

# **The Boring Stuff**

**WiFi password: On the wall**

**Hashtag: #ditseq**

**Drinks & Snacks: Help yourself. Make a donation if you want.**

**Audio recording and photos?**

# The Boring Stuff

## Documentation

[https://public.etherpad-mozilla.org/p/DITSeq\\_-\\_Episode\\_I](https://public.etherpad-mozilla.org/p/DITSeq_-_Episode_I)

**Google Docs, GitHub, ... for more detailed stuff  
you write up**

**Questions are welcome at any time!**

# Thanks!



Alfred P. Sloan  
FOUNDATION

For supporting the DITSeq workshop series through a  
Mozilla Science Foundation Mini Grant



For hosting us today :)

# **DITSeq workshop series**

**Do-It-Together DNA sequencing with the MinION**

**Summer 2018, Berlin - done by September**

**Episode I: Introduction & Brainstorming**

**Episode II: DNA Sequencing I**

**Episode III: DNA Sequencing II**

**Episode IV: Data analysis & Bioinformatics**

**Announcements via Meetup**

**Participants of today's workshop will be given preference  
for the next ones**

**Yes but whyyyy?**



# About us

**Lisa**

**lisa@sillosphere.org**

**Biotinkering Berlin e.V.**

**<https://www.biotinkering-berlin.de/>**

**[biotinkering-berlin@groups.google.com](mailto:biotinkering-berlin@groups.google.com)**

# About you

I'm an  
engineer

I'm a  
scientist

I'm an  
artist

I'm a  
wildcard!

Also: EtherPad!

# **Plan for the day**

- 1. T: The What and Why of DNA sequencing**
- 2. Brainstorming I**
- 3. Discussion I**
- 4. Break**
- 5. T: Planning a DNA sequencing project**
- 6. Brainstorming II**
- 7. Break**
- 8. Discussion II**
- 9. Voting!**

# **What is DNA?**

**What is DNA  
sequencing?**

**Have you sequenced  
before?**

**Have you used a  
MinION before?**

**Have you done a DNA  
extraction?**

**Do you know what  
PCR means?**

**Have you done a  
PCR?**

# **RNA?**

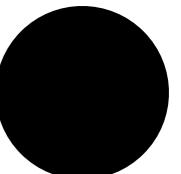
# **Metagenomics?**

# **Phylogeny?**

# **GWAS?**

**SNP?**

# Bioinformatics?

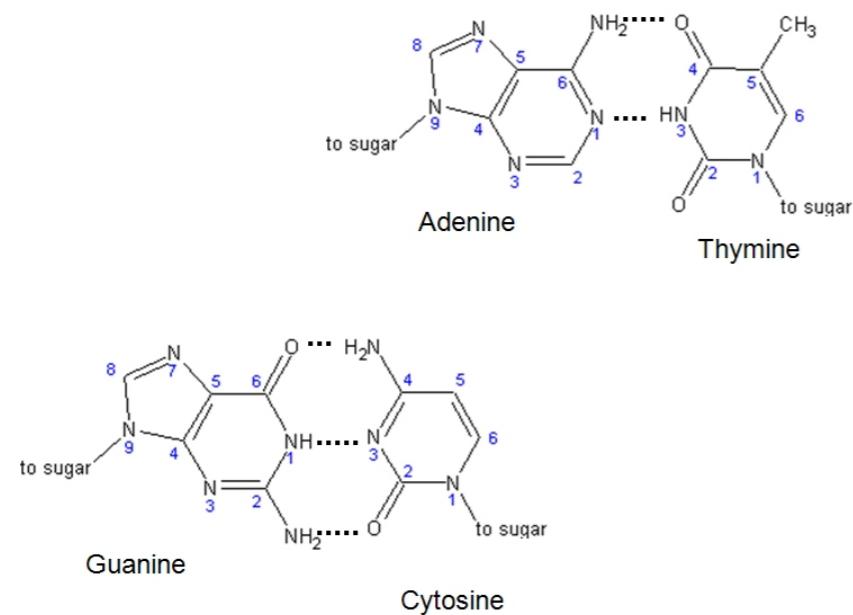


DITSeq - Episode I

# The What and Why of DNA sequencing

# **What is DNA?**

## Watson-Crick pairs



AGCGCTAGGAGAGCTAGAGATCGGACGCGATGAGAGCTAGGAGACTTAGAGAGATCGA

**What DNA can tell you.  
And what it cannot.**



scientists discover gene for



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[Scientists Discover a Gene for Pain Thanks to Some Super-Tough ...](#)

[bigthink.com/.../scientists-discover-the-gene-for-pain-thanks-to-some-super-tough-itai... ▾](https://bigthink.com/scientists-discover-the-gene-for-pain-thanks-to-some-super-tough-itai...)

