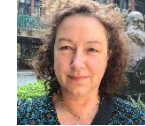




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# Failing with grace- iGEM competition and course

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## What is iGEM?

Studentdriven challenge-based education

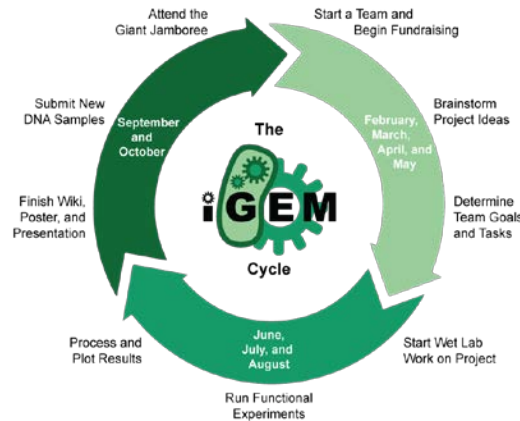
- Link to international student competition [www.igem.org](http://www.igem.org)
- Students choose their own project and common goal
- Research preparation and planning
- Skills-building: molecular/synthetic biology, lab and bioinformatics as well as generic skills, e.g. information search, collaboration, leadership and intercultural communication
- Human practice: Collaboration and reach-out

## Common failures in iGEM

**Experimental:** dilutions, documentation, misunderstandings

**Planning:** Estimation of time and resources needed.

**Social/communication:** unclear/dihonest communication



## How do we learn?

- Time and place to discuss failures
- Sharing generously and honestly in a safe environment

## Failing

Ideas/hypotheses, experiments, collaboration and communication fail!  
Students solve problems and have time to iterate or change plans and hypotheses. In the process, students build grit, enhanced understanding and confidence.

## Teacher support

Course framework (safety, schedule, examination and more), codes of conduct, teaching- cheering on.

## Teachers

Margareta Krabbe (course leader), Uppsala University professors Anthony Forster, Hugo Gutierrez de Teran, Samuel Flores and David van der Spoel

## References:

[www.igem.org](http://www.igem.org)

Henry *et al.* 2019 "FAIL is not a four-letter word..." CBE Life Sciences Education 18: 1-17

Heller *et al.*, 2020 "The value of failure..." Journal of Chemical Education 97, 3609-3616



iGEM Uppsala team 2022