Lecture 01a – Welcome

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Staff

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Structure

This unit includes lectures, self-guided tutorials, labs, discussions, and drop-in sessions.

- **Lectures**: Tuesdays 10 AM, Wednesdays 11 AM, Chemistry Lecture Theatre 3
- **Tutorials**: Self-guided (1 hour), complete before each week's lab.
- **Labs**: South Eveleigh Precinct, Thursday 9 am – 12 pm, Friday 10 am – 1 pm, 2 pm – 5 pm
- **Discussion**: Via Ed discussion, we usually respond the same day unless it is the weekend.
- **Drop-in sessions**: Scheduled as necessary (Zoom or in person). Email us to arrange a session.

Attendance

1. **Lectures**: Highly recommended but not compulsory. Lectures are recorded, capturing slides and audio only, which may miss important discussions.

2. **Labs**: Mandatory, 80% minimum attendance required. Attendance will be taken by QR code. If you miss a lab, you may attend another session that week – send us an email!

3. **Tutorials**: Self-guided (1 hour), complete before each week's lab.

Assessments

Check Unit Outline

Week	Assessment	Weight	Type
4	Early Feedback Task	1%	Individual
5	Project 1: Describing data	10%	Individual
10	Project 2: Analysing experimental data	20%	Individual
13	Project 3: Presentation (multivariate)	20%	Group
-	Quizzes (weekly, multiple due dates)	4%	Individual
-	Exam (2 hours, MCQs + Short Answers)	45%	Individual

South Eveleigh Precinct

Used to be known as the **Australian Technology Park** (ATP). *Still is, but it used to, too.*

Biomedical Building

Credit: Michael Wheatland

Directions

Buses

Courtesy buses are available:

- The best option is to take the bus from **Fisher Library** to **Redfern Station**, then walk to the precinct (through the new station platform as "local traffic").
- Alternatively, direct buses are available – but less frequent.

Driving

Free parking is available around Henderson Road, but it is extremely crowded. We do *not* recommend driving to the precinct.

Walking

Walking to the South Eveleigh Precinct takes about 20 minutes. However, you can save approximately 5 minutes by using Redfern station's community access gates, where you don't need to use an Opal card to get through.

If the map does not load, click here

Your Statistical Journey

Statistics in Action

Modern science and decision-making are driven by data:

- **Research**: From lab experiments to field studies

- **Policy**: Environmental management decisions

- **Industry**: Business analytics and optimisation

- **Innovation**: AI and machine learning – foundations
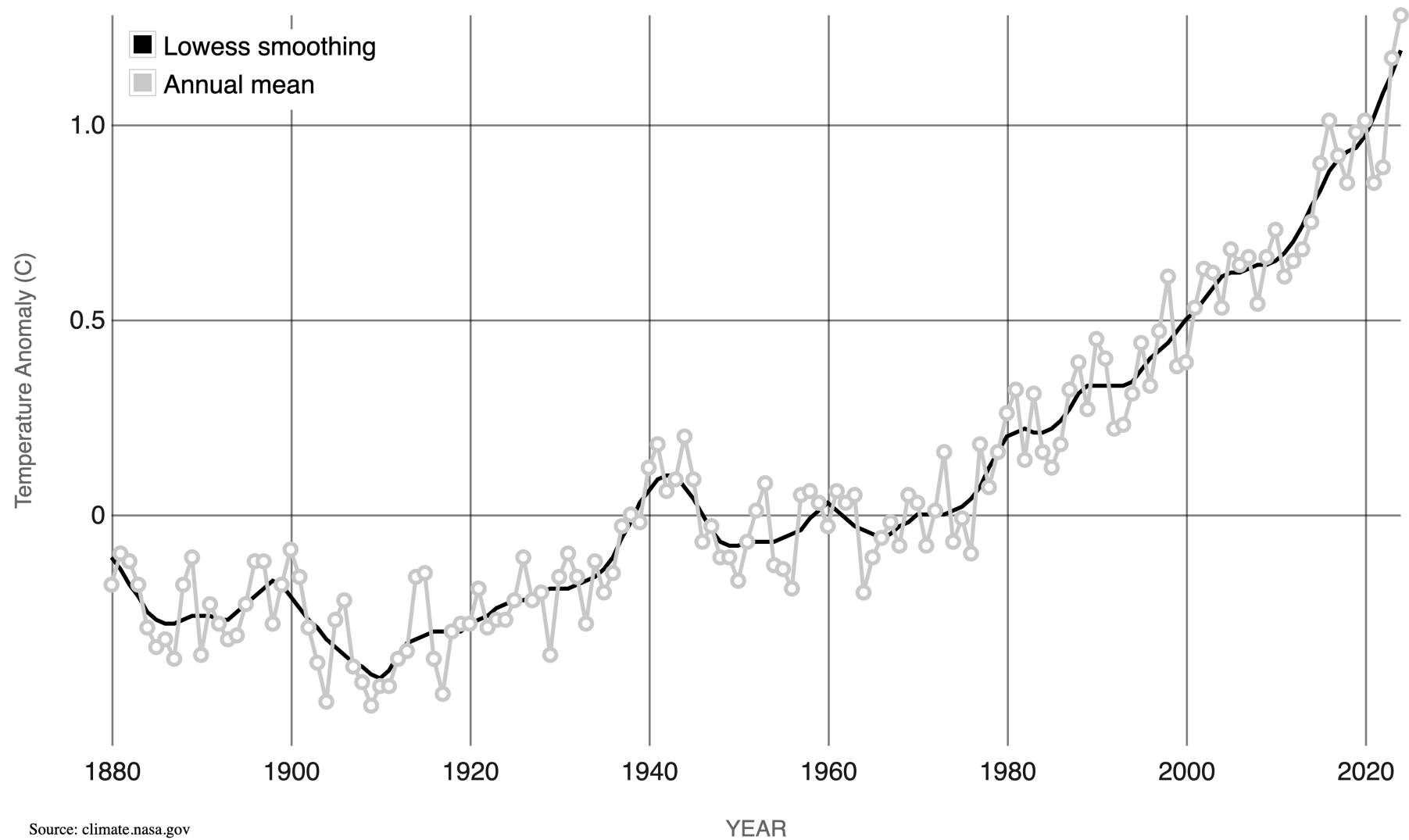
Why Statistics Matters?

Statistics empowers you to:

- Turn raw data into meaningful insights

- Make evidence-based decisions

- Communicate findings effectively

- Solve complex real-world problems

Statistics helps avoid misinterpreting data. Source: *Anchorman* (2004)

Real-world Applications

Legend:
- Lowess smoothing
- Annual mean

Y-axis: Temperature Anomaly (C) — 1.0, 0.5, 0

X-axis: YEAR — 1880, 1900, 1920, 1940, 1960, 1980, 2000, 2020

Source: climate.nasa.gov

Source: NASA's Global Temperature Index

Sports Analytics

The favorites stick around longer at the Australian Open

Average number of rounds won for men's and women's players seeded in the top 10, by seeding at each of the four Grand Slams, 2011-20
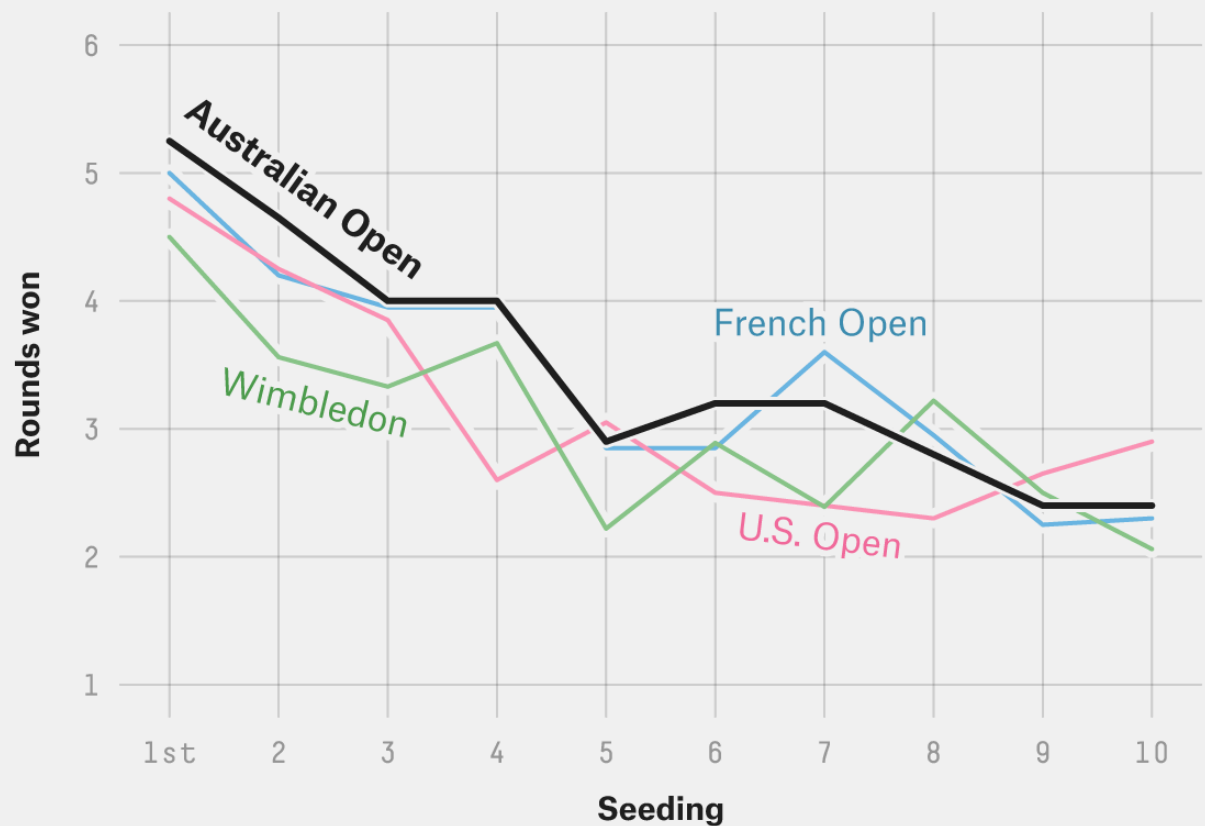
FiveThirtyEight

