

Accessibility in communicating science



What we'll cover

- 1. Colour Schemes
- 2. Fonts
- 3. Figures
- 4. Design
- 5. Screen reading
- 6. Accessibility checker

Colour Schemes

- Choice of colour scheme should consider:
 - How you use your colour scheme
 - If colours can be easily distinguished
 - Colour contrast for text and background

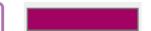
Checking Contrast

- **WebAIM contrast checker**
- **Input Hex colours**
- **Checks contrast for text, large text, and graphics**
 - <https://webaim.org/resources/contrastchecker/>

Contrast Checker

[Home](#) > [Resources](#) > Contrast Checker

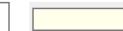
Foreground Color

#A20262 

Lightness



Background Color

#FFFFEB 

Lightness



Contrast Ratio

7.62:1

[permalink](#)

Normal Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

Large Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

Graphical Objects and User Interface Components

WCAG AA: **Pass**



Text Input

Checking Contrast

- Colour Contrast Analyser
- Input Hex colours or use eyedropper tool
- Checks contrast for text, large text, and graphics
 - <https://www.tpgi.com/color-contrast-checker/>



Colour Schemes

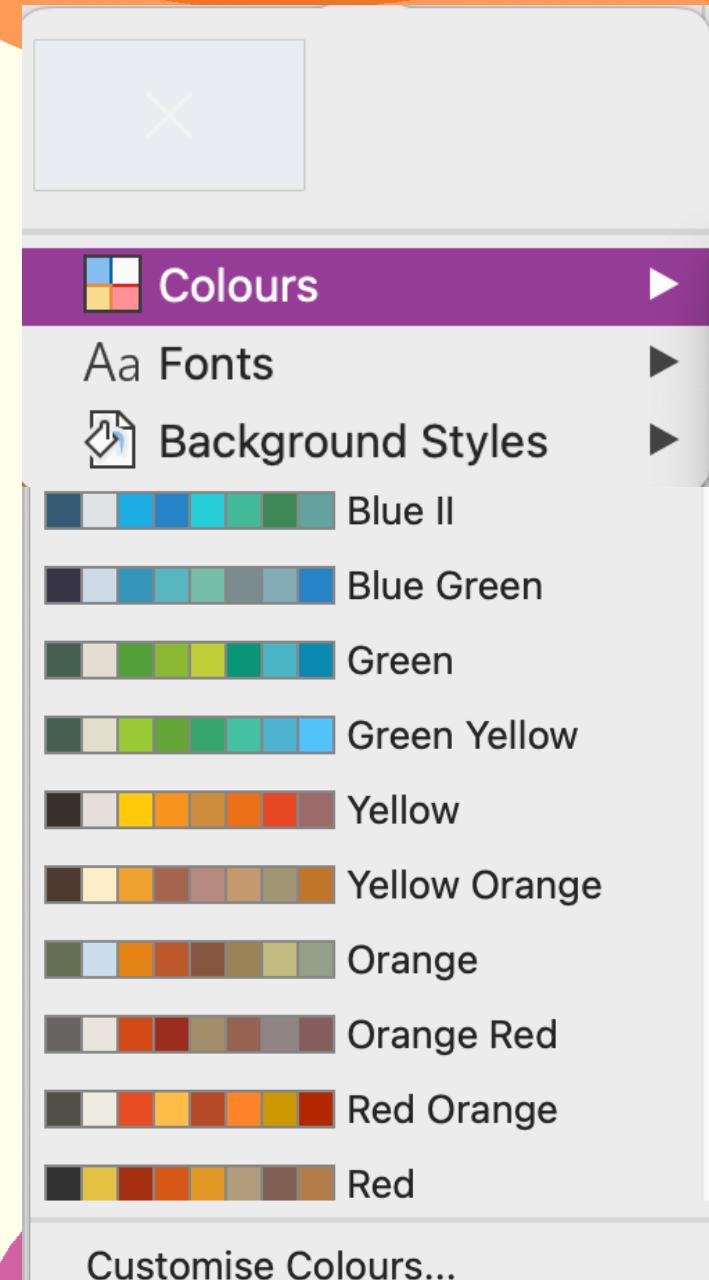
- It can be tempting to avoid thinking about colour
- Black text on a white background is often inaccessible
- Off-white backgrounds are easier

Colour Schemes

- White text on a black background is always better

Choosing Colours

- You can make your own colour scheme
- Then use the design tab to input them to powerpoint



Choosing Colours

- Colour palette builder
- Checks contrasts to find good text / background colours
 - <https://toolness.github.io/accessible-color-matrix/>

Accessible color palette builder



Edit palette

White #FFFFFF
Light #B3EFFF
Bright #00CFFF
Medium #046B99
Dark #1C304A
Black #000000

	White text #FFFFFF Aa	Light text #B3EFFF Aa	Bright text #00CFFF Aa	Medium text #046B99 Aa	Dark text #1C304A Aa	Black text #000000 Aa
Black background #000000	Aa	Aa	Aa			
Dark background #1C304A	Aa	Aa	Aa			
Medium background #046B99	Aa	Aa				
Bright background #00CFFF					Aa	Aa
Light background #B3EFFF				Aa	Aa	Aa
White background #FFFFFF				Aa	Aa	Aa

Colourblind Friendly Checks

- COBLIS colourblind simulator
- Upload a figure online
- Simulate it for different deficiencies
 - <https://www.color-blindness.com/coblis-color-blindness-simulator/>

Drag and drop or paste your file in the area below or: No file chosen

Trichromatic view: Anomalous Trichromacy: Normal Red-Weak/Protanomaly Green-Weak/Deutanomaly Blue-Weak/Tritanomaly *Dichromatic view:* Red-Blind/Protanopia Green-Blind/Deutanopia Blue-Blind/Tritanopia *Monochromatic view:* Monochromacy/Achromatopsia Blue Cone Monochromacy