Dec 18, 2017 - Because of this, medical **researchers** have been looking to find a pain control method that isn't addictive. Unfortunately, we don't have a good ...

[Scientists discover gene that could be making you fat - Gizmag](#)

[https://newatlas.com/obesity-gene-stores-fat/52177/ ▾](https://newatlas.com/obesity-gene-stores-fat/52177/)

Nov 13, 2017 - We all have that annoying skinny friend who seems to be able to eat anything and never put on weight, yet others struggle to keep the pounds ...

[Scientists discover gene controlling genetic recombination rates ...](#)

[https://www.sciencedaily.com/releases/2018/04/180421085728.htm ▾](https://www.sciencedaily.com/releases/2018/04/180421085728.htm)

Apr 21, 2018 - Genetic recombination is vital to natural selection, yet some species display far more crossover than others. **Scientists** have discovered a gene ...

[Scientists discover key gene for producing marine molecule with huge ...](#)

[https://www.sciencedaily.com/releases/2018/02/180226122612.htm ▾](https://www.sciencedaily.com/releases/2018/02/180226122612.htm)

Feb 26, 2018 - Researchers have discovered a key gene for the synthesis of one of the world's most abundant sulfur molecules -- Dimethylsulfoniopropionate ...

[Scientists discover dozens of new genes for hair colour | Science | The ...](#)

[https://www.theguardian.com/science/.../scientists-discover-dozens-of-new-genes-for-... ▾](https://www.theguardian.com/science/.../scientists-discover-dozens-of-new-genes-for-...)

Apr 16, 2018 - Forensic **scientists** are a step closer to predicting the colour of a suspect's hair from their DNA alone after the discovery of more than 100 new ...

[Scientists Discover a Gene for Brain Size - SciTechDaily](#)

[https://scitechdaily.com/biology-news/ ▾](https://scitechdaily.com/biology-news/)

A team of **researchers** has identified for the first time a gene (ARHGAP11B) that is only present in humans and contributes to the reproduction of basal brain stem ...

# **Height?**



**Not influenced by DNA**

**Completely determined by DNA**

# Height?

# **Intelligence?**



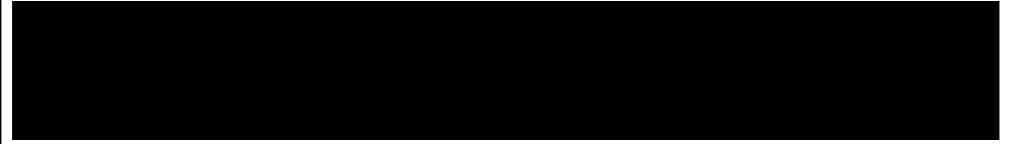
Not influenced by DNA

Completely determined by DNA

# Intelligence?

*Depending on your definition of “intelligence”...*

**Whether you will  
develop cancer?**



**Not influenced by DNA**

**Completely determined by DNA**

# **Whether you will develop cancer?**

**Sex?**



**Not influenced by DNA**

**Completely determined by DNA**

# Sex?

**Whether you will  
develop Huntington's?**



**Not influenced by DNA**

**Completely determined by DNA**

**Whether you will  
develop Huntington's?**

**Whether you will get  
hit by a car?**



Not influenced by DNA

Completely determined by DNA

**Whether you will get  
hit by a car?**

**Age at first kiss?**



**Not influenced by DNA**

**Completely determined by DNA**

# **Age at first kiss?**

**Your favourite colour?**



**Not influenced by DNA**

**Completely determined by DNA**

# Your favorite colour?

**Who are your parents?**



Not influenced by DNA

Completely determined by DNA

# Who are your parents?

*Although here, the relationship is reversed:  
Who your parents are determine your DNA,  
not the other way around*

