**Class 1: Types of Communication**

**Lecture**

* Why science communications are important
  + Opening and creating opportunities
* Had to have strategies to effectively communicate science and articulate it to the audience
* If you can teach something than you understand it
* READ THE GUIDE
* Word you use can change the meaning of a sentence

Types of communication

* Posters
* Presentations/ Conference
  + Learning to speak and present your work will have great effects in your life, even if it’s not you are in a scientific career
* Journal
  + If you can write and communicate them well, you can write anything
* Social media
  + Become so much more important in science
  + Amplify message
  + Goes to anyone in the world while journals only go to a group of people that had access to it
* Research grants
  + Important to write grants
* Podcast

Know your audience

* Sometimes you know your audience and often times you don’t
* Makes a difference once you pitch your talk
* Different versions of the same information
* Engage your audience by asking questions
* Acknowledge things that the audience is going through things as a collective a whole

Lay summary

* Know your audience
* Structure, organize and roles
* Assume grade 8 level
* Simple summary that avoids jargon and the audience is able to understand

Social media

* Don’t sacrifice clarity for brevity
* Use images and videos to augment your content
* Use # and @ to engage others and encourage retweets
* Live tweet from conference and academic events
* Use analytics to work out what engages your audience most
* Share perspectives or take a strong stance in topical content
  + Blend you are of expertise into you views to provide a unique perspective only you could possibly provide
* Engage and respond to tweets from those with higher follower counts within topics that interest you more visibility
  + Don’t be afraid to partake in real discussion
* Be yourself
  + Don’t cultivate an online personality that doesn’t reflect who you are. Remain true and consistent to your core values, and be vulnerable in making those values known
* Be polite, but edgy, sarcastic, witty in your tone
* Be respectful- treat people as you would in person

Layman’s Summary Paper

* brain injury- ICU – death
  + Because of pulling the plug/ withdraw support
* Problem:
  + In ICU good at predicting who will not recover
  + No predictors of good outcomes
  + Not good at predicting based on good
* Use machine learning to see if brain scans can be used to generate positive predictors
* Can we see how well they recover
* Scan their brain passively
* Gave the info to the machine and the machine was able to 80% accurate tell who could survive
* Fully automated tool for identify who are able to recover
  + The originally stuff like checking pupils and see hands squeezing

ARTICLE POINTS

* The main goal of the paper is to find out if a special brain scan (fMRI) can help doctors predict if patients in a coma or unresponsive after a serious brain injury will have a good recovery or not within six months.
* Many people with brain injuries often end up in the ICU due to the severity of the trauma and most often this leads to death
  + The reason why this occurs is often due to the family wanting to withdraw life support
* Problem
  + There are lots of ways to know whether someone will not survive
  + However, there are no predictors to know whether someone **will survive**
* This study uses machine learning to see if the brain scans can be used to generate positive predictors and you can see how well they recover
  + Patients underwent a brain scan for 5.5 mins
  + Glasgow outcome scale was used to indicate patients classified as good or poor outcomes
* The brains were scanned passively, and this information was given to the machine which had an 80% accuracy of predicting survivability
  + Fully automated tool for identify who are able to recover
    - Originally checking pupils and seeing if simple motor movements such as hand squeezes were the main predictors used
  + The most significant predictors of recovery were the three visual predictors of the ten used

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**Class 2: Story Telling Narrative**

**Readings**

**How to tell compelling scientific stories:**

Introduction

* **Purpose of Communication**: Researchers communicate their work not just to fulfill academic demands but because knowledge-building is a social and rhetorical act.
* **Role of Genres**: Effective communication in research writing and presentation is influenced by structure, purpose, audience, and occasion.
* **Example**: Communication varies based on context, such as a conference presentation versus an informal family gathering, highlighting the need for different genres of communication.

