Translational Science Communication

Dr. Becca Levy

(she/her/hers)
National Science Foundation Astronomy & Astrophysical Postdoctoral Fellow
Department of Astronomy/Steward Observatory, University of Arizona
RebeccaLevy@arizona.edu

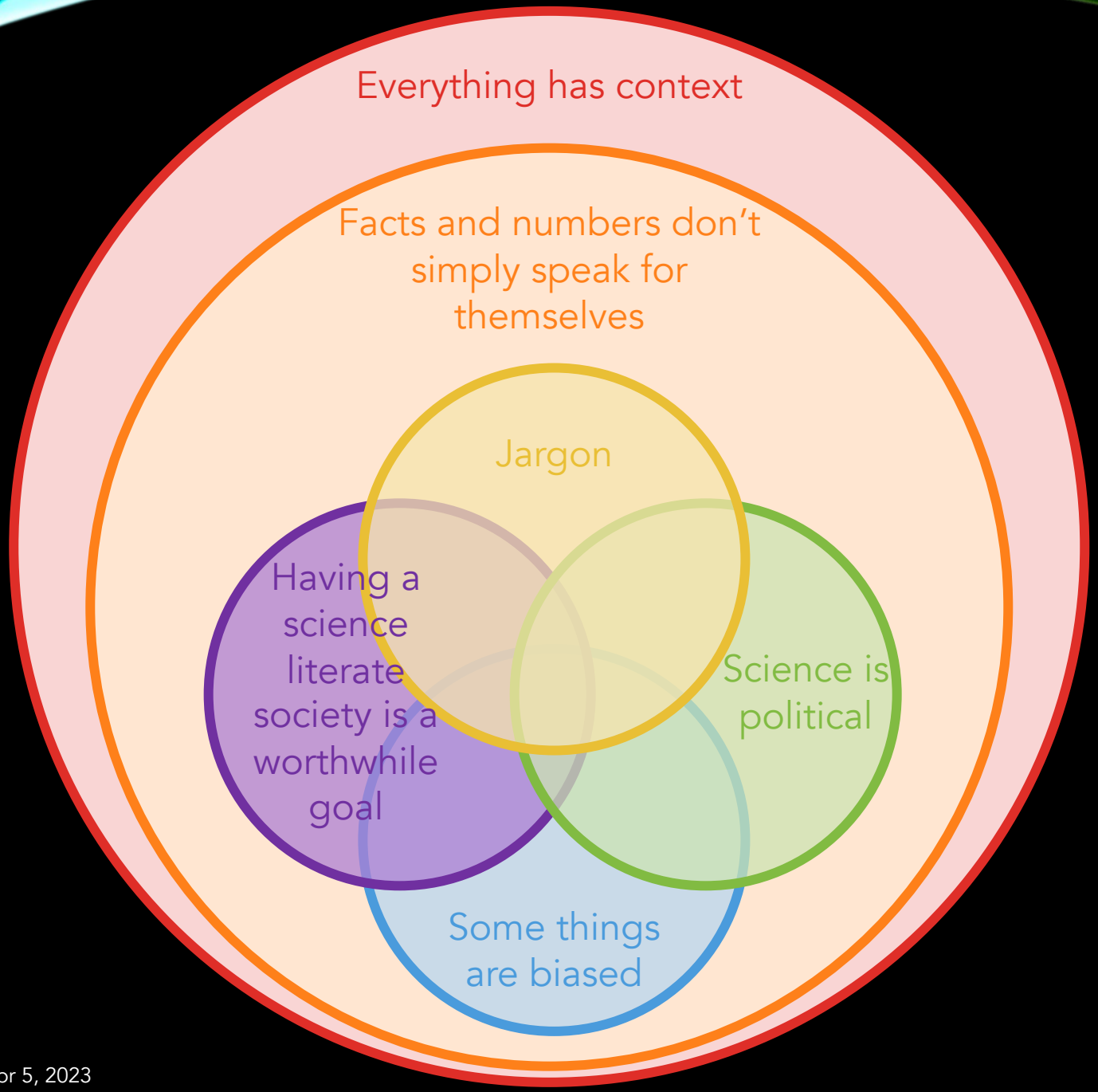
What is “translational science communication”

“The purpose of [translational science communication] is to focus on presentation of scientific evidence in a language and format that improves accessibility to and comprehension by an intended audience in a given context.

Translational communication addresses the ongoing struggle to balance accuracy and comprehensibility of information being used to address pressing social issues.”

–Krieger & Gallois 2017, *Journal of Language and Social Psychology*
“Translating Science: Using the Science of Language to Explicate the Language of Science”

It is not “dumbing things down”



Why do we need translational science communication?