# **Genotype vs phenotype**

*It's complicated...*

# **Mechanistic vs statistical (GWAS)**

**Influence != determination**

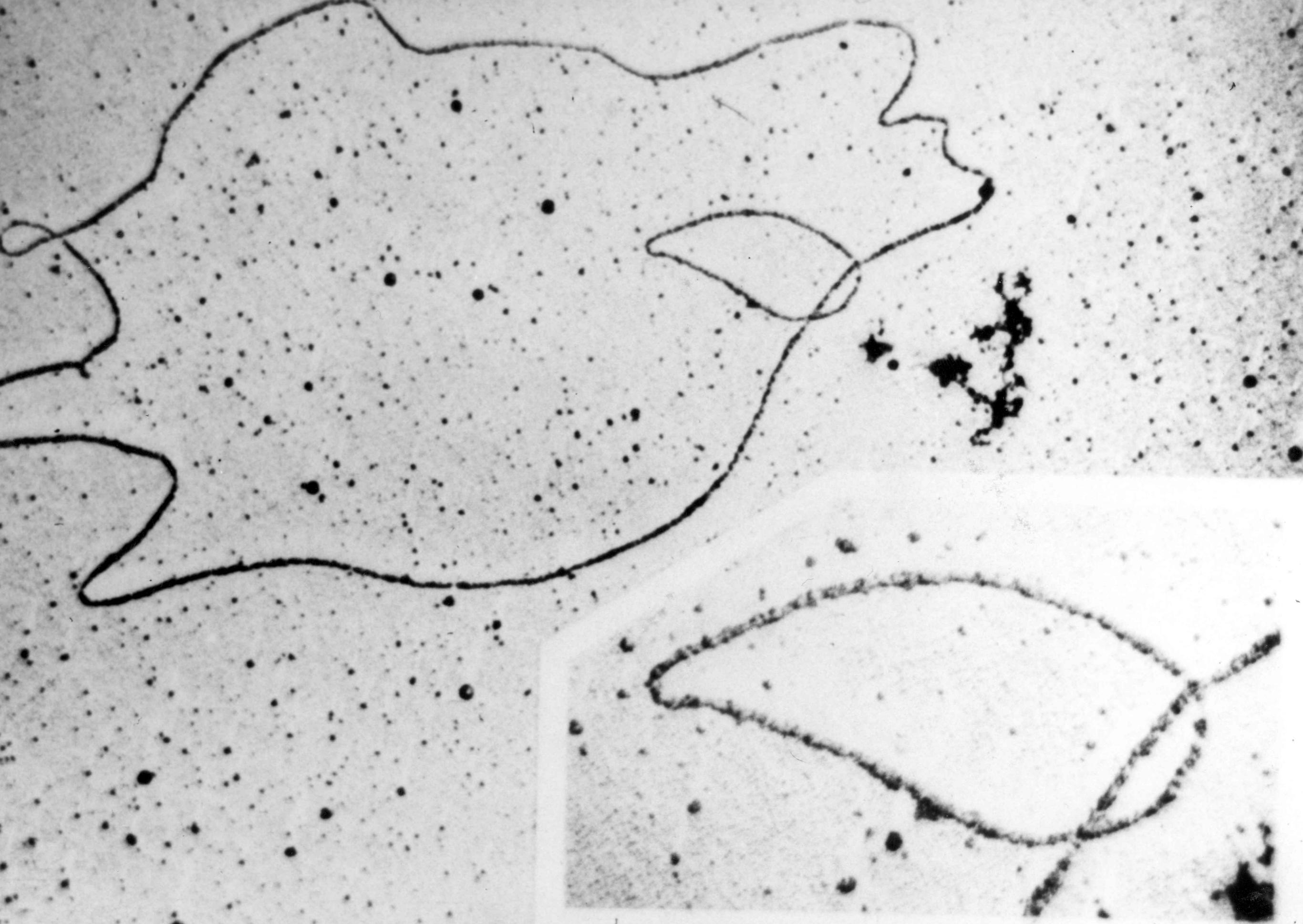
**Correlation does not imply causation**