Use lens to compare with normal view: No Lens Normal Lens Inverse Lens

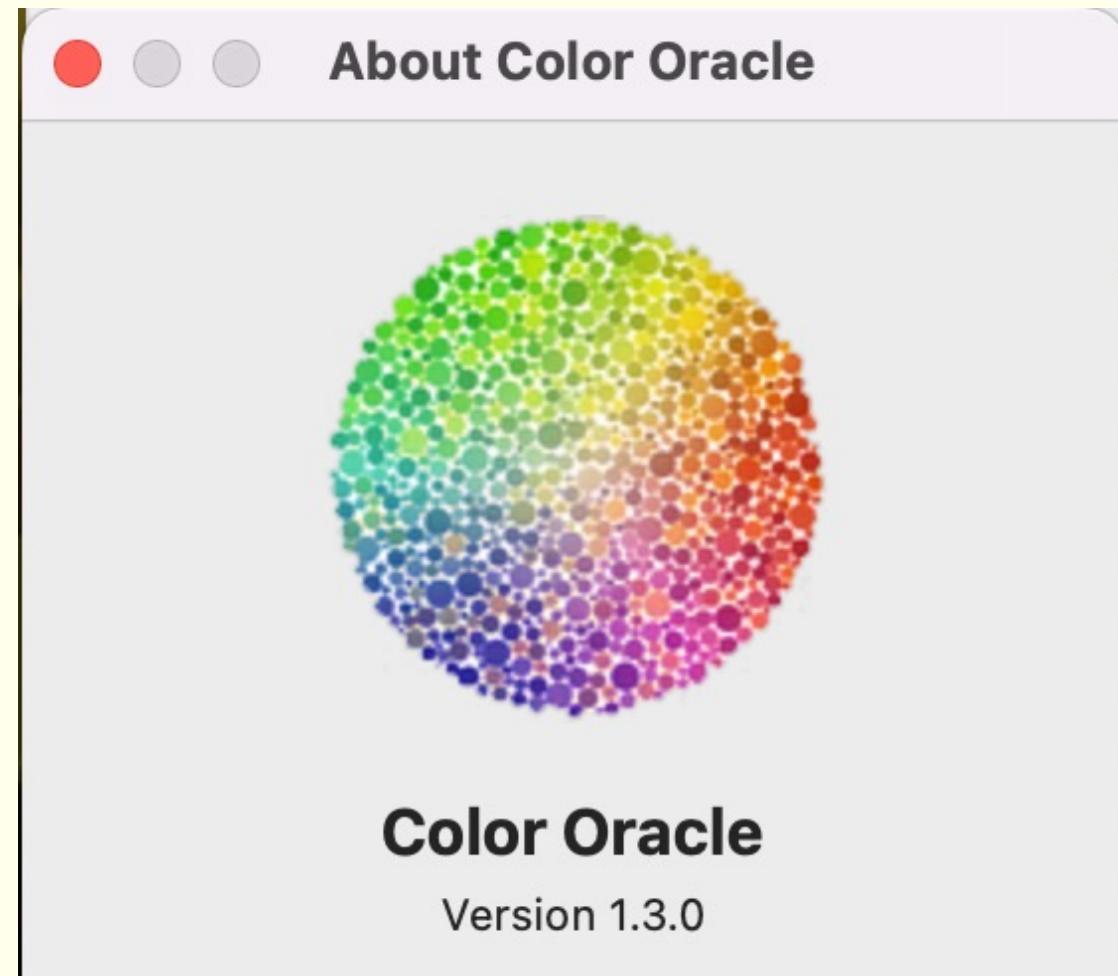
[Reset View](#)



Zoom, move and lens functionality only with your own images available.

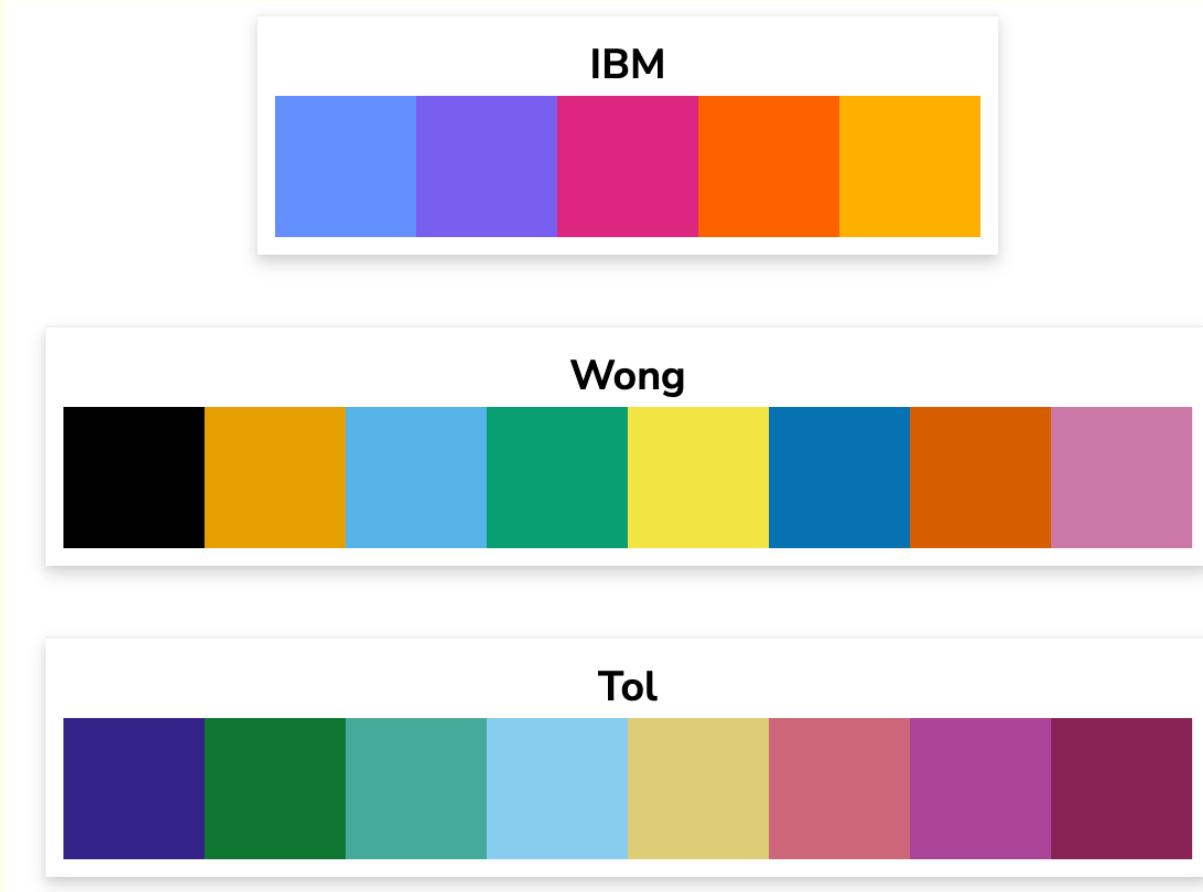
Colourblind Friendly Checks

- Color Oracle
- Free to download
- Simulates 4 types of colourblindness directly on your screen
 - <https://colororacle.org/index.html>



Choosing Colours

- There are good colourblind friendly palettes online
- <https://davidmathlogic.com/colorblind/>



Python Colour Schemes

Hex Codes

- Find the hex code for your colours

```
plt.plot(x, y,  
         color='#b3b3b3')
```

Cycler

- Define your own colour cycler
- Then call colours with 'C0', 'C1'

```
plt.rcParams[  
    'axes.prop_cycle'] =  
    cycler(color =  
        ['#f89441', '#a82296'])
```

```
plt.plot(x, y, color='C1')
```

Fonts

- **Font choice is important**
- **Sans serif fonts are more accessible**
- **Different fonts will be better for different people**

Fonts

Serif

Aa

- Sans serif fonts are easier to read for people with dyslexia or head injuries
- Serif fonts **can** be used for large headings on posters

Sans Serif

Aa

Fonts

Some good fonts include:

Arial

Helvetica

Courier

Verdana

Tahoma

Century Gothic

Comic Sans

Trebuchet

Calibri

Open Sans

OpenDyslexic

Computer Modern

Fonts

- Computer Modern is the standard LaTeX font
- It was found to be readable in a study into dyslexia-friendly fonts
- The study can be found at:
https://dyslexiahelp.umich.edu/sites/default/files/good_fonts_for_dyslexia_study.pdf

