistants

career

Language

	🇬🇧	🇫🇷
Course documents & presentations	+	
Assistants speak	+	some
Ask questions	+	+
Exam questions	+	+
Lab notebook & reports	encouraged	allowed

Software Tools



Workshops

Getting started with Benchling software

Creating effective scientific figures and legends

How to analyse scientific data

How to write a scientific report

See Moodle

Evaluation

Continuous control	December	December	
Electronic Lab Notebook	Lab Report/ Poster 1	Exam	LISV I
Continuous control	May	May	
Electronic Lab Notebook	Lab Report/ Poster 2	Exam	LISV II
40%	30%	30%	Final grade

Laboratory Notebook

A lab notebook is a **legal document** (publication, patents)

A **record of everything you do** in the lab and **why**

All **data** must be entered and labeled with an adequate description

Electronic Laboratory Notebook (ELN)

SLIMS
LIMS + ELN

Each student writes an individual lab notebook

Preformatted content for each lab session

Must be completed one week after the lab session

Assistants will give feedback the week after (Moodle/ SLIMS)

Use the feedback to improve

Final Laboratory Report/ Poster

Guidelines will be posted on Moodle

Describe the aims, experiments, results and discussion of the data (figures + figure legends)

Submitted at the end of the semester

Exam

Multiple choice questions

December 17

Délégués de classe

Please contact me

Questions ?

Intro Benchling Software

Dr. Alexandra Bezler

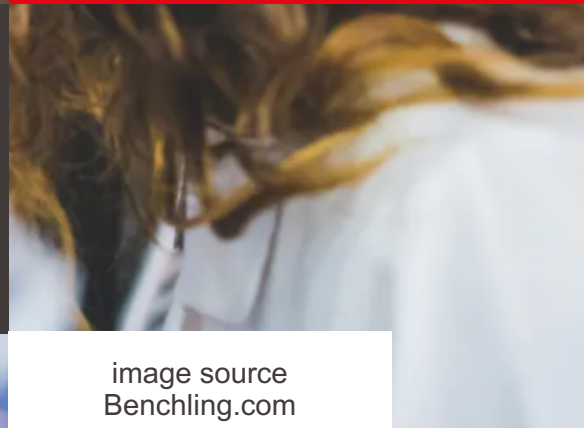


image source
Benchling.com

Benchling: What? Why?

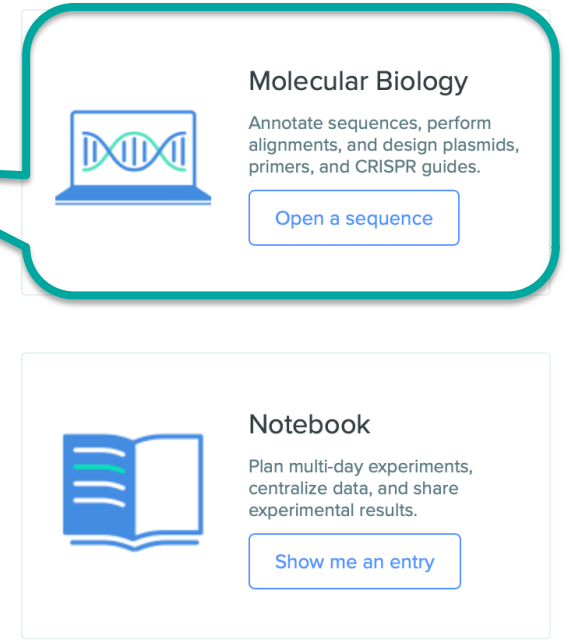
DNA sequence visualization + analysis

Professional tool (used in industry + EPFL)