# **Summary: Why look at DNA?**

**Living organisms have properties, and some of them are influenced or determined by DNA**

**Looking at DNA can give us hints as to how these properties come about and how that works**

**What is DNA  
sequencing?**



# **Nanopore sequencing - Theory**

**Cue video: <https://nanoporetech.com/applications/dna-nanopore-sequencing>**

# **Nanopore sequencing**

## **- Practice**

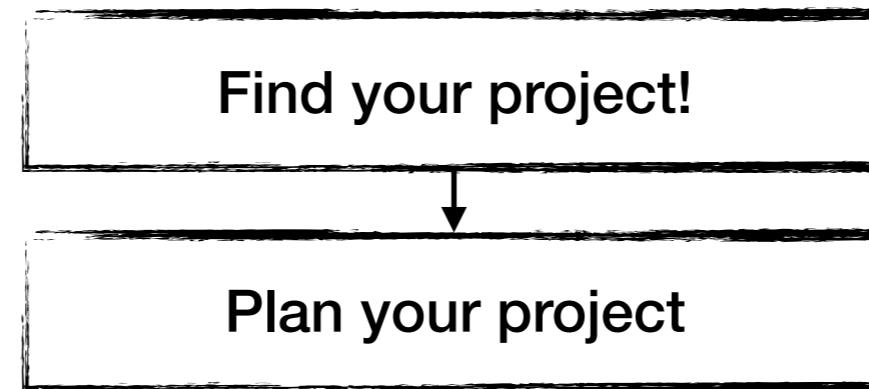


> AGCTAGATAGATATGCCCGCGCTAGACGCGCTATTTAGAGCTATTATAGCGG...

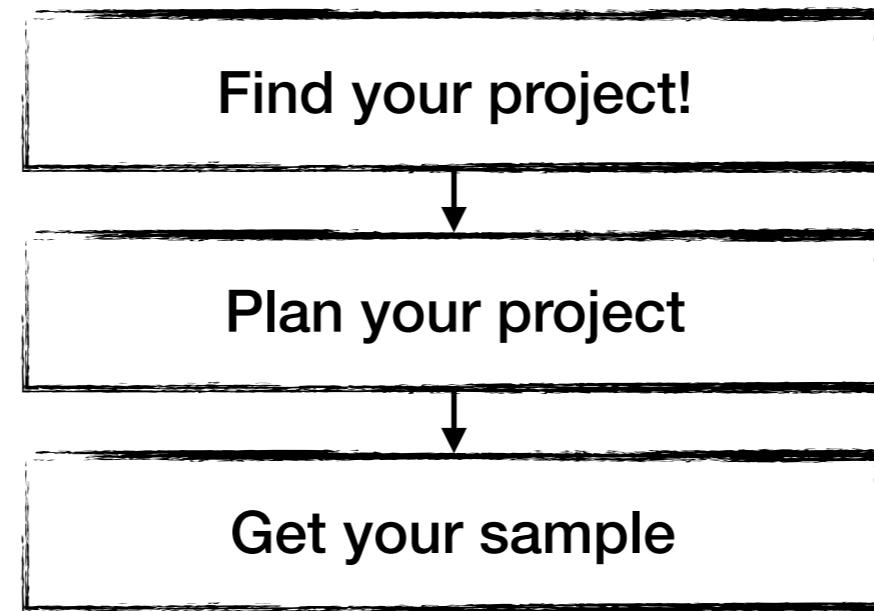
# DNA sequencing project from start to finish

Find your project!