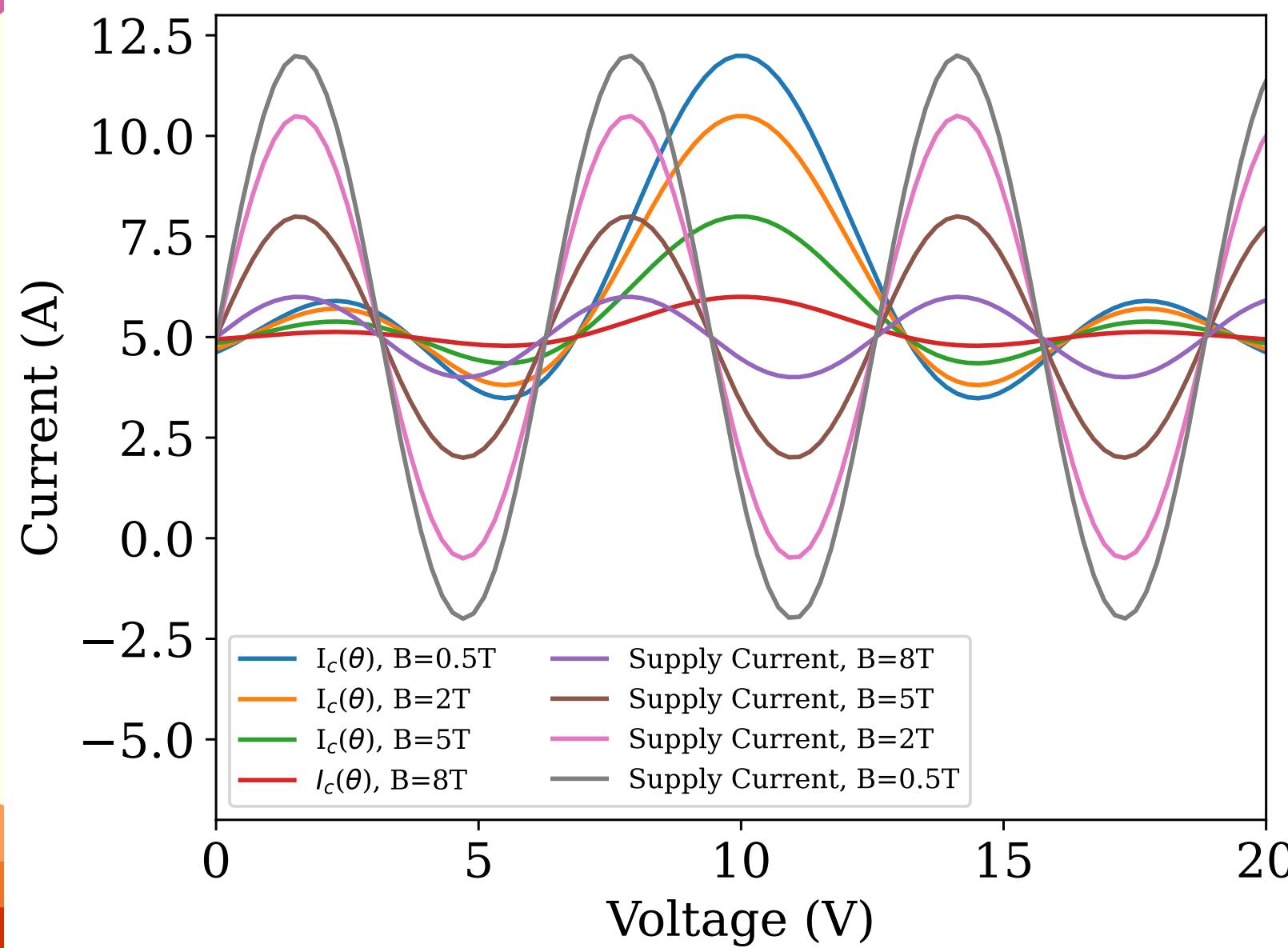
Figures

- We need figures to communicate our research
- They can be really pretty
- A lot of figures are inaccessible!

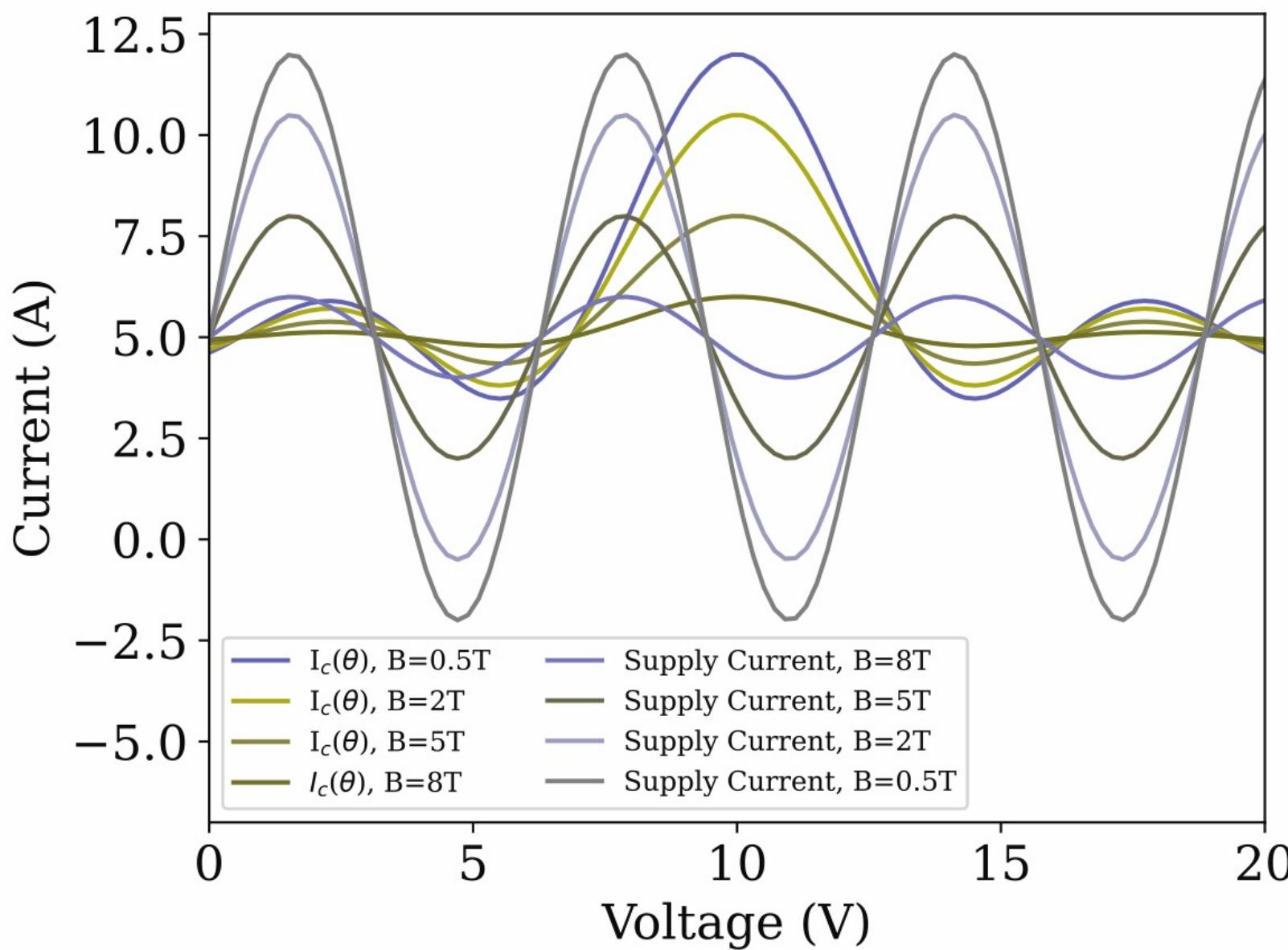
Figures

- There are three main issues with figures:
 - Overcrowded figures
 - Poor choice of colour scheme
 - Relying solely on colour