Everything has context

If you don't supply the context in a way that is accurately conveyed to the audience, they may *misunderstand*, *confuse*, *ignore*, *reject*, etc your message

Importance of clear storytelling

He went to the store.

Fred died.

Sharon went hungry and wept.

Slide inspired by Paul Propster/ Prof. Erika Hamden

Everything has context

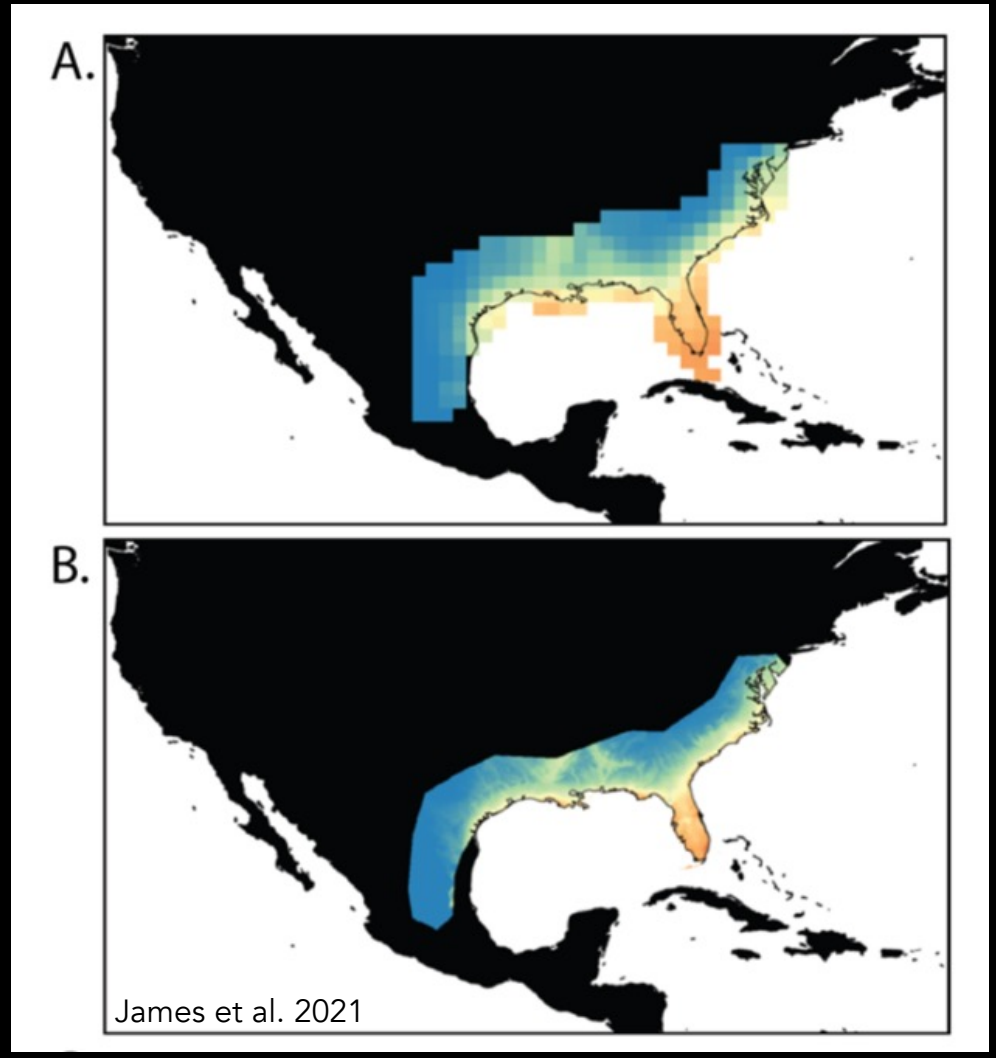
Facts and numbers don't simply speak for themselves

"There is a significant body of research demonstrating that non-expert audiences use much more than science facts to understand, interpret and respond to science messages, including personal beliefs, attitudes, knowledge and skillsets, as well as message characteristics such as source and aesthetics"
–James et al. 2021

It's not just numbers: graphics don't speak for themselves either

- These are biodiversity maps showing climate suitability for Palamedes swallowtail butterflies

