Graduating out of 3 common writing pitfalls

"The truth is that most US academic prose is appalling—pompous, abstruse, claustral, inflated, euphuistic, pleonastic, solecistic, sesquipidelian, Heliogabaline, occluded, obscure, jargon-ridden, empty: resplendently dead."

-- David Foster Wallace

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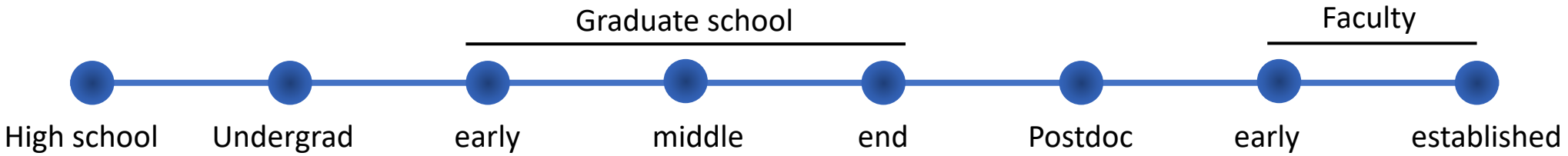
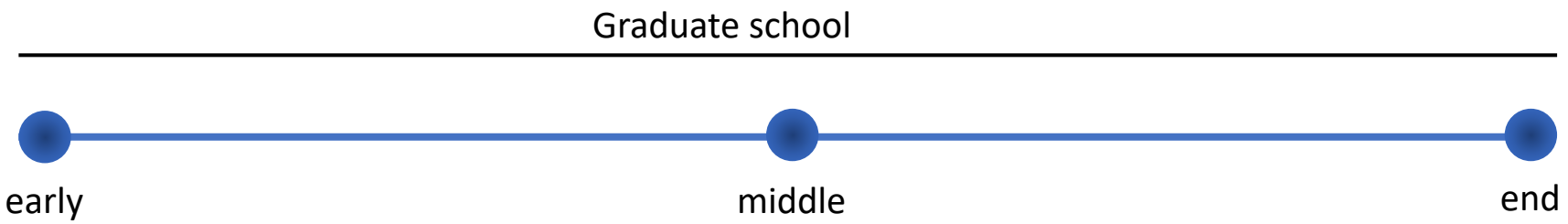
Exercise #1: Where are you in your evolution as a scientist? As a writer?



Think about the type of writing skills or abilities that are expected of you at your stage? One stage below? One stage above?

Write down 1 – 3 writing skills for your stage on the papers provided. Adhere the papers to the chart at the front of the room

Graduate students improve their writing skills throughout their tenure



- write an abstract for a conference (with edits)
- write protocols
- take a STEM writing course
- write to effectively communicate with a team (e-mail, etc)

- draft a review in their field
- write a project proposal (prelim exam document)
- generate written reports (poster, presentation, etc)
- develop teaching documents
- develop lab documents
- effectively e-mail with collaborators

- write a scientific paper (with other authors)
- write a dissertation
- direct collaborative writing projects
- peer review manuscripts for journals
- convey in writing the missing knowledge in their field
- formulate their own research questions and argue for their favored research approach

Mentor Well Faculty Workshop 2022 – professor responses

What are three major pitfalls?

1. Erudition
2. The disconnected list of facts
3. Imprecise language

What are three major pitfalls?

1. **Erudition**
   - *On the nature of a treatise of a gentleman scientist who betwixt matriculation and graduation doth pontificate most strenuously in defense of his dissertation*
2. The disconnected list of facts
3. Imprecise word choice

We avoid erudition because…

- The science is complicated enough
- The goal is to have the reader understand

A history of erudition in the sciences

- 1066 –The Battle of Hastings. The Norman French defeated the English army
- Normans took control of English institutions – religious affairs, scholarly affairs, business
- Normans spoke Latin, French, and Greek rooted language
- Common people spoke Anglo Saxon
- Modern English has roots in both languages and the Latin/French roots are typically associated with academic institutions

Adapted from:
Anne E. Green. 2013. Writing Science In Plain English

How to avoid erudition

- Focus on the reader's experience
- Brevity - use (shorter) Anglo-Saxon words over Norman words. Shorten sentences
- Clarity
- Tell a story – overall and in every sentence (Naly's section)