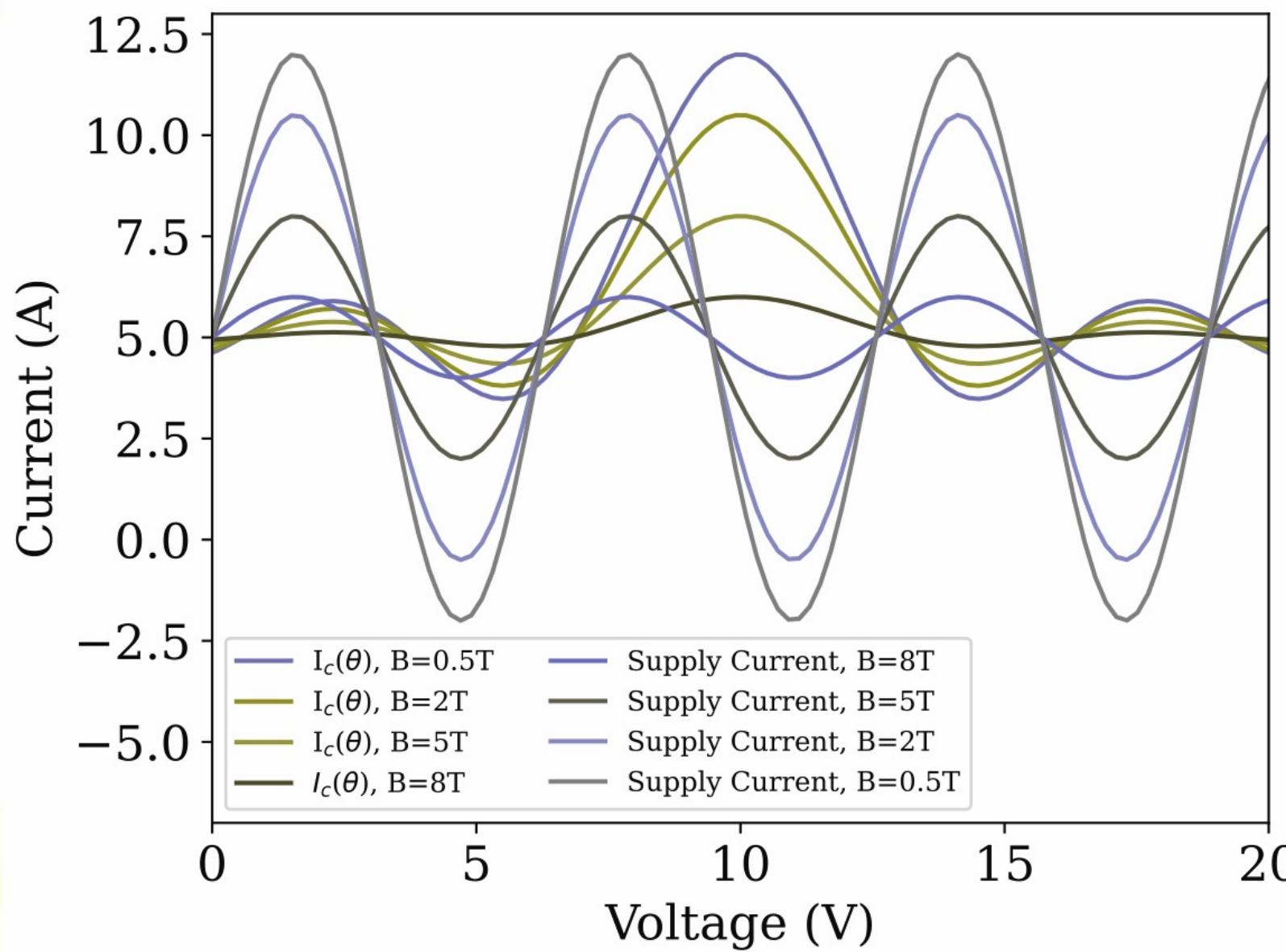
A Terrible Figure



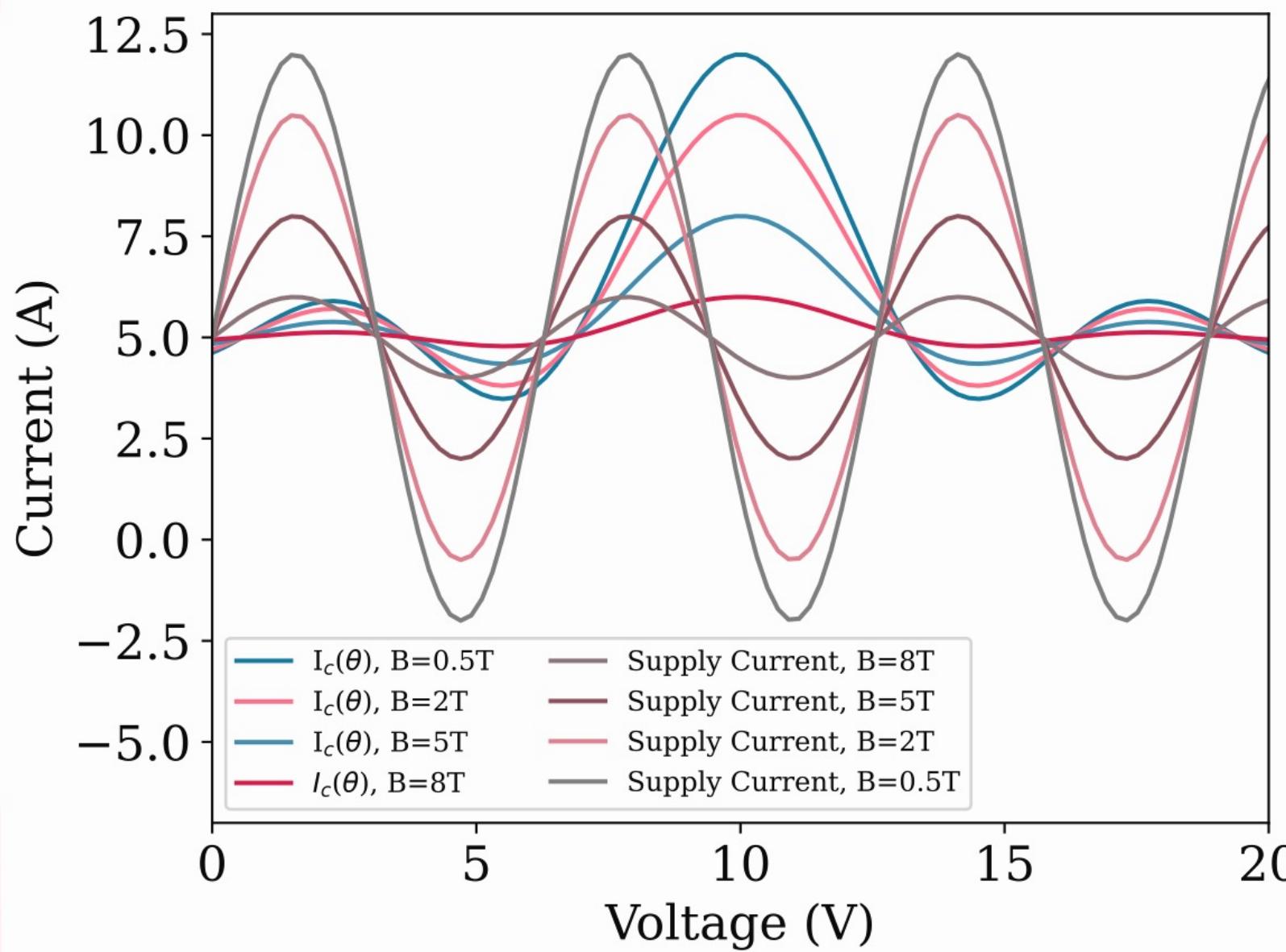
A Terrible Figure



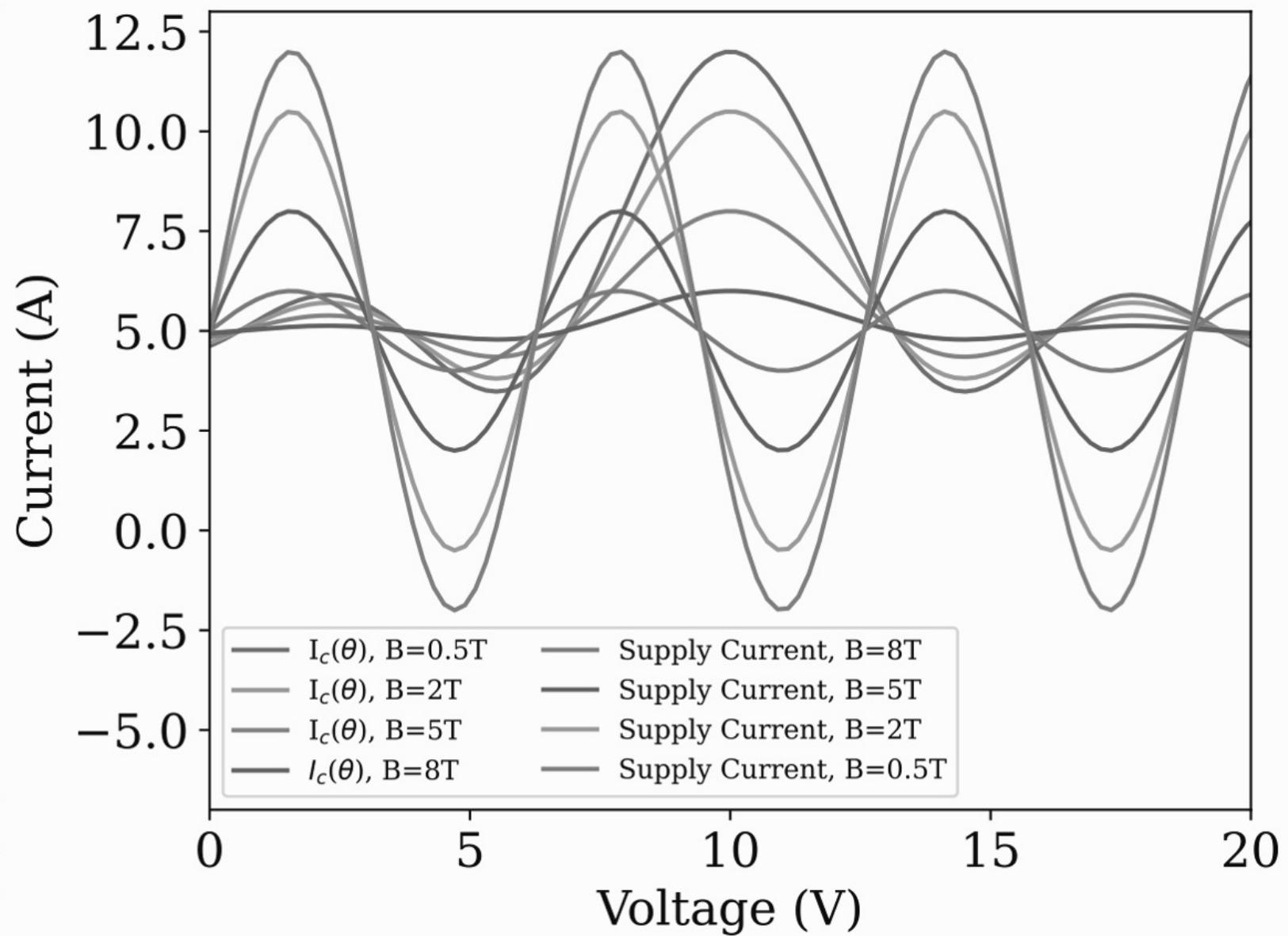
A Terrible Figure



A Terrible Figure



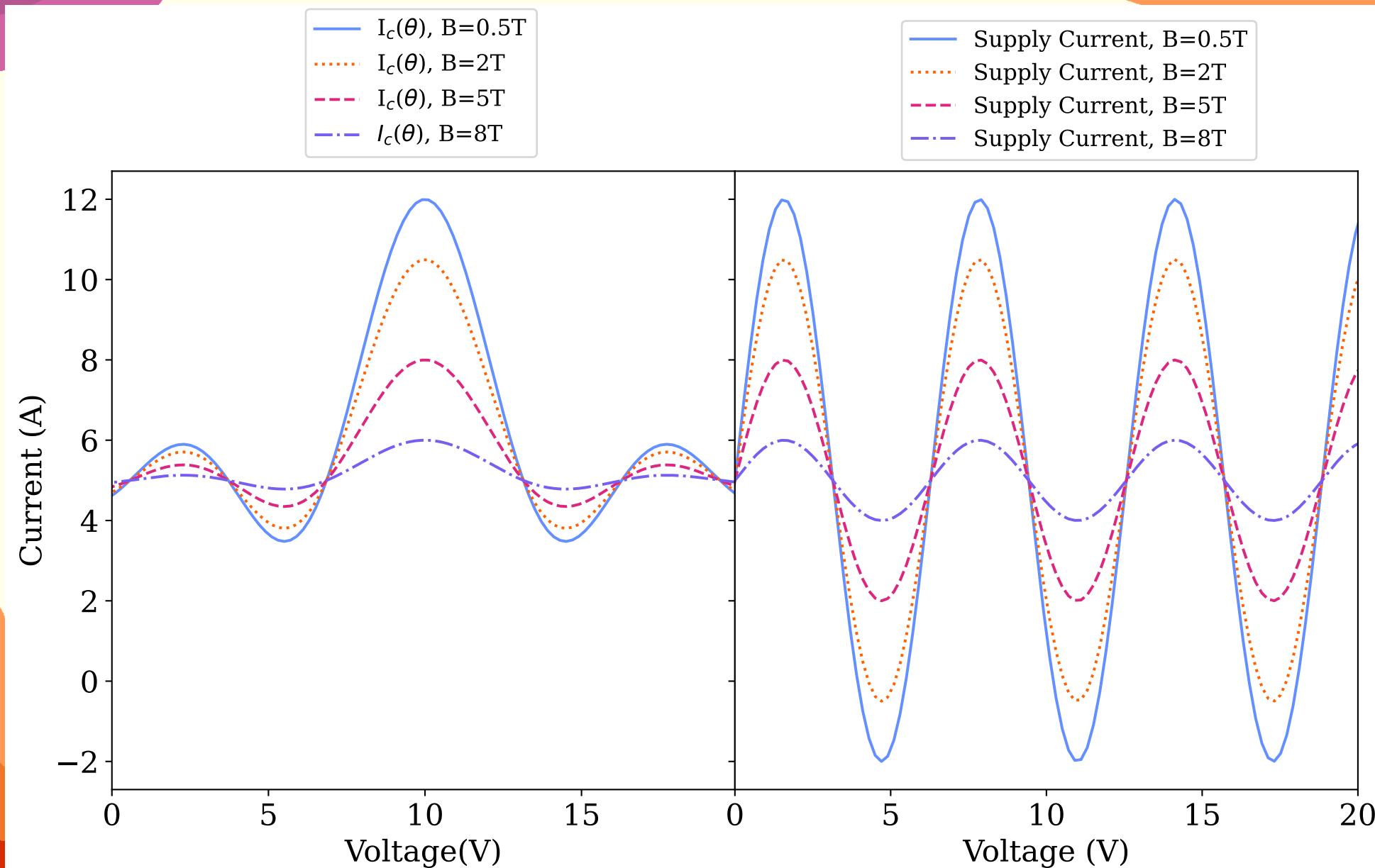
A Terrible Figure



Fixing the Figure

- Change colour scheme
- Add non-colour line distinguishers
- Move legend
- Make it a subplot figure

A Better Figure



Slide Design

- **Don't overcrowd your slides**
- **Avoid too many animations or transitions**
- **Make sure text is clear and readable**

Design Don'ts

- Don't put a wall of text on your slides, even if it's been split into bullet points and is all deemed useful content, it's hard to read and intimidating, especially if you're talking at the same time and expanding on the content.