#### Writing Up

* **Five Key Aspects**:
  + **Entering the Conversation**: Write as if joining a conversation, focusing on the relevance of your research to a problem in the reader's world.
  + **Mapping the Gap**: Identify a problem, establish a gap in current knowledge, and articulate why this gap matters.
  + **Telling the Story**: Write persuasively, crafting a narrative that captures the reader's interest.
  + **Crafting the Language**: Use clear, engaging language to convey your research effectively.

#### Entering the Conversation

* **Focus**: Shift from describing the study to telling a story relevant to a problem in the reader's world.
* **Journal Selection**: Choose journals based on alignment with the problem your research addresses and their audience's values.
* **Literature Review**: Treat it as a map of conversational turns in the field, highlighting how your work contributes to ongoing discussions.

#### Mapping the Gap

* **Three Steps**:
  + **Identify a Problem**: Make it clear what problem in the world your research addresses.
  + **Establish a Gap**: Show where current knowledge or thinking about the problem is lacking.
  + **Articulate a Hook**: Convince readers that the gap you identified is significant and worth addressing.
* **Context Sensitivity**: Understand the evolving context of what constitutes a problem in your field to ensure relevance.

### Practical Tips for Writing and Presentation

* **Social Media**: Utilize social media to disseminate research, reaching a broader audience beyond traditional academic channels.
* **Imaginative Approach**: Use metaphors like joining a cocktail party conversation to intuitively guide your writing and engagement with scholarly debates.

### Key Principles Summarized

1. **Join a conversation**: Position your research within ongoing scholarly discussions.
2. **Identify a problem**: Make your research relevant to a real-world issue.
3. **Map the gap**: Clearly outline where current understanding is lacking.
4. **Have a hook**: Engage your audience by emphasizing the importance of the gap.
5. **Tell a story**: Make your research narrative compelling and persuasive.
6. **Craft the language**: Pay attention to how you phrase and present your findings.

**It’s a story not a study:**

* Include
  + clear question and propose a statement
  + theoretical framework
  + detailed methods and results
  + thoughtful limitations
* Key Differences Between Study and Story
  + **Structural**:
    - **Study**: Focuses on methods and results.
    - **Story**: Unfolds in the introduction and discussion/conclusion.
  + **Rhetorical**:
    - **Study**: Must be reported accurately.
    - **Story**: Must be told persuasively.
* Goals for Effective Research Papers
  + **Understandable**: The narrative should be clear.
  + **Compelling**: The story should engage the reader.
  + **Memorable**: The research should leave a lasting impression.
* Standard Manuscript
  + Introduction:
    - What problem did you explore?
    - What’s the hook—why does the problem matter?
  + Literature Review:
    - What conversation are you joining?
    - What’s the gap in knowledge?
  + Methods:
    - What did you do?
    - What was the rationale for the research design?
    - Is the explanation accessible?
  + Results:
    - Who are the main characters in your results?
    - Have you illustrated them convincingly?
  + Discussion:
    - How does your story add to the conversation?
    - How have you filled the gap?
    - How does the design limit your contribution?
  + Conclusions:
    - What’s the key lesson from your story?
    - What is the inevitable story-in-waiting?

**The Science and Power of Storytelling**

* Scientists need to engage and educate the public.
* Storytelling is a powerful tool for communication, enhancing understanding and inclusivity in science.
* **Neural Mechanisms**: Studying brain activation during story telling by Prof. Uri Hasson.
* **Findings**:
  + Listeners' brain activity aligns with the storytellers.
  + Similar neural responses across different languages show the narrative's power.
  + Shared interpretations lead to greater neural similarity.
* Storytelling in Science Communication
  + **Brain Coupling**: Listeners' brains sync with the storyteller’s, improving comprehension.
  + **Implications**: Storytelling can bridge divides by fostering shared understanding.
* The power of story telling
  + Engaging listeners creates a stronger and more meaningful transfer of the knowledge
    - creates intellectual investment and emotional bond between speaker and audience
  + Emphasizes the human side
  + Helps authors write engaging introductions
  + Connects science with cultural backgrounds
  + Use storytelling to empower
  + Makes science more inclusive and understandable