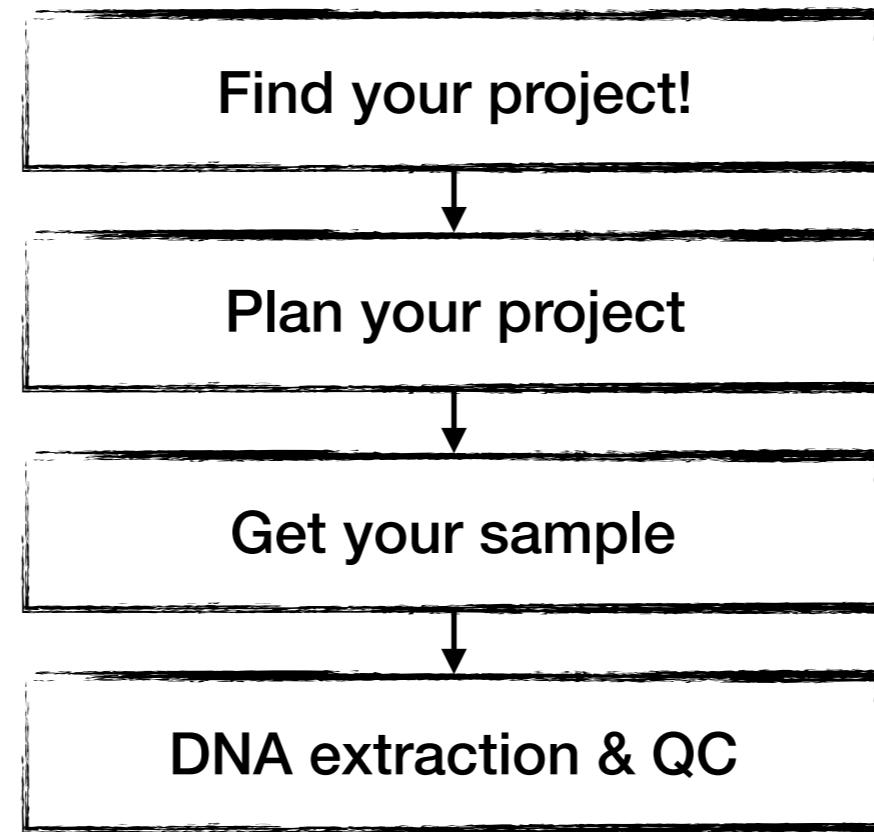
# DNA sequencing project from start to finish



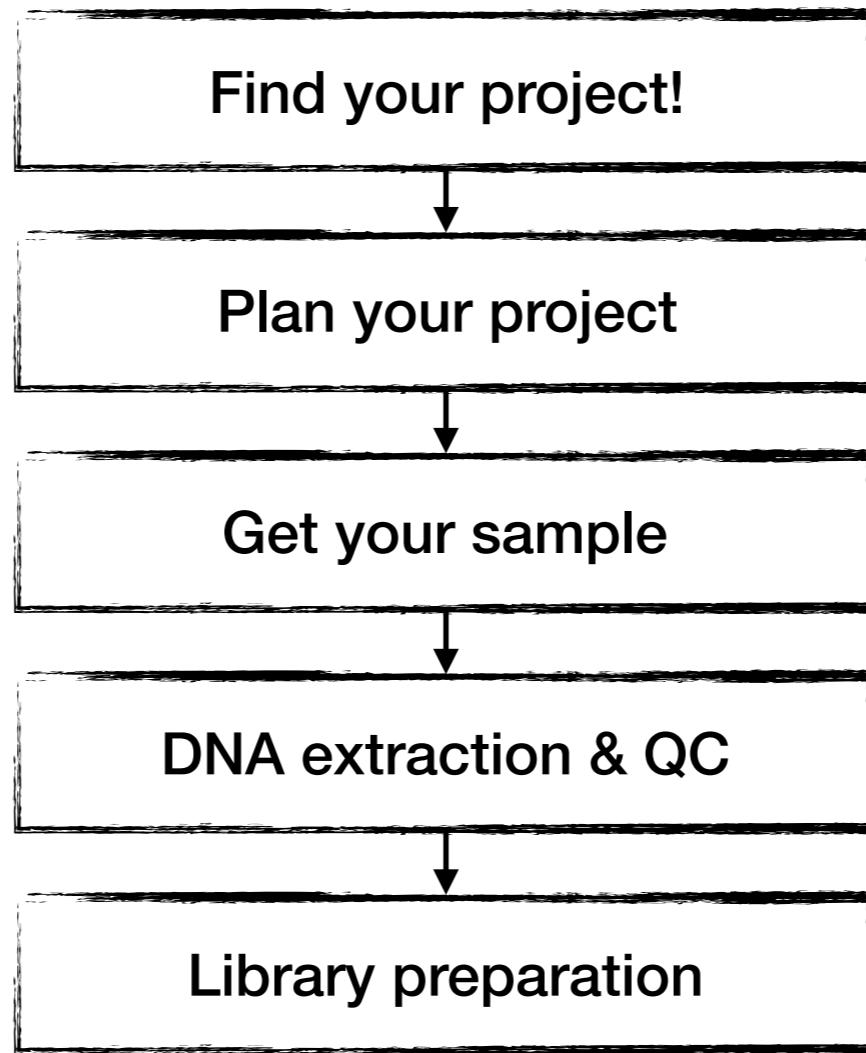
# DNA sequencing project from start to finish