- Remember to space out your bullet points with white space in between them, otherwise it can be difficult to know where one starts and one ends, particularly if your bullet point is small.
- Avoid making your bullet points really long, it's better to have more concise bullet points that you can expand on, than requiring everybody to read really quickly.
- While slide animations and transitions can be really helpful, avoid having too many, such as each bullet point flying in, or star transitions between every slide.

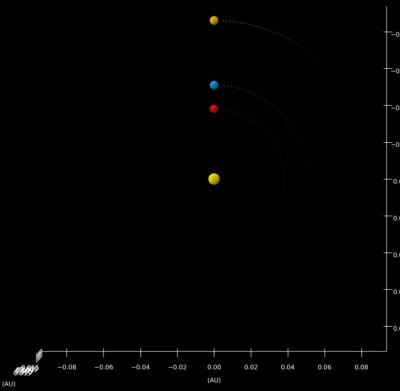
Design Dos

- Use a small number of bullet points
- Keep bullet points short and succinct
- Add white space in between bullet points
- Split information into multiple slides to improve design and readability

Fixing a Bad Slide

Top Skills:

- Python (especially matplotlib.3d.animate)
- Allesfitter (fits all! → binaries, transiting exoplanets, RVs, flares and more)
- Packages for stellar parameters:
astroARIADNE, Pysynphot, Specmatch-EMP



What I do:

- 3rd Year
- Equitea co-founder ☕
- Office: F19B (the mini corridor by the stairs to the common room, cosy vibes)
- Supervisor: Matt Burleigh
- Part of NGTS gang 👍👍👍
- Looking for transiting exoplanets in photometry
- Countless nights of observing remotely (and also in South Africa 🍷)
- Still working on a ‘trash-to-treasure’ project rounding up missed TESS Objects of Interest in NGTS data → Hopefully doing some papers on a collection of Neptunes and Jupiters 😍
- Writing a paper on three long period planets

Fixing the Slide

- Change text colour for better contrast
- Change fonts to sans serif non-condensed fonts
- Increase body text font size
- Split into two slides

What I do:

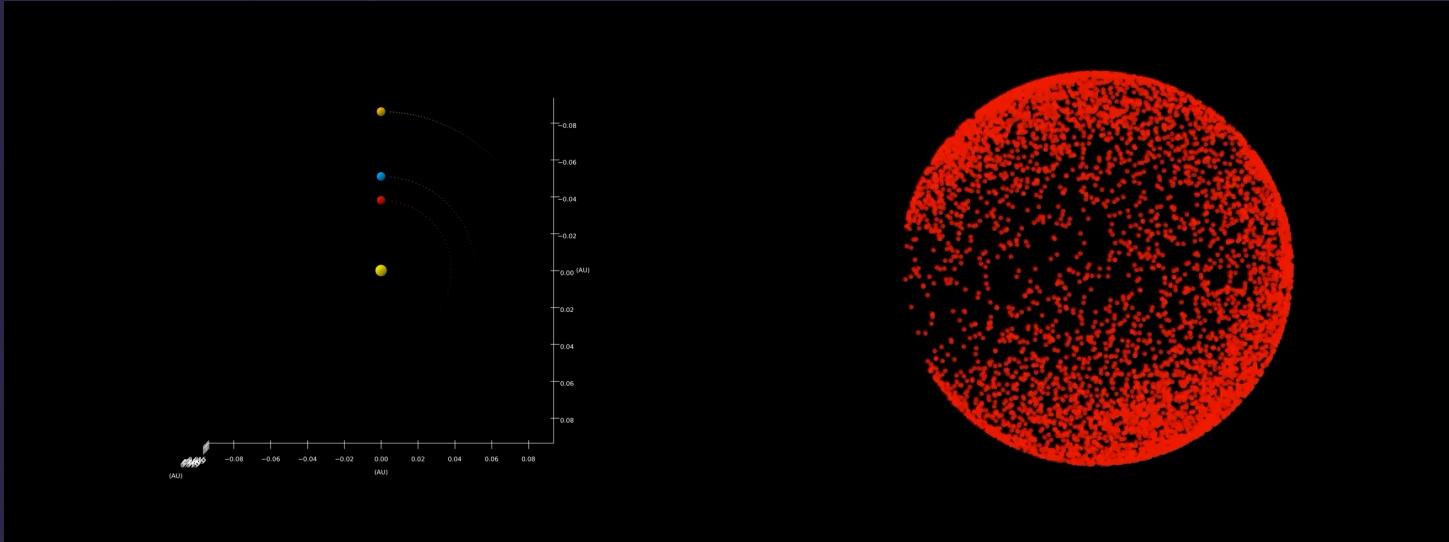
- 3rd Year
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- Looking for transiting exoplanets in photometry

