# Greener Labs

How can you implement sustainability in everyday lab routines?



### Join our **Coffee Lecture**!

Thu, 30.09.21, 11:00 - 11:30 am via Zoom

## Greener Labs

How can you implement sustainability in everyday lab routines?



### Familiar lab routines

• Plastics are everywhere.

....

- Each step requires a new tip.
- Falcons for buffers are thrown away after single-use.
- Accumulation of huge polystyrene boxes.
- Nitrile gloves are often used more than needed.
- Air circulation equipment is on non-stop.
- Structure in the freezers is not well-organized and documented.
- Ultra-low freezing is standard at -80°C.





# Quiz: Would you have guessed it?

- How many types of plastics exist? 1 2 3 4 5 6 7
- What energy saving can be achieved by upregulating the ULT freezer from -80°C to -70°C?
   30%
- What energy consumption correlates with running a fume hood 24h for 365 days? (unit <sup>^</sup>/<sub>1</sub>)
   <sup>^</sup>/<sub>1</sub> <sup>^</sup>/<sub>2</sub> <sup>^</sup>/<sub>1</sub>
- How much water is consumed by a single run of an autoclave? up to goo liters of water!
- What CO<sub>2</sub> emission is equal to a 100 ns dynamic simulation of the Satellite Tobacco Mosaic Virus?
   95kg ~ 545 km car ride



### Strategy: How you can tackle this problem as a scientist!

#### Wet Lab

- Reuse plastic especially when sterility is no issue!
- Replace plastic with glass if possible!
- Minimize amount of plastics entering the lab!
- Use "Take-Back-Systems" of companies
- Cold storage: Colder isn't always better be a minimalist! Don't keep things you won't need again.
- Switch off air circulation equipment if not needed! (sticker, friendly reminder,..)
- Close the sash of your fume hood each time you stop working there!

#### Dry Lab

- Minimize unnecessary computations!
- Data analysis at first on small dataset
- use calculator: CO<sub>2</sub> emission worth it?



The Caring Scientist: Mission Sustainable

Nikoline Borgermann & Adriana Wolf Perez



### Bottlenecks: University

- MONEY: Internal research funds are not high enough to invest in sustainability! Mentality: "Let's further use the ULT freezer if it's still working!" Reality: high energy consumption → high running costs
- GENERAL SUPPORT: lack of structural support from university
   Providing material on the uni website, e.g. guidelines /tips & tricks
   making it easier to achieve green changes
   Lack of communication: networking to keep motivated in thinking sustainable!
- HUMAN: Research time often takes priority; plastic consumables > glass ware Convenience, easier handling
  - Habits: Easier to keep doing what you always did



### Initiative: Prof. Brun´s Lab (FB07)

- supported by **Sustainability Office** of the TU Darmstadt
- Working group: Sustainable Labs Initiative concept / guideline for "Greener Labs" at the TU Darmstadt
- First ideas:



Prof. Nico Bruns

"Traffic Light System" as marking toxicity/harmfullness of chemicals, solvents, etc.

"**Pooling**" of **devices**: sharing of smaller lab equipment, not limited to working group only

• Sustainability concept as **unique selling point** for university!

Soft skills as competences via lectures (sustainable synthesis, etc.) Living the trend of sustainability on the campus!



## Additional links

- <u>https://www.mygreenlab.org/</u>
- <u>https://www.labconscious.com/</u>
- Guides, Tips & Tricks
- https://www.ucl.ac.uk/sustainable/staff/labs/resources-and-materials
- http://2017.igem.org/wiki/images/6/60/T--TU\_Dresden--GoGreenGuide.pdf
- Calculate CO2 footprint of computations:
- http://www.green-algorithms.org/
- Samples that can be stored at -70°C:
- https://docs.google.com/spreadsheets/d/13UvBeoXAhwSHshSYoUDHwcxWiW7qYLnUb-eLwxJbCYs/edit#gid=0
- Plastic reduction in microbiology lab
- doi: 10.1099/acmi.0.000173

Podcast-Link:

https://open.spotify.com/show/1BCQF97RRT8YcBCPMjCvVW



We would be open for nice discussions!