1. Which map is more accurate?
2. Which map do you prefer?



It's not just numbers: graphics don't speak for themselves either

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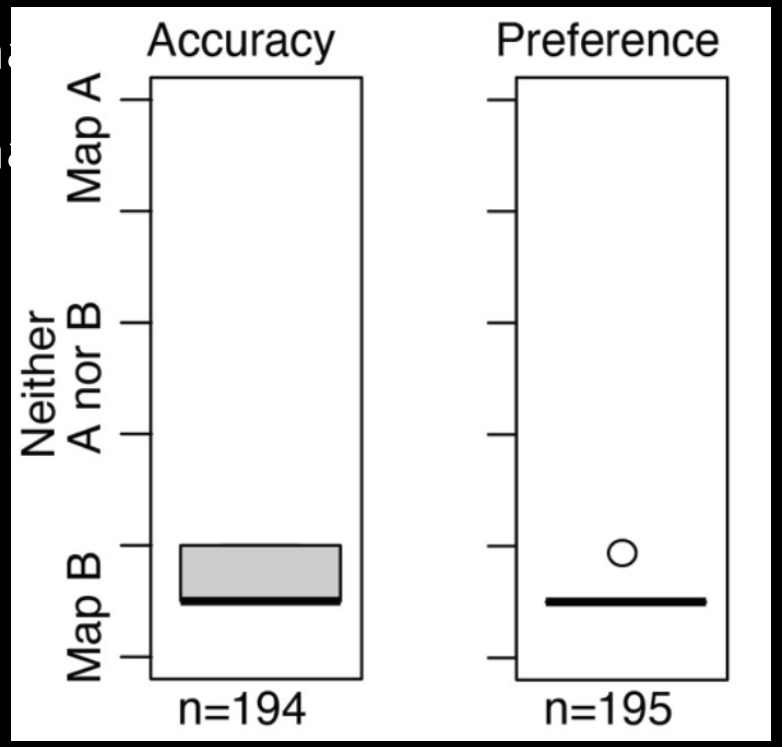
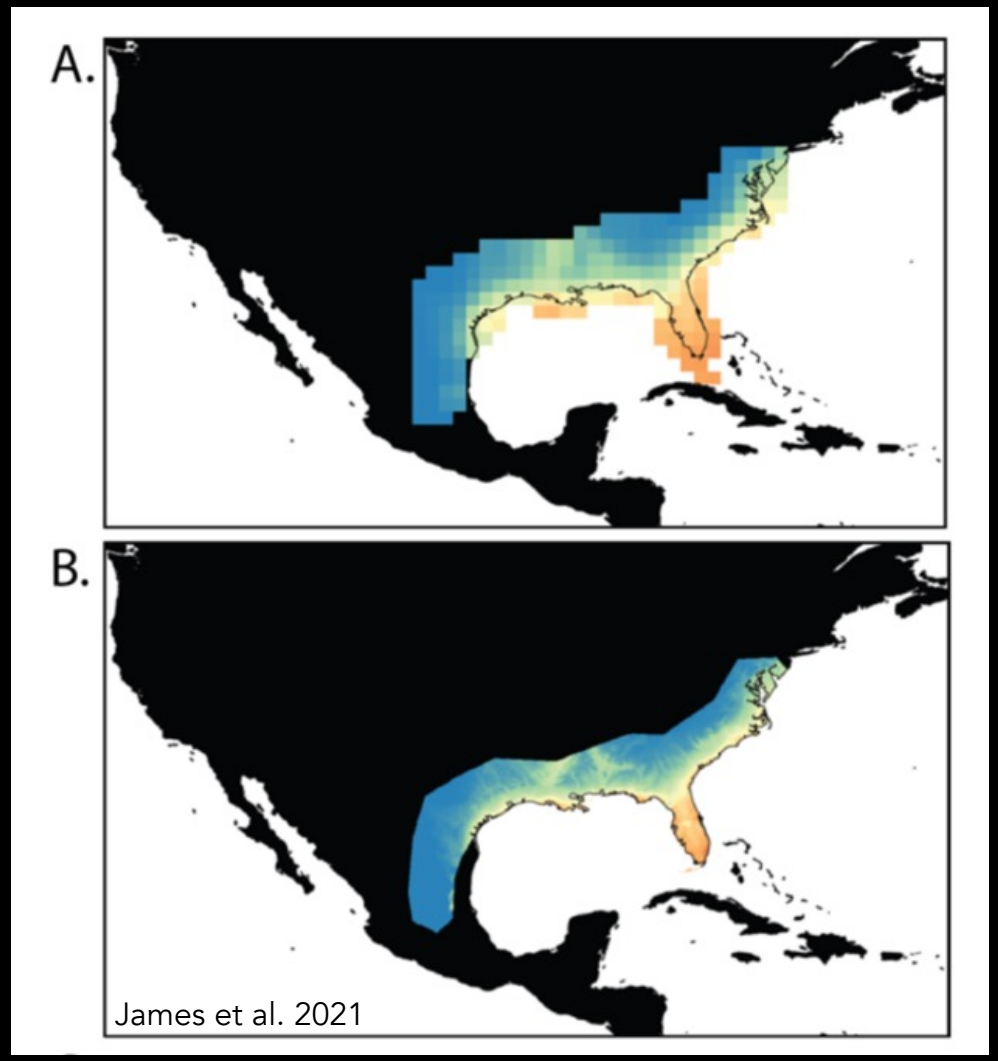
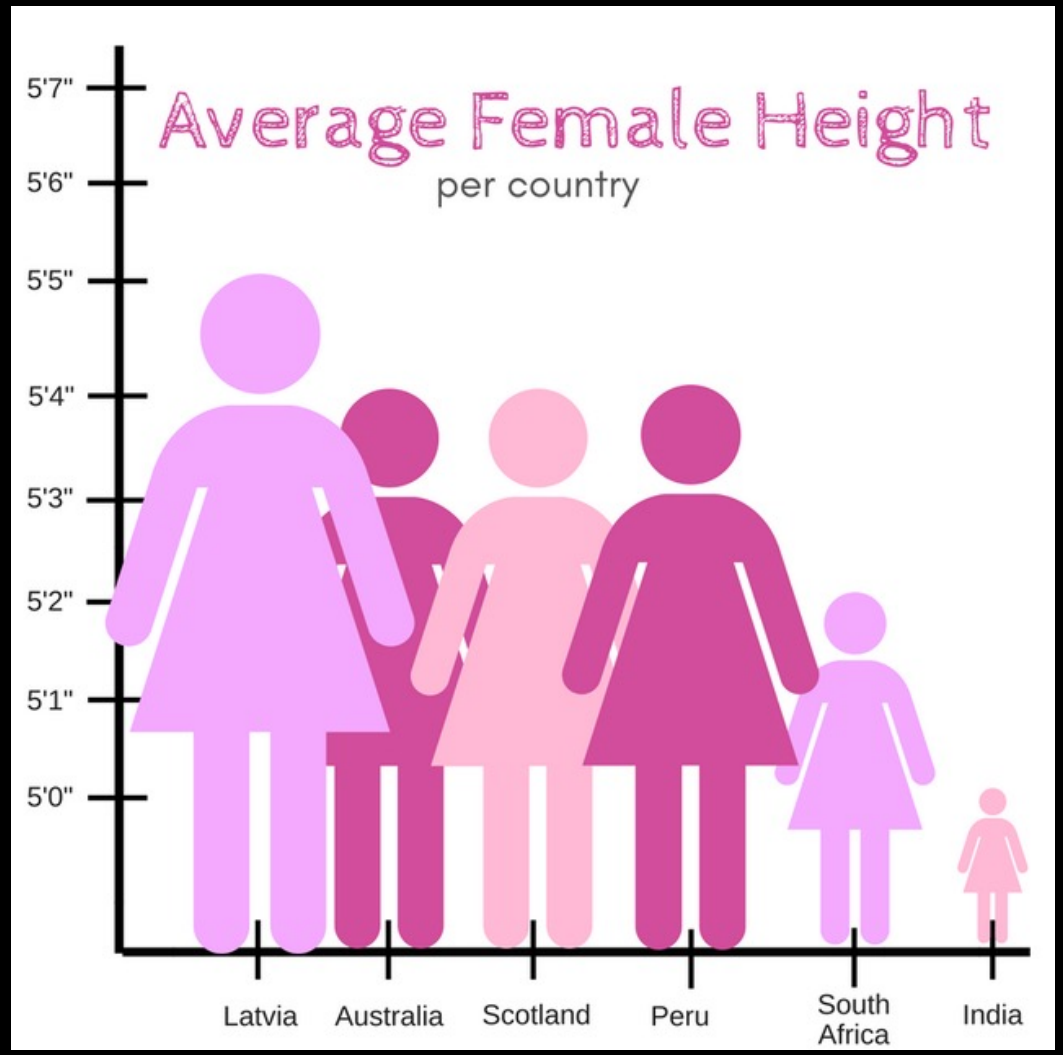
1. Which ma
2. Which ma