**Making Science Meaningful for Board Audiences through Stories:**

* Importance of Storytelling in Science Communication:
  + Stories help make science comprehensible and meaningful for general audiences by placing scientific information in a relatable and engaging context
  + Storytelling aids in the processing and recall of new information by audiences
* Challenges in Scientific Communication:
  + Scientists often struggle to convey the importance of their work to non-expert audience
  + There is a concern among scientists that storytelling might conflate empirical evidence with fiction, but effective storytelling in science involves highlighting the story elements inherent in the subject matter
* Elements of an Effective Story:
  + Protagonist: A relatable and often flawed main character that the audience can empathize with
  + Inciting Incident: An event that changes the protagonist's situation and sets the story in motion
  + Obstacles: Challenges the protagonist faces, which can be internal or external, adding depth and complexity to the story
  + Stakes: The risks involved if the protagonist fails, which keep the audience invested in the outcome
  + Broad theme: A universal lesson or message that resonates with the audience beyond the specifics of the story​

**Science and Storytelling:**

* Kids were able to visualize and understand the story
* Creating an emotional connection with the audience
* Going on the journey together
  + Shared experience
* Often there is a lack of relatability
* School science: Failure to anticipate

**Lecture**

Feedback on lay summary

* Give the global perspective as well as the local perspective
  + Ex. Hook: brain injury affects a people in the world
* Be precise and accurate… don’t leave anything unsaid
  + This tool could change how doctors understand life support treatment BY…
    - Improving, offering etc
* Open and close with a hook that will draw the reader
* Get a quote from researcher, carer or patient to show that you, as the reporter, have heard about it firsthand and to add a personal angle
* Balance essential detail with too much detail
  + But don’t be too vague as well
    - Ex …mislead factor => but what is the misleading factor, what do they mean by that?
* Don’t add too much science detail that will just make the piece difficult to read and understand
* Avoid word salas and check sentence meaning again
* Don’t start paragraph with this or it

Ask the author

* Target audience was vegetative state, students with some knowledge
* What’s something different you would do know that you published?
* How were you able to remember the facts and stuff, did you document your journey in a journal, and if not was it difficult to recall the memories and feelings you experienced
* How did you know you wanted to publish
* Did you know you always know you were going to write a book… because how were you able to recall the feelings, emptions, and experiences… did you document it?

What makes a good story?

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**Class 3: Microteach presentation**

**Readings**

**Types of communication styles:**

* Linear vs circular
* Direct vs indirect
* Low vs high context
* Attached vs detached
* Idea vs person focused
* Task vs relationship focused
* Formal vs informal

**Active learning:**

* Requires thoughtful engagement with course material
* Requires proper instructor design and guidance
* Incorporation into lecture
* Enhances deeper learning
* Evidence based approach

**Lecture**

Microteach Debrief

* Introduce yourself
  + Good habit to adopt
  + Be clear what the topic is about in the first 30 seconds
* Less is more
  + Can scale back
* Flow and order of information is important
  + Don’t want any confusion
* Filler words
  + Embrace the pause
  + Try to recognize and work on it

**Class 4: Publications and Proposals**

**Readings**

**The Review process**

* Manuscript submission 🡪 review 🡪 returned to editor 🡪 reject/revise 🡪 reject/ revise 🡪 published
* Quality check, scope and see if it fits review

**The Art of Grantsmanship**

* It’s a competition
* To help optimize chances of success competing
* Good science can become non fundable grant proposal
  + Bad wiring will kill good ideas
* Proposal fits agency’s mission
  + Matching objectives
* Outline your proposal
* Keep proposal focuses, original, and feasible