What I do:

- Countless nights of observing remotely
- Trash-to-treasure project for missed TESS objects in NGTS data 😍
- Hopefully papers on a collection of Neptunes and Jupiters
- Writing a paper on three long period planets



Top Skills:



- Python (especially `matplotlib.3d.animate`)
- Allesfitter (`fits all`)
- Packages for stellar parameters:
`astroARIADNE`, `Pysynphot`, `Specmatch-EMP`

Poster Design

- Don't put too much text on it
- Ensure contrast between text and background
- Make sure fonts are accessible and large enough
- Split your poster into different sections

Poster Design

- Ensure titles stand out against body text
- Make sure elements are aligned
- Make the reading order clear
- Use graphics to make it more interesting

Working in Partnership

Developing Students' Graduate Skills in collaboration with the Library

A. Real Person (A.person@ncl.ac.uk) - Library Liaison Team

The Aim

The aim of this research was to align the liaison librarian teaching offer to Newcastle University's Education Strategy and new Graduate Framework. The library team also hoped to encourage a collaborative and consistent approach to the planning of embedded information and digital literacy skills across all Faculties to provide greater parity of access for students across faculties. In doing so, this project aimed to help explore ways of ensuring that students develop a broad range of relevant information and digital literacy skills at a pace suited to their stage and course of study.

Opening a dialogue

According to Peters., Jones and Matthews (2007), **students receive the greatest benefit in their studies when academics and librarians work together** to develop appropriate training. This is likely due to the fact that such collaborations increase perceived relevance of information literacy skills (i.e. the ability to find and evaluate information successfully) amongst students. Such collaborations can also necessarily be more tailored towards the specific requirements of individual disciplines and subjects, since the academic's subject expertise enables them to provide direct insight into particular challenges of research within their field. Based on these findings, our first step was to engage academic colleagues in a productive dialogue around both our offer and the skills students could be expected to gain at each stage of their degree course.

To help facilitate this, we developed a **Working in Partnership dialogue**, which **consists of two key documents** that have been made available on the Newcastle University staff intranet and Library website. The first document consists of an outline, an outline of our teaching offers and **how we can collaborate with academics and students**. The second document is a student Development and Progression document, based on Information Literacy curriculums from SCOUNL (2015) and ANCIL (2011). This provides **an outline of the information literacy skills and competencies** students can be expected to have at each stage of their undergraduate degree.

These documents were initially shared with School Library Representatives to gain provisional feedback. Once this feedback had been received and evaluated these documents were revised as deemed appropriate. Afterwards the documents were distributed more widely at various inter-departmental meetings such as Faculty Education Committees to gain a broader range of input.

"I think this will help raise awareness amongst academics of how you can help us – not just to deliver a library session for the first years in induction but throughout the whole student journey."

- Senior Lecturer, Newcastle University Business School

"The Library team were happy to extensively consult at all stages, particularly with regard to how their resources could complement our new emphasis on skills-based training for our students."

- Senior Lecturer, History, Classics & Archaeology

Partnership in Practice

Following their introduction, our Working in Partnership documents have helped us to initiate **positive conversations with academic colleagues** across several Faculties. Consequently, we have been able to strategically implement learning interventions that lead to more positive outcomes for a large number of students.

For example, Biosciences used our Student Development and Progression document to help them **successfully embed Information Literacy skills within their wider Academic and Professional Skills module for all first-year students** in semester one. Our Working in Partnership materials are similarly being used by Engineering and Chemistry to help them map out key skills across their new first-year skills programmes. By providing these skills within the first year of study, these embedded materials can help students access a wider range of relevant resources from the outset of their study. This can in turn lead to establishing more in-depth knowledge, which can act as a foundation for further critical evaluation and comprehension.

Likewise, Architecture and Urban Planning (AUP) used our Student Development and Progression document to **map out learning outcomes at each level against the AUP programme**. Modules were selected at each stage where embedded Information Literacy workshops would be best placed. History and Law are taking a similar approach to embedding key skills. By staggering information literacy workshops across the stages of study, we have been able to more gradually introduce ideas to avoid feelings of being overwhelmed by information (a common experience during the pandemic) and slowly build on existing knowledge in a measured, scaffolded way.. Much pedagogical research has shown that

In Speech and Language Science and Natural and Environmental Sciences' skills programmes took a slightly different approach and **we collaborated with programme leaders to restructure our embedded teaching to ensure appropriate progression of skills**. For example, we revised the order of teaching so that students now develop key referencing skills before being introduced to reference management tools.

We were also able to **adapt our documents to respond to the challenge of online learning in 2020, producing a Supporting Flexible Learning webpage** as a guide to our approach.

References

- ANCIL (2011) 'Use ANCIL in your institution: A New Curriculum for Information Literacy'. 25 August. Available at: <https://newcurriculum.wordpress.com/using-ancil/> (Accessed: 26 February 2020)
- JISC (2019) Jisc digital capabilities framework: The six elements defined. Available at: <http://repository.jisc.ac.uk/7278/1/BDCP-DC-Framework-Individual-GE-110319.pdf> (Accessed: 26 February 2020)
- Newcastle University (2019) Graduate Framework. Available at: <https://www.ncl.ac.uk/careers/planning/graduateframework/> (Accessed: 26 February 2020)
- Peters, K., Jones, R and Matthews, D (2007) 'Training for Independent Learning.' InfoSkills, 5(1) pp. 4-8
- SCOUNL (2015) Seven Pillars of Information Literacy. Available at: <https://www.sconul.ac.uk/page/seven-pillars-of-information-literacy> (Accessed: 26 February 2020)



Developing Graduate Skills

As mentioned before, Our Student Development and Progression document links to the **Graduate Framework strands**. The strands that we chose to focus on are outlined below:

Critical Thinkers

We engage students in **critical thinking** around the resources they choose for their work: Students are prompted to justify their decisions for selecting resources and develop a deeper understanding of where that information comes from by asking and answering key questions that enables them to evaluate both the strengths and weaknesses of their sources.. In doing so, students develop a greater ability to **identify and select appropriate academic knowledge and express informed views**.

Digitally Capable

In line with JISC's (2019) Digital Capability framework we focus on developing information literacies. This is achieved by **improving students' capacity to Find, Evaluate and Manage digital information**, therefore addressing all of the core aspects that define digital capability. Where possible, we have done this by making use of active and blended digital learning opportunities. In these instances, students are encouraged to interact with ideas and information and try out the skills we discuss to gain a fuller understanding of them. By supplementing asynchronous digital resources that can be done at home with synchronous workshops, we aim to provide flexibility in how this digital capability can be both learned and put into practice.

Curious

Our teaching sessions and online guides embedded in the VLE **promote independent exploration of the resources and tools** available to our students. By facilitating this kind of independent learning, our provision encourages students to take ownership of their learning journey and tailor their experiences accordingly

Skills Audits

Digital self-assessment tools aimed at undergraduate and postgraduate levels were created and embedded in Canvas modules and on the ASK website to **encourage student engagement with their own information and digital skills development**.

