Mastering the Chaos: Organize your Research like a Pro

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Featuring:

Mehdia N. Rajab Ali

Anthony Compton

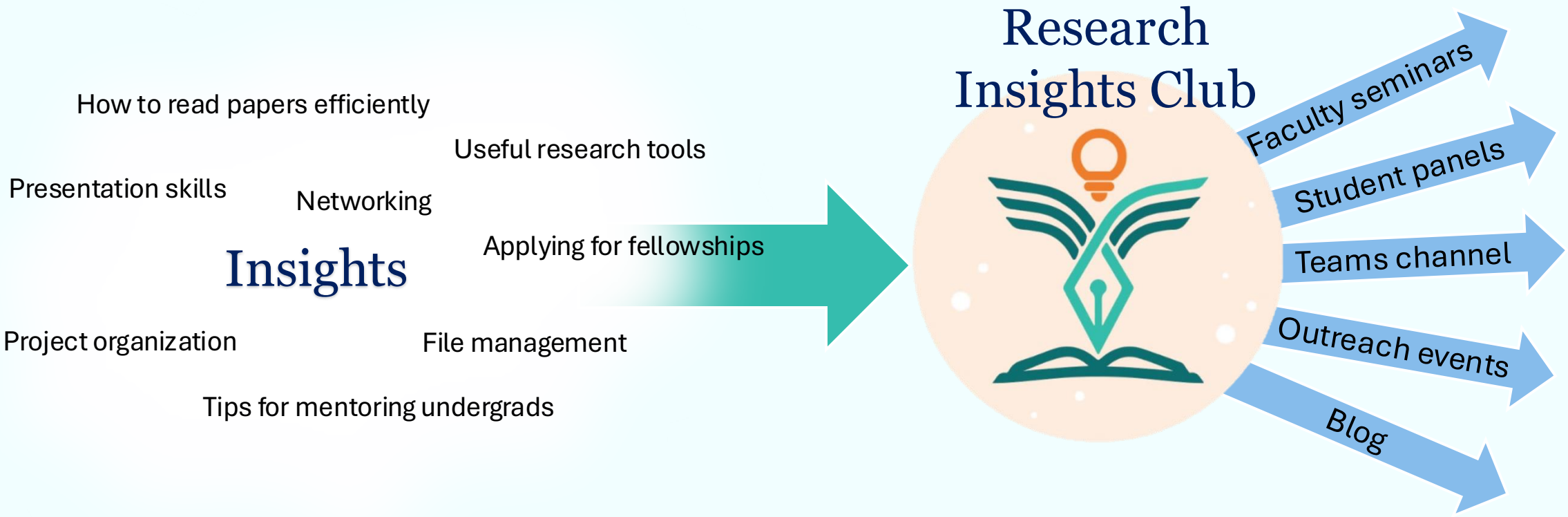
Research Insights Club

Our Purpose

(1) To disseminate detailed and hard-to-obtain knowledge to Georgia Tech students to help them navigate and thrive in the complex field of academic research.

(2) To facilitate knowledge transfer and networking between student researchers outside their usual fields.

Implementation Strategy



Join us!

Students & researchers at all levels welcome

- If interested, reach out to Steven Swingle → steven.swingle@gatech.edu
- Find us on Engage https://gatech.campuslabs.com/engage/
- Follow us on instagram @gatech.ric

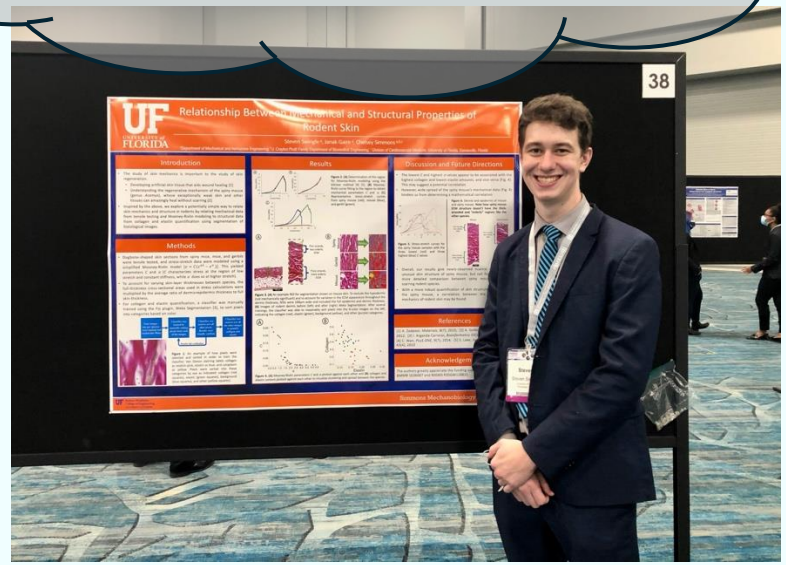
Mastering the Chaos: Organize your Research like a Pro

Why is organizing your research important?