The "true map" is at an intermediate resolution between these two





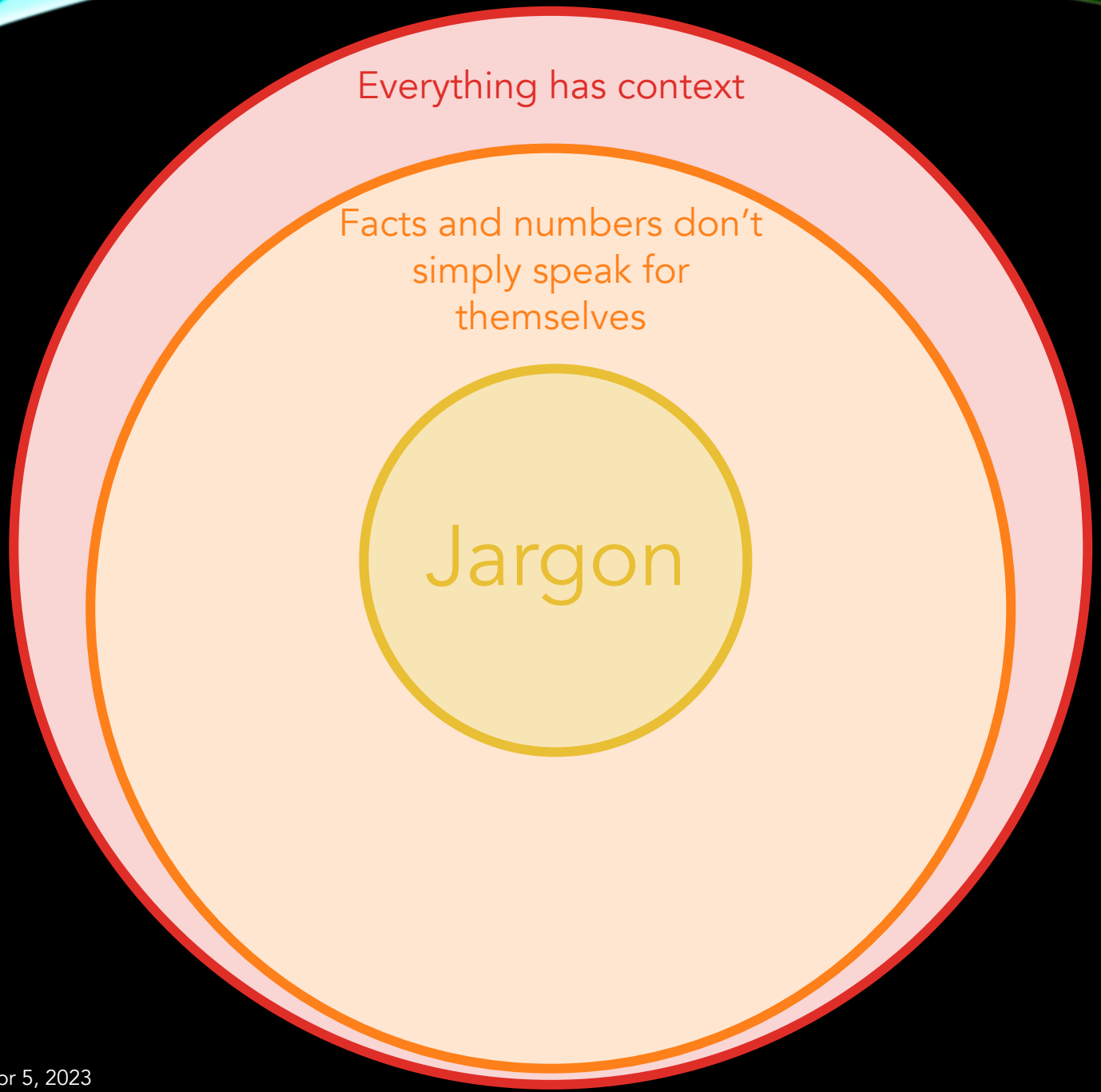
What do you take away from this plot?



Source: morethanmyheight.com

Everyone comes in with their own preconceived notions and biases

- Know your audience
- Some misconceptions are *very* deeply rooted
- Set a clear foundation so everyone is starting from the same place
- *Be very careful assuming knowledge*



- Every field has jargon
- So pervasive you may forget what is jargon and what isn't!
- Can be *weaponized* to intentionally mislead
- Comes across as elitist and "better than thou"
- Jargon can extend beyond technical language
  - Know what words have fundamentally different meanings outside science

Terms that have different meanings for scientists and the public		
Scientific term	**Public meaning**	**Better choice**
enhance	improve	intensify, increase
aerosol	spray can	tiny atmospheric particle
positive trend	good trend	upward trend
positive feedback	good response, praise	vicious cycle, self-reinforcing cycle
theory	hunch, speculation	scientific understanding
uncertainty	ignorance	range
error	mistake, wrong, incorrect	difference from exact true number
bias	distortion, political motive	offset from an observation
sign	indication, astrological sign	plus or minus sign
values	ethics, monetary value	numbers, quantity
manipulation	illicit tampering	scientific data processing
scheme	devious plot	systematic plan
anomaly	abnormal occurrence	change from long-term average

Slide by Prof. Chris Impey

An example of my own…

I research starburst galaxies.