Next Steps

The next step in the library's Working in Partnership project is to develop a booking system that **encourages a collaborative dialogue with academics** at the point of request. This will help the project achieve its initial vision of co-produced learning more efficiently and make it less likely to fall into traditional patterns of parallel provision. We also aim to collaborate with academic staff in **reviewing lessons learned from a year of online teaching**, with the aim of developing a mix of non-synchronous, synchronous and Present in Person (PIP) options for 21/22. This will help ensure that blended learning continues to be informed by best practice as the Higher Education sector adapts to a pandemic (and post-pandemic) learning environment..

Working in Partnership

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The Aim

- To align our teaching offer to the University's Education Strategy and new Graduate Framework.
- To encourage a collaborative and consistent approach to the planning of embedded information and digital literacy skills across all Faculties.
- To ensure students develop a broad range of relevant information and digital literacy skills at a pace suited to their stage and course of study.



Opening a dialogue

Greatest benefit to the student is achieved when academics and librarians work together to develop appropriate training (Peters, Jones and Matthews, 2007).

Our Working in Partnership dialogue consists of two key documents that are available from the Library website:

- An outline of our offer and **how we can collaborate with academics and students**.
- A Student Development and Progression document, based on Information Literacy curriculums from SCOUNL (2015) and ANCIL (2011), that provides **an outline of the information literacy skills and competencies** students can be expected to have at each stage of their undergraduate degree.

These documents were initially shared with School Library Representatives then, more widely, at Faculty Education Committees.

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- Biosciences
- Architecture and Urban Planning (AUP)
- In Speech and Language Science
- Natural and Environmental Sciences



Image by Luisa Brimble on 'Unsplash'. Available at: <https://unsplash.com/photos/vfHoMBagDpc>

We were also able to **adapt our documents to respond to the challenge of online learning in 2020**, producing a **Supporting Flexible Learning webpage** as a guide to our approach.

References

- ANCIL (2011) 'Use ANCIL in your institution: A New Curriculum for Information Literacy'. 25 August. Available at: <https://newcurriculum.wordpress.com/using-ancil/> (Accessed: 26 February 2020)
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Developing Graduate Skills

Our Student Development and Progression document links to the following Graduate Framework strands:

Critical Thinkers

We engage students in critical thinking around the resources they choose for their work; justifying these decisions and understanding where information comes from helps them to **identify and select appropriate academic knowledge and express informed views**.

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In line with JISC's (2019) Digital Capability framework we focus on developing information literacies by **improving students' capacity to Find, Evaluate and Manage digital information**, making use of active and blended digital learning opportunities where possible.

Curious

Our teaching sessions and online guides embedded in the VLE **promote independent exploration of resources and tools** available to our students.

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Digital self-assessment tools aimed at **undergraduate and postgraduate levels** were created and embedded in Canvas modules and on the ASK website to **encourage student engagement with their own information and digital skills development**.



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- To collaborate with academic staff in **reviewing lessons learned from a year of online teaching**, with the aim of developing a mix of non-synchronous, synchronous and Present in Person (PIP) options for 21/22.

Screen Reading

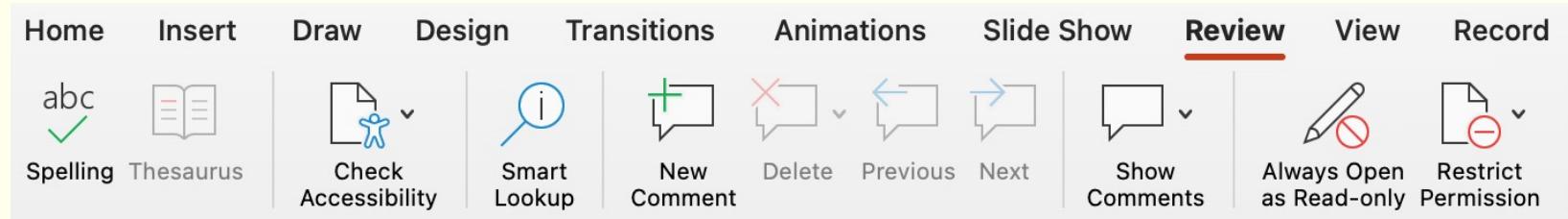
- Some people will rely on screen readers
- Alt text should be added to all figures to describe them to screen readers
- Need to define correct screen reading order for powerpoints and posters

Accessibility Checker

- In-built powerpoint tool to check accessibility
- Flags poor colour contrast, missing alt text, and reading order queries
- Can be accessed in the review tab

Accessibility Checker

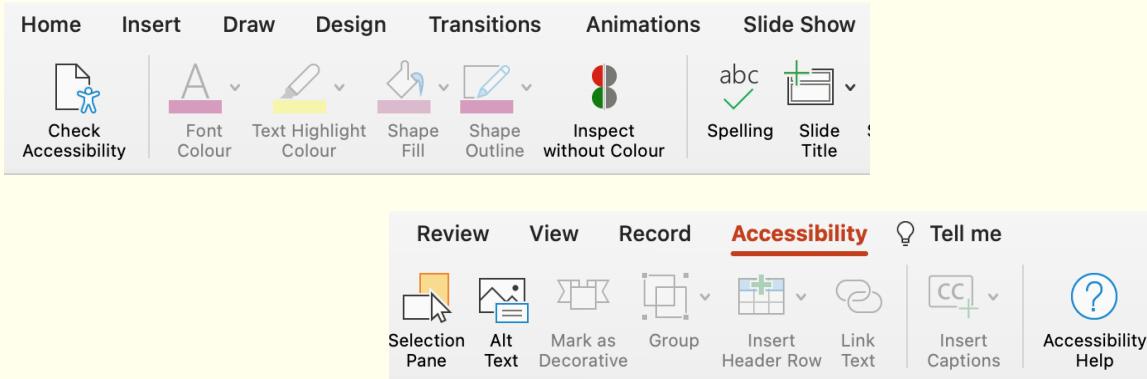
1.



Click Review

2.

Click Check Accessibility



Accessibility Format Picture

Inspection Results

▼ Errors

- > Missing Object Description (34)
- > Missing Slide Title (21)

▼ Warnings

- > Missing Audio or Video Subtitles (4)
- > Hard-to-Read Text Contrast (4)
- > Use of Merged or Split Cells (1)
- > Check Reading Order (5)

> Tips

> Intelligent Services

Accessibility Checker

3. In Accessibility pane, click Check Reading Order
4. Go into home tab, arrange, selection pane to then change your reading order

Where to find our resources

- All of our resources can be found on our websites
- linktr.ee/equiteauol (QR code on our posters)
- equitea-university-of-leicester.github.io
- Includes this presentation and all resources mentioned today

NEXT SESSION:

Being Trans in Academia

A talk from Ares Osborn (he/they, University of Warwick) about what it's like being a transgender person in academia right now, and how allies and institutions can offer support.

12th December F10/11 Time tbc

QUESTIONS? CONTACT US!

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TRANS RIGHTS ARE
HUMAN RIGHTS