Stressed

Sporadic

Unfocused



Steven, circa 2021

- Not organizing what I was doing
  - Research protocols
  - Goals
  - Papers
  - Network

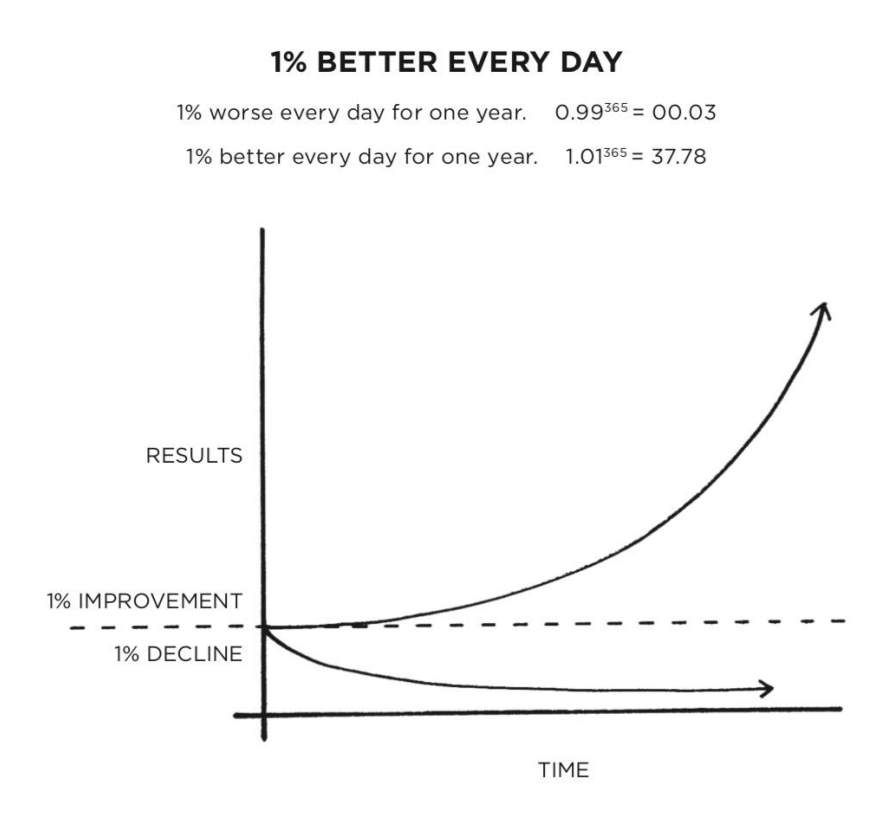
Mastering the chaos – lessons learned

- Document everything
  - Protocols
  - Goals
  - Papers
  - Network
  - Meetings
- Have a system, any system
  - Today's goal: suggestions for systems

    1st half - Personal (Mehdia)

    2nd half - Research (Anthony)