**Lecture**

Paper vs Proposal

* Paper 🡪 presenting result and how it fits into a question
  + Intro, methods, results, discussion
* Proposal 🡪 request for approval, money, resources
  + Usually comes first
  + Tweak it to the agency
  + Objectives, preliminary data, background info
  + Why significance
  + Backup plans if experiment fails
  + Within the scope of the journal
  + Need a lit review
    - What do we know, what do we not know
  + Return on investment
    - Advance in society
    - Discoveries and impact to be made
  + Sex and gender analysis
  + Lay summary
  + Societal and scholarly benefits
  + Highly trained personnel and your credibility and CV on team
    - Why they are the perfect people to carry out research
  + Budget justification
    - Budget reflags
      * Not clear where money is going
      * Excessive with technology
      * Not allowed to pay yourself or people working for research, secretaries, admins
  + In kind costs
    - Arrangement to provide something that isn’t cash
    - Agency feels like you are getting a value for money and feel like you’re getting something for free
    - “Matching funds”
* Both are posing a research question

What comes to mind when you think of publication process

* Tedious
  + Focus is being pulled for professor
  + Getting all co-authors to agree
* Long
  + You vs the reviewers
  + About a year
    - Why?
      * Make changes if not approved right away
* Rewarding
* Tailored
  + Different journals have different requirements
* Impact factor
  + How much impactful the paper will have in the journal

Where to send it

* Fit in the journal’s scope
* Should aim high when submitting to journals
* H index
  + How many papers you published
  + Published high impact papers over a period of time
* Review journals have higher impact factor than peer review

Process (author, editor, review)

* Editor makes the decisions about the paper and not the reviewer
* Reviewer = just comment do not write if it gets published or not
  + 2/3 is standard
* Good editor will not go through a 3rd reviewer

Effective proposal

* Letter of intent
  + Pre submission inquiry
  + Saves time if you grant won’t get approved
  + A page long
  + Importance of the work
  + Tirage the grant
  + Used for budgeting
    - How much money is going to be asked

Grant panel review

* Tri council
  + Nserc
    - To advance knowledge in the natural science or engineering
  + Sshrc
    - To add to ours. Understanding and knowledge of individuals, groups societies
    - Lest largest budget
  + Cihr
    - All research primarily indented to improve health
    - Largest budget
* Under 4 you don’t get funded
* Score is how much money is left in the pot

Grant brief task

* SGBA
  + Look at tri council website
  + Training environment
    - Who you’ll train
    - EDI

A whiteboard with writing on it

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**Class 5: Giving and Reading Feedback**

**Readings**

**Giving feedback on others’ writing**

* Energy, clarity, persuasiveness
* Poor feedback can be confusing, unhelpful, and discouraging
* Feedback should be a conversation
* Being specific can help both the reader and writer
* If unsure where to start 🡪 story, structure, then style
  + Way to organize feedback
* Too much feedback can be overwhelming
* Readers can sometimes offer generic comments if they don’t know how to address or name the problem
* Name problems 🡪 know there is a problem but can’t say it? Just say that
* Resist urge to rewrite
* Find balance
* Feedback can be personal

Giving and Receiving Feedback

* Feedback is personalized information based on direct observation, aimed at helping receivers achieve their best potential
* Feedback should be specific, non-evaluative, and descriptive.
* It must be based on direct observation and relate to specific behaviors rather than personal traits.
* Effective feedback requires a respectful interpersonal climate and a committed relationship between giver and receive
* Giving feedback
  + Establish mutual learning goals that are specific, measurable, attainable, relevant, and time-bound (SMART).
  + Use constructive, descriptive, and non-judgmental language, focusing on behaviors rather than personal traits.
* Receiving feedback
  + Receiving feedback can be challenging and requires listening and active participation.
  + It is important to make conscious decisions regarding the implementation of feedback.
* Methods
  + **Feedback Sandwich**: Sandwiches negative feedback between positive feedback. Though simple, it can seem rigid or contrived.
  + **Ask-Tell-Ask**: A bidirectional method that involves asking for self-assessment, telling observations, and asking for understanding and action plans.
  + **Pendleton Rules**: Starts with self-assessment, followed by the supervisor's input on positives and areas for improvement.
  + **1-Minute Preceptor**: Incorporates feedback into brief teaching moments, focusing on specific learner behaviors and understanding.
* Barriers
  + Mismatched perceptions between givers and receivers about the amount and quality of feedback.
  + Lack of established feedback relationships and clear expectations.
* Strategies
  + Label feedback conversations explicitly.
  + Foster trusting relationships and create opportunities for continuous feedback.