Shorten your words – try for Anglo Saxon-derived words

French/Latin/Greek	Anglo Saxon
implement	use
adhere	stick
develop	make
retain	keep
terminate	end
ascertain	find
facilitate	help
endeavor	try
transmit	send
initiate	start
alteration	change
subsequent	next

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… but don’t get too carried away with overly casual wording

Too casual
contractions (don’t, isn’t, they’re)
Starting sentences with “Also, ...” or “So, … “
Finishing sentences with “etc”
“a lot” / “a little bit”
“got”
verb + prep (“went by”, ”look at”, “find out”, “cut out”)

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Get rid of wordy phrases -- they slow down the reader

Too wordy	shorter
in this study we assessed	we assessed
conduct an investigation of	investigate
were responsible for	caused
played the role of	were
in order to	to
for the following reasons	because
during the course of / during the process of	during
a majority (most of the)	most
undertaken an examination of	study
various lines of evidence	evidence
the analysis presented in this paper	our analysis
in the absence of	without

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What are three major pitfalls?

1. Erudition
   - *On the nature of a treatise of a gentleman scientist who betwixt matriculation and graduation doth pontificate most strenuously in defense of his dissertation*
2. **The disconnected list of facts**
   - Ankylosauraus has a bumpy back. It can fight. T. rex can fight too but T. rex has little arms but T. rex is really strong and with strong teeth and it's super scary. Triceratops has three horns, and its name means three horns.
3. Imprecise language

Which type of storyteller are you?

The kid obsessed with dinosaurs?

The person leading a trust walk?

Exercise #2

- Read the first and second paragraphs. Which is easier to read? What features of the writing make reading easier?

Use adverbs and other cues to guide the reader through the twists and turns

- *additionally*
- *alternatively*
- *as a result*
- *as predicted*
- *consequently*
- *conversely*
- *finally*
- *for example*
- *for instance*
- *furthermore*
- *hence*
- *however*
- *in addition*
- *in conclusion*
- *in fact*
- *in summary*
- *instead*
- *likewise*
- *moreover*
- *nevertheless*
- *next*
- *on the other hand*
- *of these*
- *predictably*
- *rather*
- *similarly*
- *since*
- *still*
- *subsequently*
- *surprisingly*
- *then*
- *thereby*
- *therefore*
- *thus*
- *typically*
- *yet*

Where are the adverbs and other “cues”?

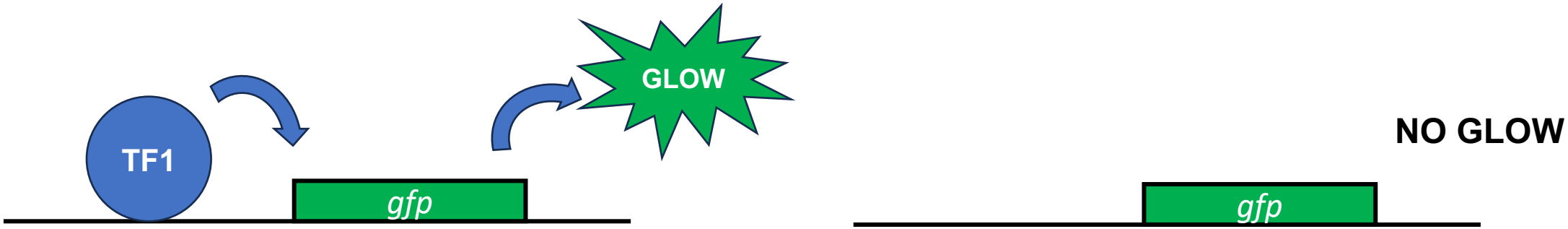
In recent years, many biological fields have identified biomolecular condensates associated with diverse cellular processes. **For example,** multiple biomolecular condensates **within nuclei** have been identified **such as** the nucleolus associated with ribosome assembly, Cajal bodies involved in RNA processing, and nuclear speckles ascribed to enhance gene expression (Politz et al., 2006; Yao et al., 2019; Liao and Regev, 2020; Alexander et al., 2021; Courchaine et al., 2021). **In contrast**, biomolecular condensates **within the cytoplasm** are associated with **other** roles. **Of these,** the P-bodies are sites of RNA metabolism, stress granules sequester mRNA, germ granules mediate germline gene expression, and Balbiani bodies attach cytoplasmic components together (Kedersha et al., 2005; Brangwynne et al., 2009; Voronina et al., 2011; Kroschwald et al., 2015; Boke et al., 2016; Protter and Parker, 2016). **Beyond these** well-studied examples, **novel** biomolecular condensates with **additional** putative functions are rapidly emerging (see Section 3).