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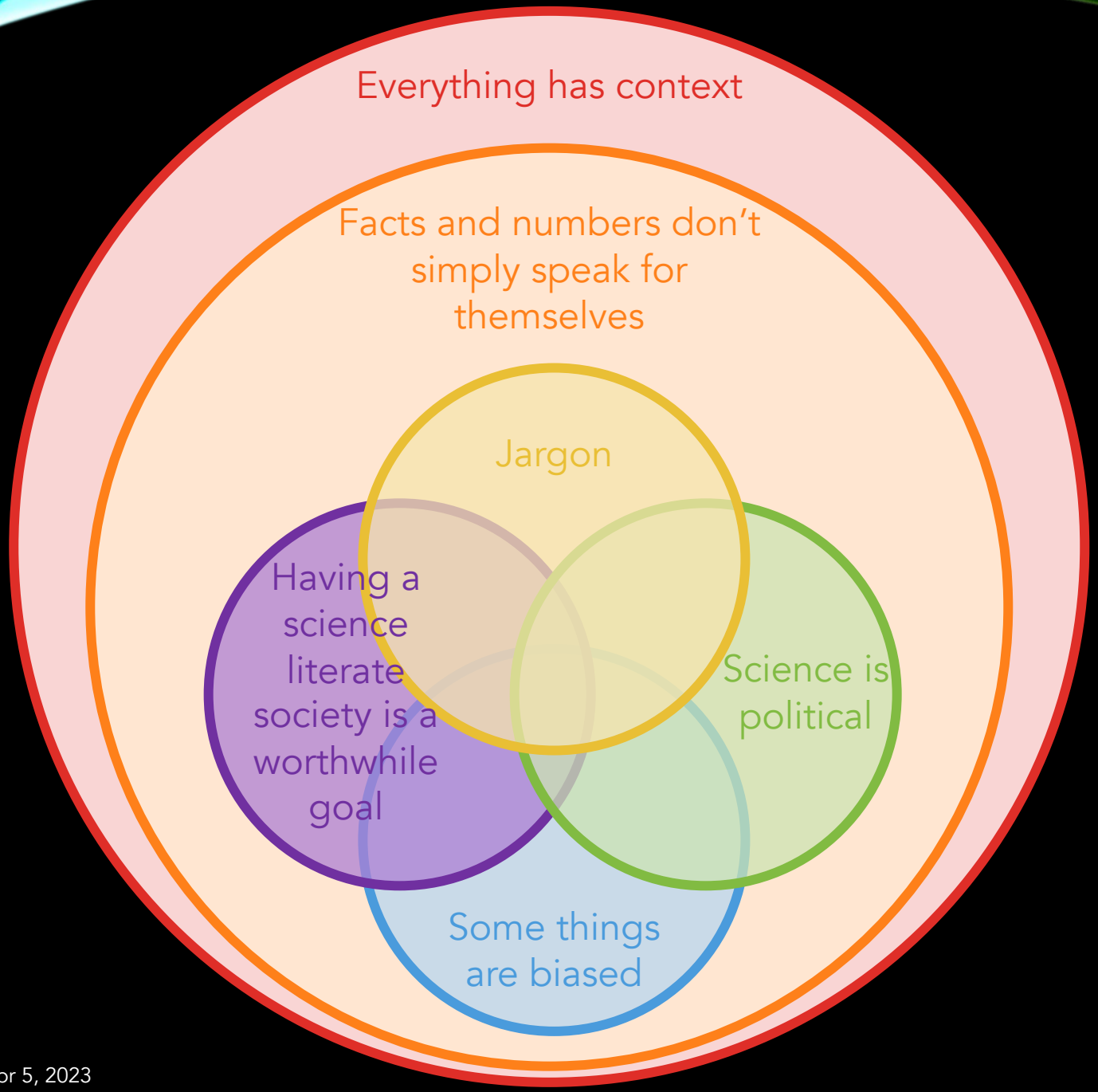
?

An example of my own…

I research starburst galaxies.

Credit: X-ray: NASA/CXC/JHU/D.Strickland; Optical: NASA/ESA/STScI/AURA/ The Hubble Heritage Team; IR: NASA/JPL-Caltech/Univ. of AZ/C. Engelbracht



How do you effectively and translationally communicate science?