SOURCE: TENNIS ABSTRACT

The 10 highest-seeded players averaged 3.48 rounds won in the Australian Open since 2011, compared to just 3.03 at Wimbledon. Source: fivethirtyeight

Your Path Ahead

This course will develop your:

Technical Skills

- R programming proficiency
- Data visualization expertise
- Statistical analysis methods

Professional Skills

- Critical thinking
- Scientific communication
- Problem-solving abilities

Doing well

Lecture attendance options

In-person vs. online recordings

In-person benefits:

- Real-time interaction with peers and lecturers
- Immediate feedback and clarification of concepts
- Active participation in discussions and polls
- Building connections with classmates

Online recording benefits:

- Flexibility to manage other commitments
- Ability to pause and review complex concepts
- Learn at your own pace
- Convenient for those with long commutes

On-campus or online?

Choose the option that best suits your learning style and circumstances. **If watching online, try to**:

- Stay up to date with recordings to avoid falling behind
- Use Ed discussion board actively for questions
- **Attend some lectures in person when possible for key topics**

There is a strong positive correlation between lecture attendance and final grades – but it's not the only factor. *It may just be the case that students who attend lectures are more likely to keep up with the course material.*

Put in the hours

- This is a **6 credit point** unit, which means that you are expected to spend **120 – 150 hours** in total, including exam prep time (~10 h per week)!

- **Practice makes perfect**. Tutorials and Labs help you apply the concepts you learn in lectures – complete all the exercises, and practice with the bonus questions provided.

Ask questions

- **Ed** is the *best* place to ask questions. We are way more responsive on **Ed** than on email.

- We are *open* to the use of AI tools (including LLMs like ChatGPT) to help you answer questions about code… but don't use them to cheat *yourself* out of learning.

- We have **drop-in sessions**, where you can jump in and have a chat on Zoom. We will announce the schedule on **Ed**.

Learning outcomes

By the end of this course, we want you to be able to:

- **LO1** demonstrate proficiency in designing sample schemes and analysing data from them **using R**.

- **LO2** describe and identify the basic features of an **experimental design**: replicate, treatment structure and blocking structure.

- **LO3** demonstrate proficiency in the use or the statistical programming language **R** to apply an ANOVA and fit regression models to experimental data.

- **LO4** demonstrate proficiency in the use or the statistical programming language **R** to use multivariate methods to find patterns in data.

- **LO5** interpret the output and understand conceptually how its derived of a regression, ANOVA and multivariate analysis that have been calculated by R.

- **LO6** write statistical and modelling results as part of a scientific report.

- **LO7** appraise the validity of statistical analyses used publications.

Thanks for listening! Questions?

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