**Lecture**

Publication Ethics

* Authorship scenario
  + Didn’t really work on the manuscript
  + If they have a job for the task they don’t need to be considered as an author
    - Didn’t really contribute to the science
    - They were paid to do the science
  + Takes away from the people who are actually doing the science
  + Have an acknowledgement section
  + The student can also ask if they are going to or not going to be an author, what they can do to be a doctor
  + Substantial contribution, drafting and reviewing, final approval, accountability
* Corresponding authorship
* First author 🡪 person who thought of it and did the work
* End author 🡪 lab chief, PI, senior person
* Coauthorship 🡪 equal contribution
* In education field 🡪 often PI is first
  + Order of contribution

Feedback

* Is information provided regarding aspects of ones performance or understanding
* Serves the purpose of improving future actions and behavior by highlighting areas of strength and identifying opportunities for growth
* For
* Important because
  + Always learning
  + Only as good as your feedback
  + Cohesiveness and same understanding
  + Furthering innovation 🡪 inspiring people/ ideas
  + Preventing mistakes
  + Maintaining creditability
* Ex.
  + Publication process 🡪 constant edits
  + Lay summary review 🡪 readability
  + For evaluation or review
  + Patient
    - Surveys
    - Regular conversation
  + Lab
    - New technique, or equipment
  + Teaching
  + Peer feedback

Types of feedback

* Constructive criticism
* Positive feedback
* Negative feedback
* Where?
  + Employment
  + Sports
  + Teaching position
  + Social media

What comes to mind when you think about feedback

* Growth 🡪 get better at everything
* Learning
* Self-reflection
* Noise 🡪 sometimes people miss the point
* Focused feedback 🡪 get back more details
* Context 🡪 providing context, provide the knowledge prior

Effective Feedback

* Specific 🡪 clear and concise
* Actionable
* Timing
* Nonjudgemental 🡪 be objective
  + Offers a new voice
* Honest and genuine
  + Transparent from where your feedback is coming from
  + Framing it by saying “if I were to do it..”
* Bidirectional 🡪 have a conversation
  + Ongoing
  + Not just a one way evaluation
* Balanced 🡪 better word would be respectful
  + Linked to genuine and real
  + Poke holes so that it can be better
* Focused on behaviour 🡪 not personal, or attack person

Peer review

* Letter
* How would you format and structure it?
  + Sandwich method
  + Can be personal and informal
  + Overarching statement and specific statements
    - Overall and circle back
  + Summary and contextualize
  + Single spaced
  + Address and sign name at bottom
  + 3 sections, intro body and conclusion
  + Different components and have subheadings
    - Themes or sections
  + Provide your justification why you are bringing awareness to a particular form
  + Opinion based
    - Statements more than questions

Response letter

* Something you justify
* Respond to the points
  + Thank you for bringing this into consideration
  + Acknowledge and appreciate
  + Perhaps a misunderstanding
  + No, I don’t agree because

**Class 6: Mock Interview**

* Just prepped for interview! No readings or notes

Interview

* Themes
  + Career in science
  + Personal
    - Who is Dr. Owen
    - Things that happened that led to his journey in this career
    - Who is …
      * Why did you choose neuroscience
      * How was you’re experience during your academia career
      * What made you who you are
  + Advice for upcoming scientists
    - Ethics
    - Publications
    - What are some lessons in science communication that you learned that you could share with the listeners?
  + Journey of writing into the gray zone
    - What’s the experience like
    - How would you change, or would you change something if you had the chance to go back
    - What lesson learned that you’ll implement into future books
    - Storytelling
    - Who came up with the title and what made the think of it
    - What was the editing process like
    - How were you able to remember everything? Did you write everything
    - Emotional component?
* Publications
* Podcast has a theme
* Welcome to blah blah blah podcast we will be exploring
* Conversational style
  + Avoid each person asking questions