Can someone follow the logic and structure of your paragraph?
What if they only read the beginning and end of each sentence?
What if they didn’t know any of the nouns?

What are three major pitfalls?

1. Erudition
2. The disconnected list of facts
3. **Imprecise language**
   - I believe Aim 2 will prove my theory that there are less colonies on galactose than yeast clumps on glucose.

Check that your language matches your experiment



- Depleting transcription TF1 resulted in the loss of GFP signal in the *ges-1promoter::GFP* reporter construct.
  A. This illustrates that TF1 activates the *ges-1* promoter
  B. This illustrates that *ges-1* promoter activity depends on TF1

Scientific writing requires a constrained vocabulary

- If terminology is inconsistent, readers may think different terms mean different things.
- Consistent, constrained, precise terminology is preferred
- Scientific writing sounds more repetitive than fiction. That's ok.
- Grammarly will flag you for this. Ignore it.

In deserts, competition for water limits the size of plant communities. In grasslands, plant biomass is restricted by the extent of herbivory. In seasonal systems, the abundance of plant material fluctuates.

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Exercise #3: Science-specific word choice

Circle the most correct word option

A	B
Patient data are shown in Table 1.	Patient data is shown in Table 1.
A single bacteria is visible by electron microscopy.	A single bacterium is visible by electron microscopy.
To test if H3 K4 me3 was associated with transcription…	To test whether H3 K4 me3 was associated with transcription…
The most widely accepted theory is currently X.	The most widely accepted hypothesis is currently X.
Heat shock has a dramatic affect on gene expression.	Heat shock has a dramatic effect on gene expression.
With the advent of high throughput sequencing, many new fungi have been discovered.	With the advent of high throughput sequencing, many new funguses have been discovered.
When galactose was used fewer colonies grew.	When galactose was used less colonies grew.
Our results prove that chromatin modifications direct gene expression changes at the HOX locus.	Our results support the hypothesis that chromatin modifications direct gene expression changes at the HOX locus.
We believe that HLH binding domains are more ancient than zinc finger domains.	Our findings support the model that HLH binding domains are more ancient than zinc finger domains.

Answer	Reason
Patient data are shown in Table 1.	The word “data” is plural*.
A single bacterium is visible by electron microscopy.	”bacterium” is the singular form of “bacteria”
To test whether H3 K4 me3 was associated with transcription…	Both are correct. “whether” is sometimes preferred over “if” to stress agnostic attitude to the outcome.
The most widely accepted hypothesis is currently X.	“theory” means principles tested ad nauseum that still remain true… “Theory of relativity”, “Germ theory of disease”
Heat shock has a dramatic effect on gene expression.	“effect” is a noun. ”affect” is a verb. “to have a strong effect” “it affects my mood”
With the advent of high throughput sequencing, many new fungi/funguses have been discovered.	Both are right. In many Latin root words, the plural of “-us” is “-i”
When galactose was used fewer colonies grew.	”fewer” refers to a countable number. “less” refers to continuous or abstract amounts
Our results support the hypothesis that chromatin modifications direct gene expression changes at the HOX locus.	We don’t ”prove” things using the scientific method. We “disprove” the null hypothesis. We exclude possibilities.
Our data supports the model that HLH binding domains are more ancient than zinc finger domains.	Generally, try to avoid feelings and beliefs in most manuscript writing. Also, think hard about when to use the term “to believe”. Make sure you aren’t overselling what could be better described as “thinking” or “favoring”

How to avoid the three major pitfalls?

1. Erudition → concise and clear
2. The disconnected list of facts → lead your reader on a trust walk
3. Imprecise language → constrained language