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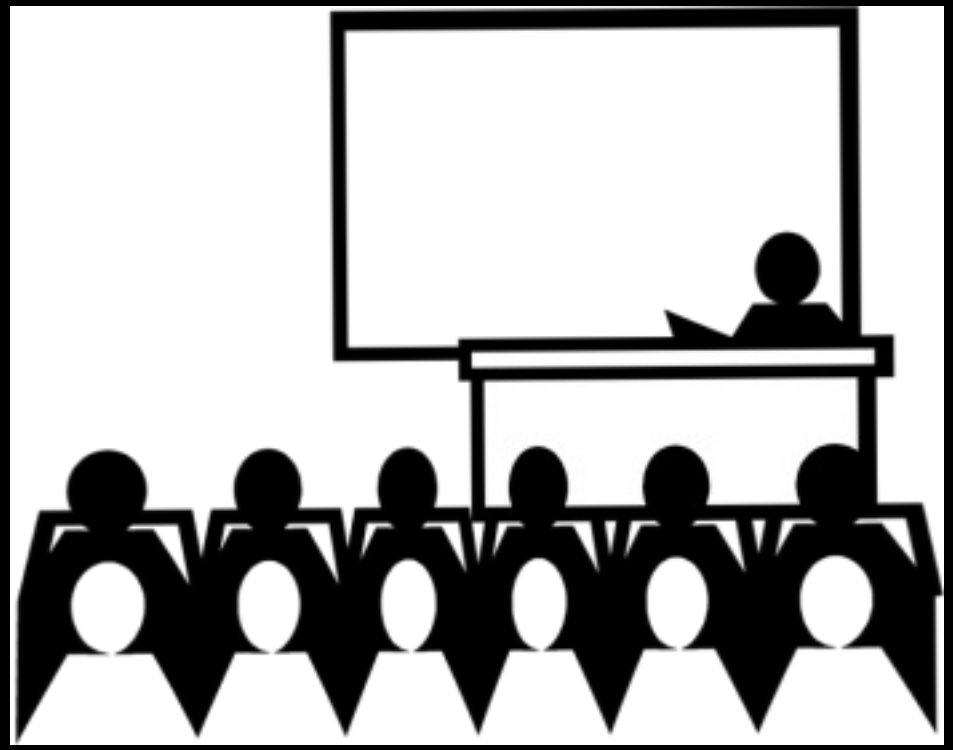
- What is the goal?
  - To teach someone something? To sell something? To persuade? To show someone how smart you are?
- What is your message?
- How are you presenting the information?
  - Orally, powerpoint, Zoom, etc?
  - Lecture, interview, interactive, flipped classroom, workshop, etc?
- Who is your audience? Who are the stakeholders?

Two approaches to communication:

Deficit Model v. Dialogic Model

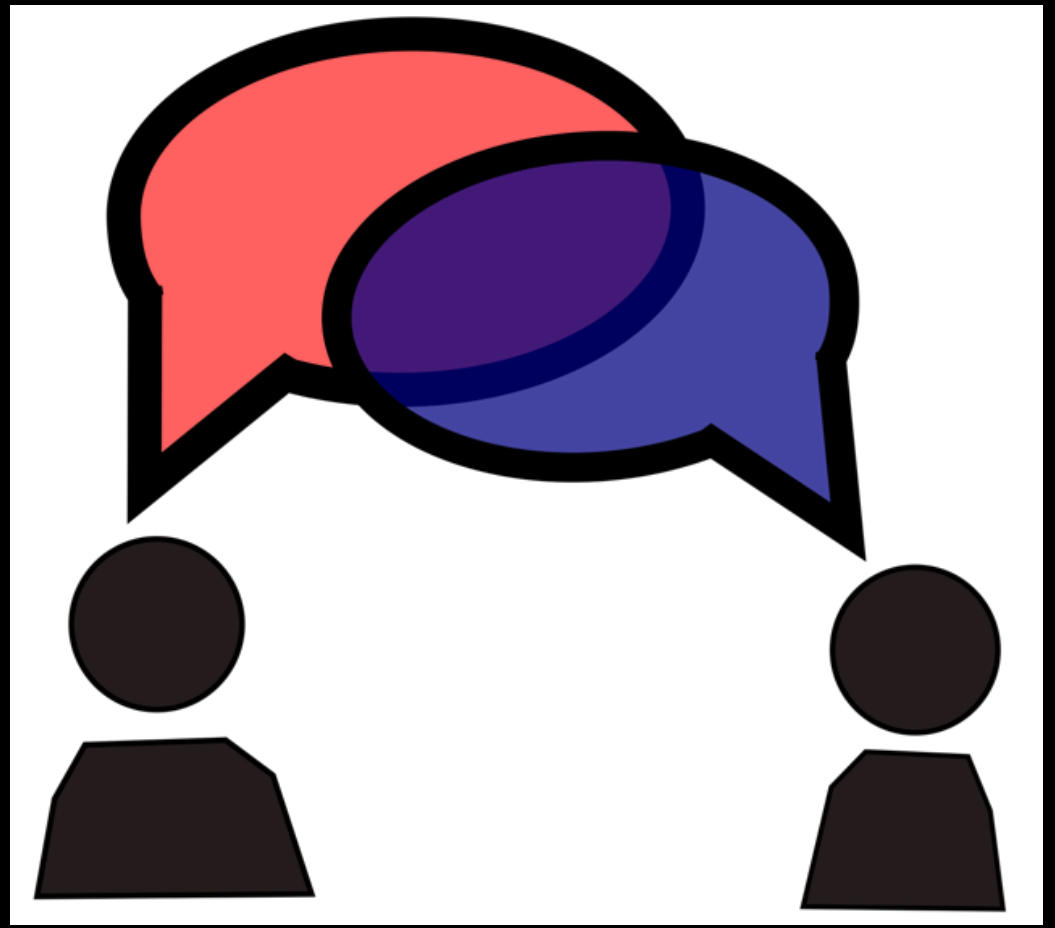
The Deficit (one-way) Model

- Assumptions:
  - There is a "sender" and a "receiver"
  - Problems are due to a lack of information
  - "The mere existence of a deficit is enough to intrinsically motivate nonscientists to pay attention to information, acquire the required skills to comprehend the information, and adjust their preexisting attitudes and beliefs to conform with scientists' interpretation of the data" –Krieger & Gallois 2017
  - The scientist or communicator's role "is simply to reduce this information deficit through disseminating scientific information more and better."
- But: this is shown to be ineffective.
  - Examples: climate change, vaccine skepticism, etc



The Dialogic Model

- All participants are simultaneously senders and receivers
- "This means that science communication efforts are intertwined with efforts to maximize the participation of stakeholders, establish ongoing channels for meaningful feedback, and develop policies and procedures for decision making that reflect diverse domains of expertise." –Krieger & Gallois 2017
- Example: citizen science
- But: this can be hard to implement in practice and takes considerably more effort



Some other miscellaneous notes on effective science communication

Be careful with analogies!

- Analogies can be super helpful tools to explain a concept
- **BUT** a poorly explained, loosely connected, or potentially misdirecting analogy can be detrimental and lead to more/deeper misconceptions

Be careful with analogies!

https://youtu.be/-FtCTW2rVFM

“Ogres are like onions”

- Everyone comes in with their own conceptions and biases.
- Just because you come up with an analogy doesn’t mean it’s effective to get your point across
- *A bad analogy can completely derail your presentation and message.*
- “Not everybody likes onions” Is your analogy possibly divisive? Too niche?

If a student answers a question incorrectly (especially if it's repeating a common misconception)

- Don't say: "kind of" or "almost" or "yeah, but" (I know, this is really hard not to do!)
- Don't make the student feel bad for thinking this!
- Try to redirect in a positive way, while making the correct answer (and reason!) clear
  - "This is a really common misconception, but…"
  - "I understand how you got there, but…"

This is really hard and takes practice!!

English as a second language

- There will be people in your audience (and maybe yourself!) who do not use English as their first or primary language
- Be clear in your language and what you mean
- Speak clearly, with annunciation, at a good speed, and good volume
  - But: don't shout (louder ≠ clearer)
    or at a drawn-out speed (exaggerated slow = offensive ≠ clearer)

English as a second language

- Idioms and other colloquialisms
  - Pervasive in our language and almost never translate directly
  - Example: “I have other things to be doing”
    - English: “I have other fish to fry”
    - French: “J’ai d’autres chats à fuetter” → “I have other cats to whip”
    - German: “Ich habe andere Igel zu bürsten” → “I have to brush some other hedgehogs”
    - What this phrase in your language and how does it translate to English?
  - Other examples: “snowball effect”, “the ball is in your court”, “it’s not rocket science”, “at face value”, “the whole nine yards”, “on the fence”, “take it with a grain of salt”,…
  - Examples of (English) colloquialisms:
    - “We could stare at these maps til the cows come home.”
    - “The PI will be madder than a wet hen if we don’t get the data.”
    - “With the new dataset, they were busier than a cat on a hot tin roof.”

Being culturally-competent

- Different cultures have different ideas on societal problems, science, nature, etc
  - Cultural associations with nature and place can run *deeply* and be intertwined with their creation stories and worldview
- Be mindful of this in your communication, assumed knowledge, centering, etc
- Be mindful of where you are.
  - Not only "whose land are you on"
    - Know how to pronounce the name of people(s) whose land you're on!
    - Ex: Tohono O'odham
  - What are you doing on that land? What interpretations are you projecting?
- Who is your audience?

Example: Constellations

- There are 88 constellations "recognized" by the International Astronomical Union
- Nearly every culture has some set of constellations, but they're not necessarily the same across cultures!

Orion (western)

Image credit: manpuku7 via Getty Images

Wintermaker (Ojibwe)

Image credit: Annette Lee

Jawza' (Arab)

Image credit: Roland Laffitte

Baiame (Wiradjuri)

Image credit: Scott "Sauce" Towney

Zebra, Arrow, and Lions (Namaquas)

Image credit: Braam Botha

- Tohono O'odham: one of the stars in Orion's belt is a mountain sheep (ceşoñ)

Source: http://www.acsu.buffalo.edu/~mathiotm/Mathiot/Volume%20I.pdf

In summary

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