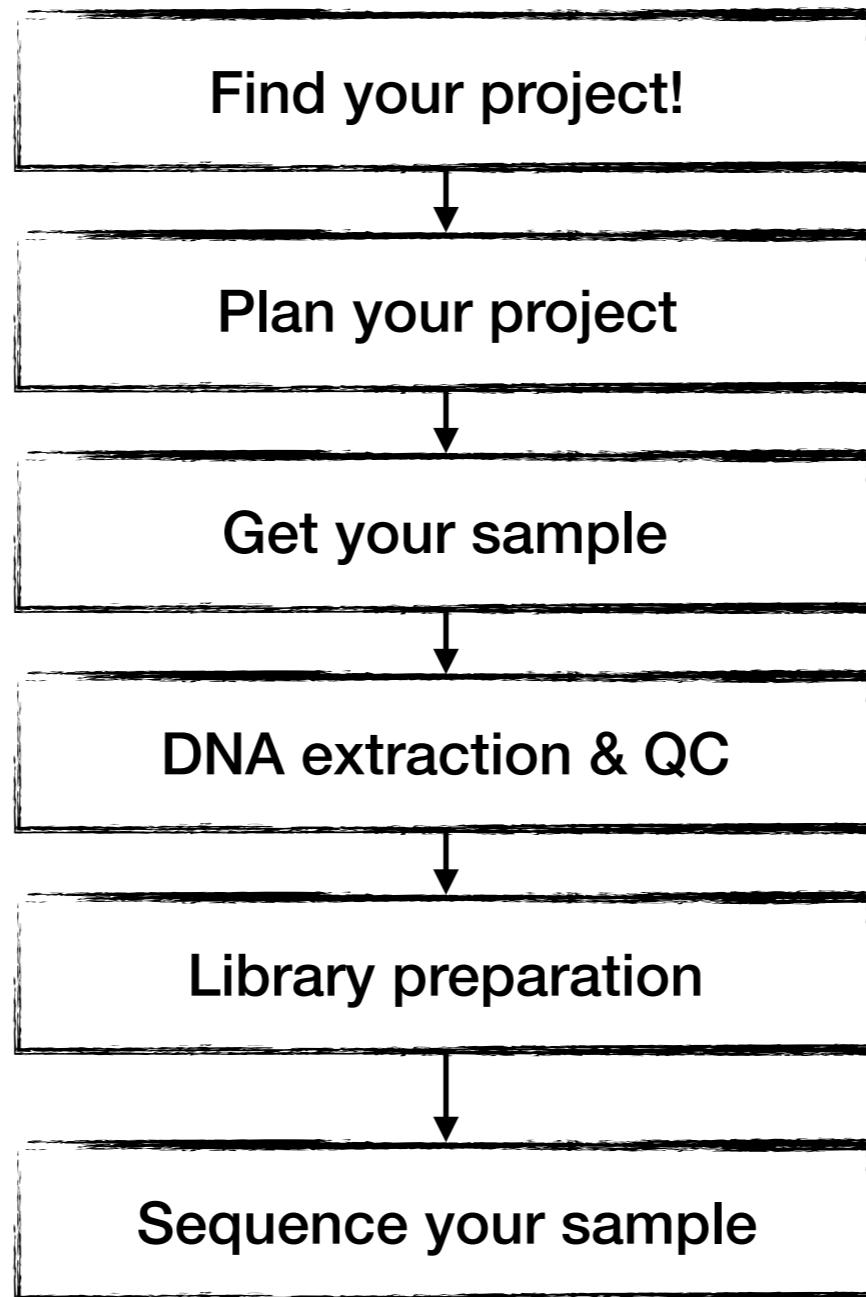
# DNA sequencing project from start to finish