**Class 7: Open Science**

**Readings**

**Predatory journals:**

* Global threat, accepting articles without quality checks for issues like plagiarism or ethical approval in exchange for fees.
* They confuse readers, waste resources, and publish shoddy scholarship
* no universally accepted definition of predatory journals, making it hard to address the issue
* Predatory journals (PFJs) publish articles without proper editorial and peer review processes, focusing on profit rather than scientific quality.
* These journals often provide false information, such as fake impact factors and editor credentials.
* Consensus definition
  + Predatory journals and publishers are entities that prioritize self-interest at the expense of scholarship and are characterized by false or misleading information, deviation from best editorial and publication practices, a lack of transparency, and/or the use of aggressive and indiscriminate solicitation practices.
* Characteristics
  + False and mislead information
  + Deviating from best practices
  + Lack of transparency
  + Aggressive solicitation
  + Harm in scientific integrity
    - Publishing low quality research
* Quality of peer review and the intent to deceive were deliberately left out due to the difficulty in assessment and subjectivity
* Developing a portal with educational resources and establishing an international observatory to track the problem.
* Collaborating with funders, institutions, and other stakeholders to develop resources for assessing journal quality.
* Located in developing countries
  + Possible due to limited access to reputable journals
* Reasons for publishing
  + Rapid academic promotion
  + Publish or perish culture
  + Unaware of the nature of predatory journals

**Lecture**

Publication process

* Subscription based 🡪 gets paid/ no need to pay
* Open accesses 🡪 have to pay
* Predatory 🡪 only people benefitting is them
* APC = Article processing charge

Decision process

* Where do I see this work fitting in
* Beales list

Open accesses

* What is it?
* What does it mean
* Pre registration 🡺 register your idea so that someone around the world does
  + But nothing stopping someone taking the idea and running the experiment
  + State what p test your going to use and what tools
* P hacking
  + Running p values to find a significant p vale
* Open education
* Best open practice 🡪 Computer science (sharing and making it better)
  + Physics
  + AI
* Open: freely available for readers , transparency
* Downside
  + Very expensive (especially fees)
  + Making publishing houses incredibly rich

Predatory journal

* Predatory publisher 🡪 deceiving the author
  + Company
* Predatory journals 🡪
  + Affiliated with the publisher
* Hijacked journals 🡪
  + Brandjacking
  + Taken over by bad influence
  + Disguise themselves
  + People are onto predatory publishers
* Why do people cite retracted journals
  + Not going back to the source
    - By citing when not acc reading the paper

Preprint publications

* Differences between peer review and preprint
  + Preprint
    - Open accesses
    - Accelerate progress
    - Immediate access
    - More eyes on it
    - Keep up to date of progress
    - Valuable feedback
  + Peer review
    - Peer review cycle
* Connection to scientific community and media
* Because its easy to publish a pre print does that mean anyone with a paper can submit a preprint? What’s stopping people from uploading a bunch of papers 🡪 one of the disadvantages of preprint
* Upload as preprint but doesn’t get published 🡪 journal rejected and cant find a home for the paper
* But negative findings as a preprint

Stages of writing

1. Free writing 🡪 write without thinking about grammar
2. Organizing 🡪 review and highlight interesting ideas
3. Drafting 🡪 creating a basic structure
4. Reviewing 🡪 exchange draft with partner and not areas that are unclear
5. Revising 🡪 take feedback and revise
6. Editing 🡪 correct grammar, spelling, punctuation
7. Sharing --. share final work and discuss

**Class 8: Debate & Debrief**

* Just prepped for interview! No readings or notes