Class core values

1. Be **respect**ful to yourself and others
2. Be **confident** and believe in yourself
3. Always do your **best**
4. Be **cooperative**
5. Be **creative**
6. Have **fun**
7. Be **patient** with yourself while you learn
8. Don’t be shy to **ask “stupid” questions**

Protein Engineering in Action

Per Jr. Greisen

Director for Computational Drug Discovery

Novo Nordisk

Manasi Pethe

Protein Engineering Data Scientist

Bayer Crop Science

Alex Carlin

Protein Engineer

Ginkgo Bioworks

Amandeep Sangha

Research Scientist

Arzeda

Specific aims

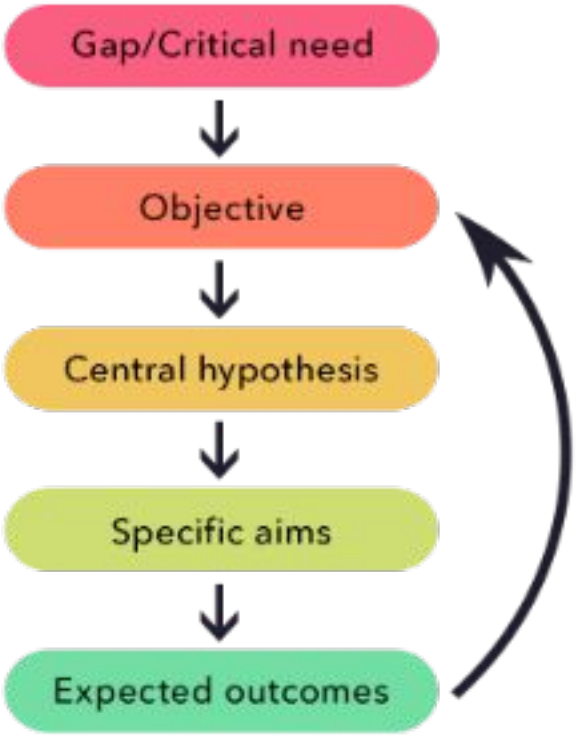

Image from Bioscience advising

First step is to refine your idea

1. Start by stating your gaol
    a. What is your objective?

First step is to refine your idea

1. Start by stating your gaol
2. Think about gaps in knowledge/technique
   a. Has this been done before? If so, why my way is better?
   b. How am I making a new contribution?

First step is to refine your idea

1. Start by stating your gaol
2. Think about gaps in knowledge/technique
3. Think about deliverables and outcomes
    a. Who cares?
    b. What differences it will make?
    c. Which groups will benefit?
    d. Am I creating a new knowledge?
    e. Is it transferable to other communities? (broader impact)

First step is to refine your idea

1. Start by stating your gaol
2. Think about gaps in knowledge/technique
3. Think about deliverables and outcomes
4. Have a measure of success

First step is to refine your idea

1. Start by stating your gaol
2. Think about gaps in knowledge/technique
3. Think about deliverables and outcomes
4. Have a measure of success
5. Identify risks
    a. How long will it take?
    b. How costly it will be?
    c. What are the failure routes?

First step is to refine your idea

1. Start by stating your gaol
2. Think about gaps in knowledge/technique
3. Think about deliverables and outcomes
4. Have a measure of success
5. Identify risks
6. Assess risk vs benefit

First step is to refine your idea

1. Start by stating your gaol
2. Think about gaps in knowledge/technique
3. Think about deliverables and outcomes
4. Have a measure of success
5. Identify risks
6. Assess risk vs benefit
7. Revise accordingly

First step is to refine your idea

1. Start by stating your gaol
2. Think about gaps in knowledge/technique
3. Think about deliverables and outcomes
4. Have a measure of success
5. Identify risks
6. Assess risk vs benefit
7. Revise accordingly

Getting familiar with the specific aims page

Introduction

What, why, who

Specific aims

Pay off

Introduction

Opening sentence -- hook

Current knowledge

Gap in knowledge/lack of something

=> a need we have to address!

Introduction

What, why, who

Specific aims

Pay off

What/Why/Who

From broad to narrow:

- Long-term goals
- Overall objective
- Current hypothesis
- Rationale

Introduction

What, why, who

Specific aims

Pay off

Aims

All part of your central question

Flow logically, but **not dependent**

Short informative headlines

Allow for alternative approaches

Introduction

What, why, who

Specific aims

Pay off

Pay-off

What will be the final results if successful

What new things we learn/can do

Who else will benefit from it

Introduction

What, why, who

Specific aims

Pay off

In class activity

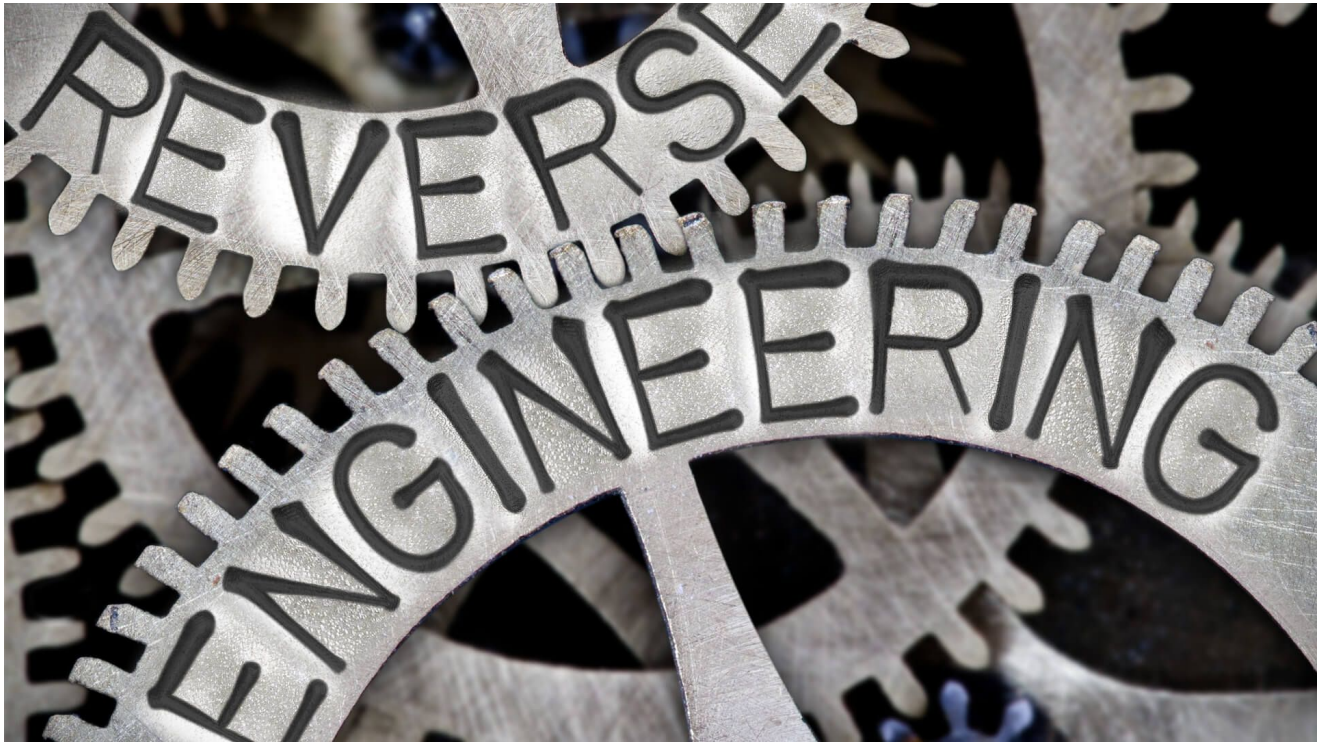

Image from Search Engine Land

For the next lecture:

1. Pre-class assessment

2. Post-class assignment
   You have a week to submit your specific aims
   For people with 510, also add methods

Next lecture:

In search of a global minimum

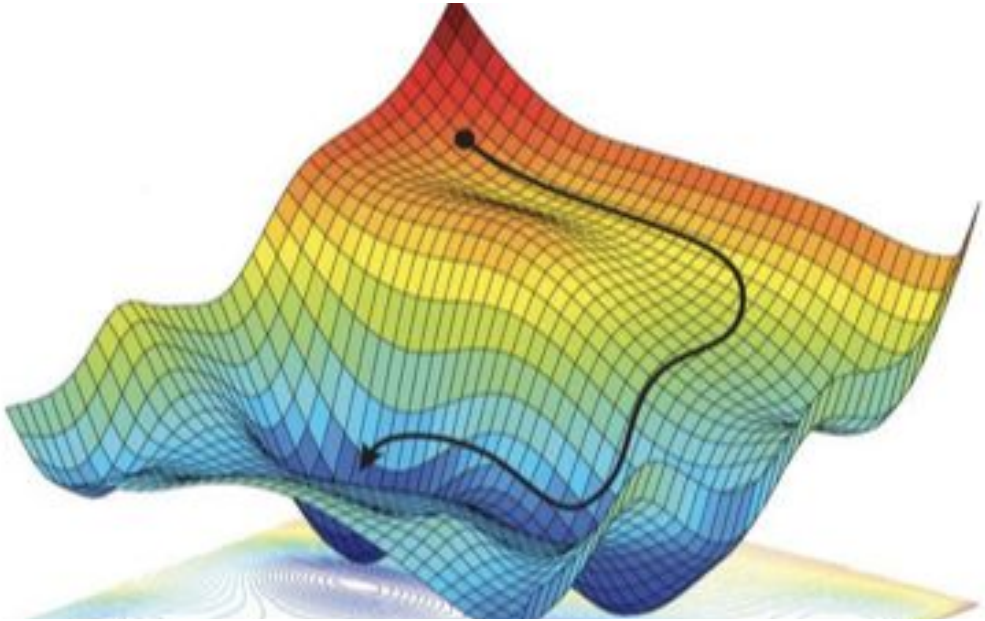

Image from medium: Explanation of gradient descent optimization