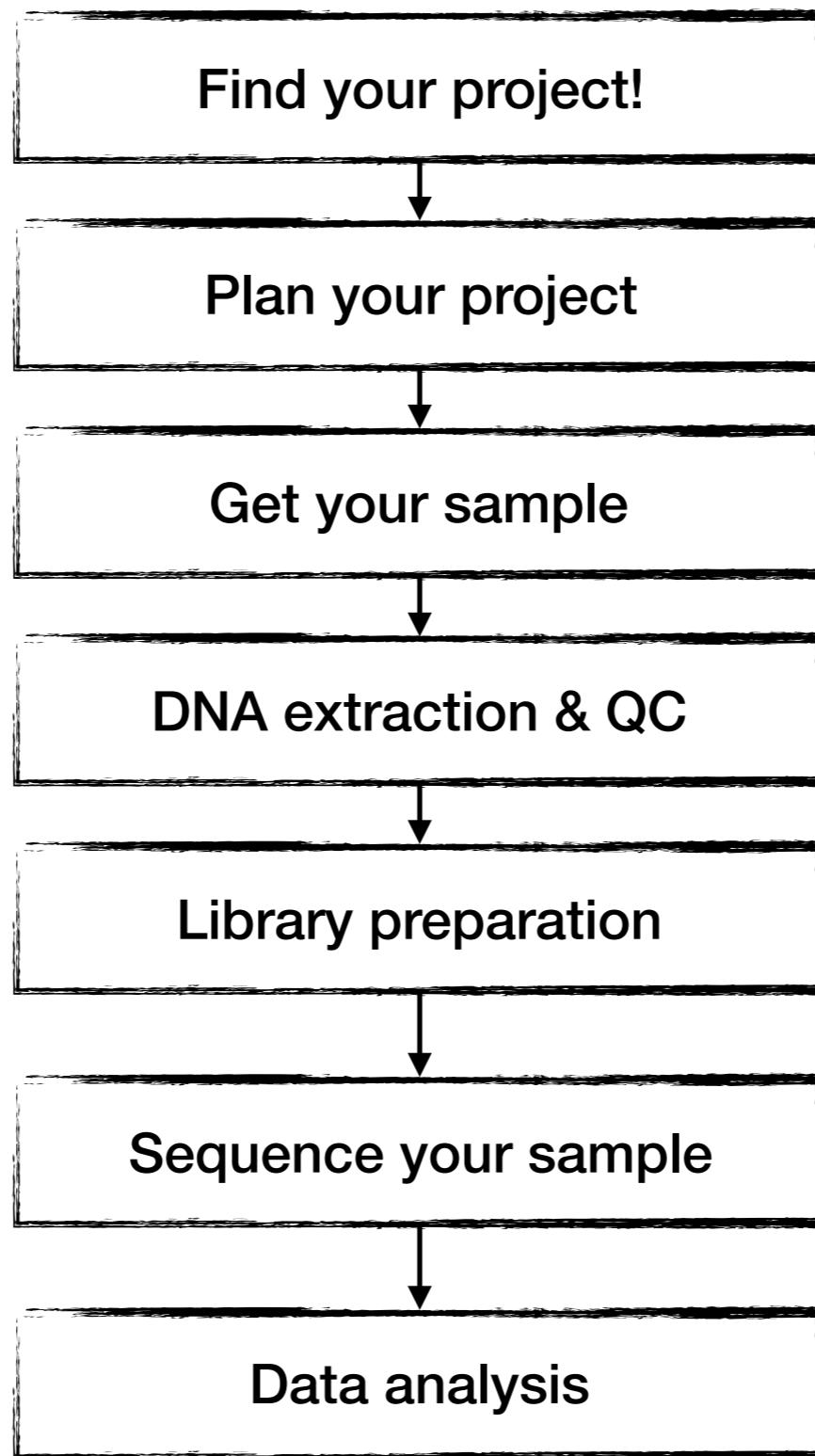
# DNA sequencing project from start to finish