Cloud based software

Basics quick to learn

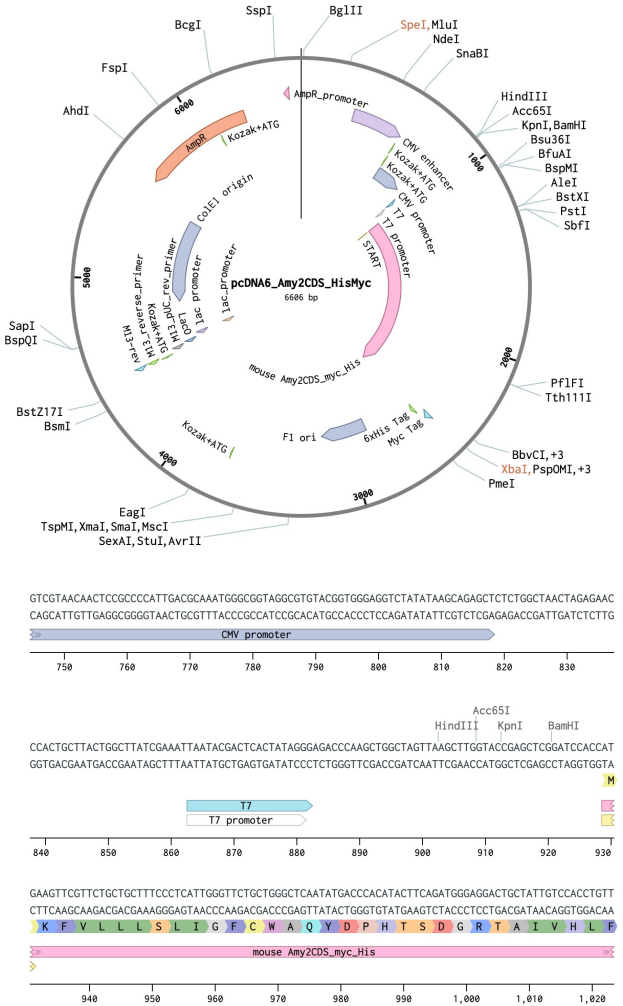
‘How to’ tutorials



Using Molecular Biology Tools

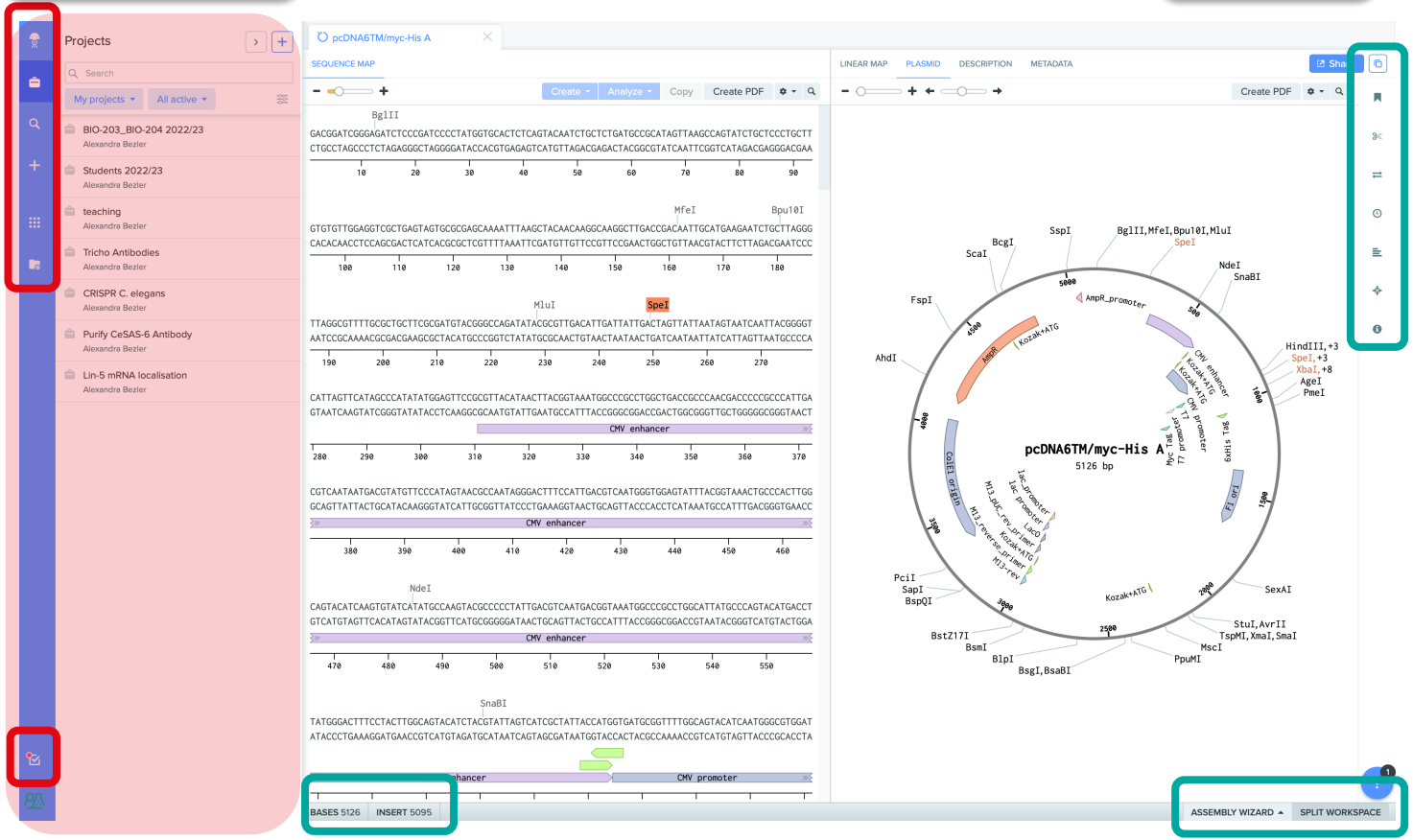
BIO-203/ BIO-204:

- annotate sequences
- restriction digest
- primer design
- translation
- sequence alignment
- virtual cloning



Account

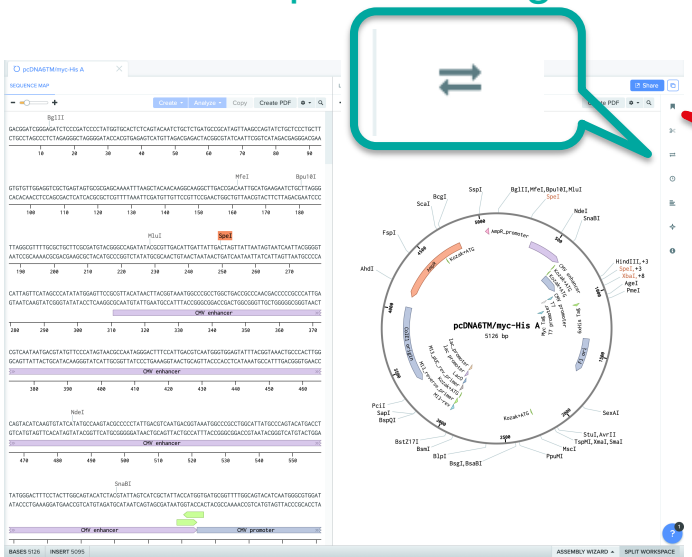
Molecular Biology



Your turn to play:
See Moodle Benchling

Worked example 1

PCR and primer design



Worked Example 2

Sequence annotation

first copy file to your account

Your tasks

Today

- ✓ create Benchling account
- ✓ exercise 1
- ✓ exercise 2

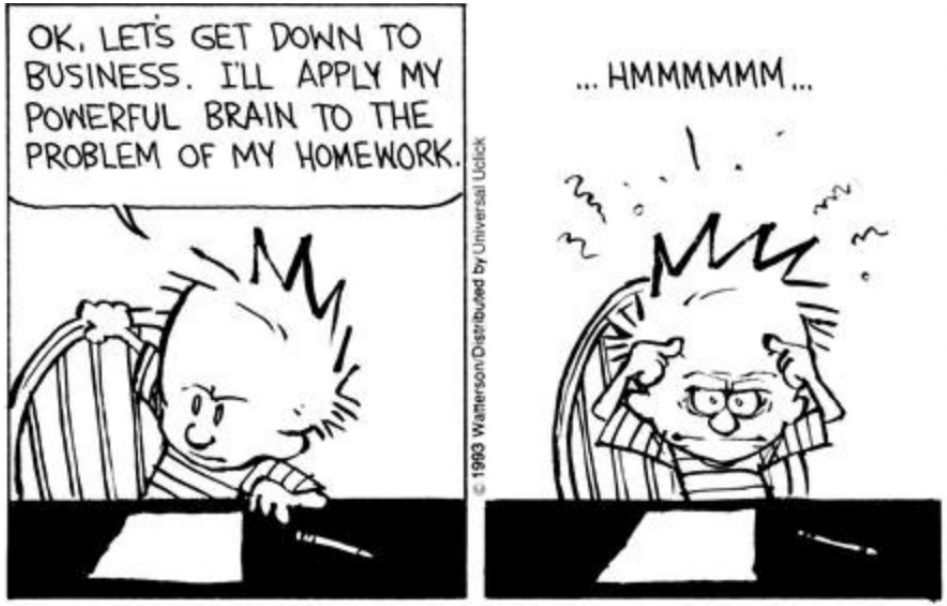
Homework

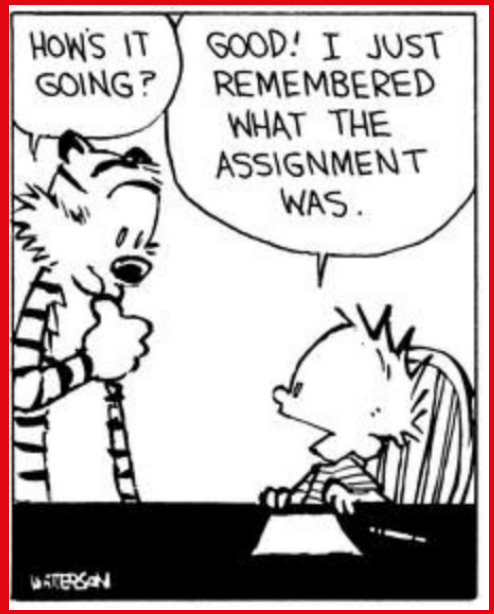
biosafety (Moodle)

- **presentation**
- **quiz**

finish Benchling exercises

See you soon!





Calvin & Hobbes
by Bill Waterson