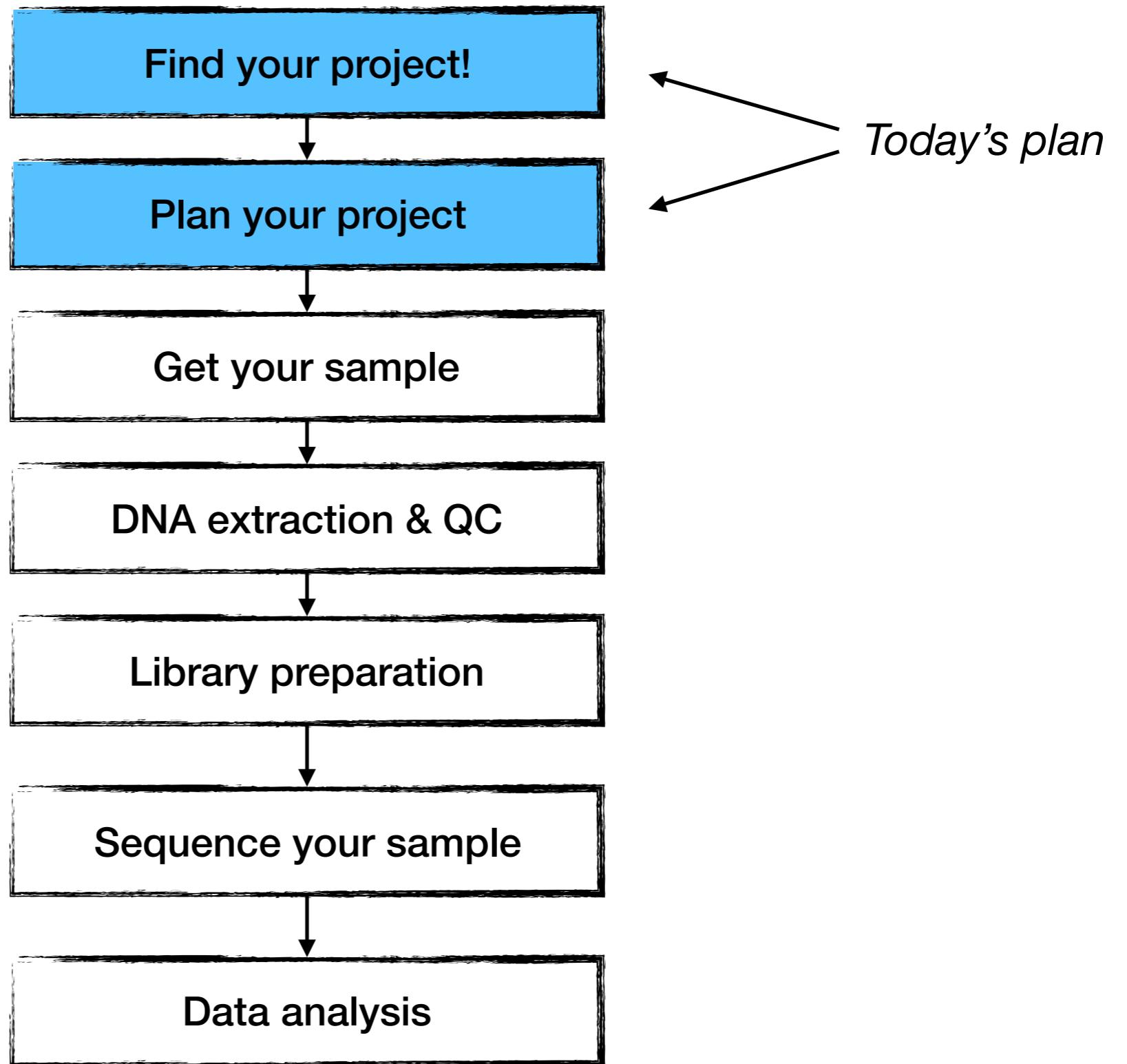
# DNA sequencing project from start to finish



# DNA sequencing project from start to finish



# DNA sequencing project from start to finish



# **Brainstorming!!1 !**