Little improvements are ok

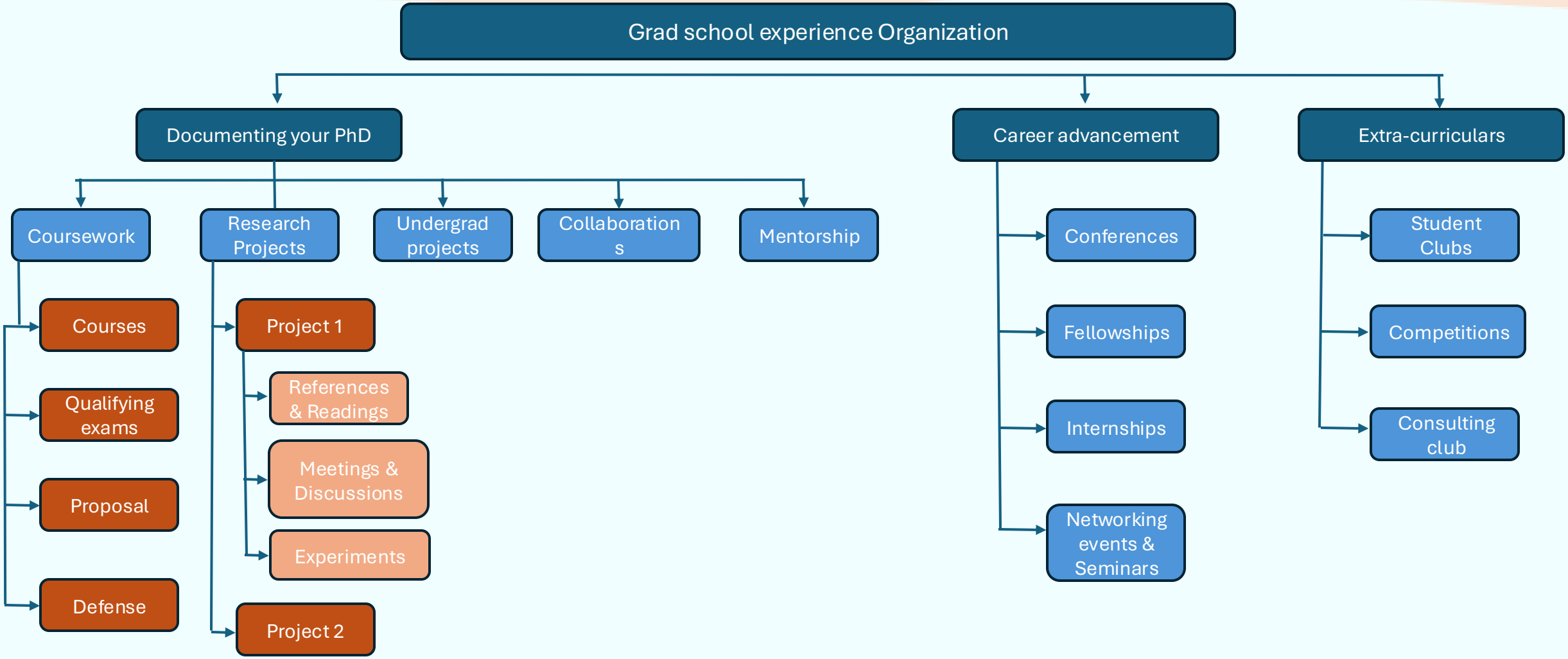


Personal Organization

Mehdia N. Rajab Ali

Personal Organization

How to organize your grad school experience?



Documenting your PhD – keeping track of milestones, meetings, experiments, decisions

1. There is no best way to document, the how is less important

2. You can structure 5-6 years of your PhD by either:
   - Academic years
   - Specific years

Categories within a year/semester

1. Coursework

- Dedicated folders for each course
- Program of study form
- RCR
- Student Advisor Matching form
- Qualifying exams
- Proposal
- Defense

Categories within a year/semester cont.

2. Research Projects

- Project 1: 2020-2025_Grant #_Chemotherapy based cell Sorting
  - References & Readings
  - Meetings & Decisions
  - Experiments (organize by theme or instrument used)
    - 09.23-03.24_Drug induced biomechanics
    - 02-34-ongoing_microfluidic sorting

- Project 2: 2024-2025 Grant # Natural Killer cell grant
  - Proposal draft
  - Illustrations

Categories within a year/semester cont.

3. Undergraduate projects
    - Create dedicated folders for each undergrad
        - Learning goals
        - Research timelines
        - Weekly updates
        - Resources
4. Collaborations
    - Create dedicated folders for each intra-lab or inter-lab collaboration
        - Parent objectives
        - Timelines
        - Task assignments
        - Communication records

Categories within a year/semester cont.

5. Mentorships

- Learning Goals
  - Initial assessments
  - Skill-building
  - Target competencies

- Development Plans
  - Milestones & timelines

- Meeting Notes
- Progress Updates
- Feedback & Reflections

Categories unspecific to semesters

1. Career Advancement
    - CVs
    - Conferences
        - Abstracts
        - Agendas
        - Presentations/Posters
    - Fellowships
        - Application
        - Recommendation letters
        - Project proposals
        - Important deadlines
    - Internships
        - Interview notes
        - Offer letters
    - Networking events & Seminars
        - Event schedules, speaker information, resources, follow-up emails etc.

Categories unspecific to semesters

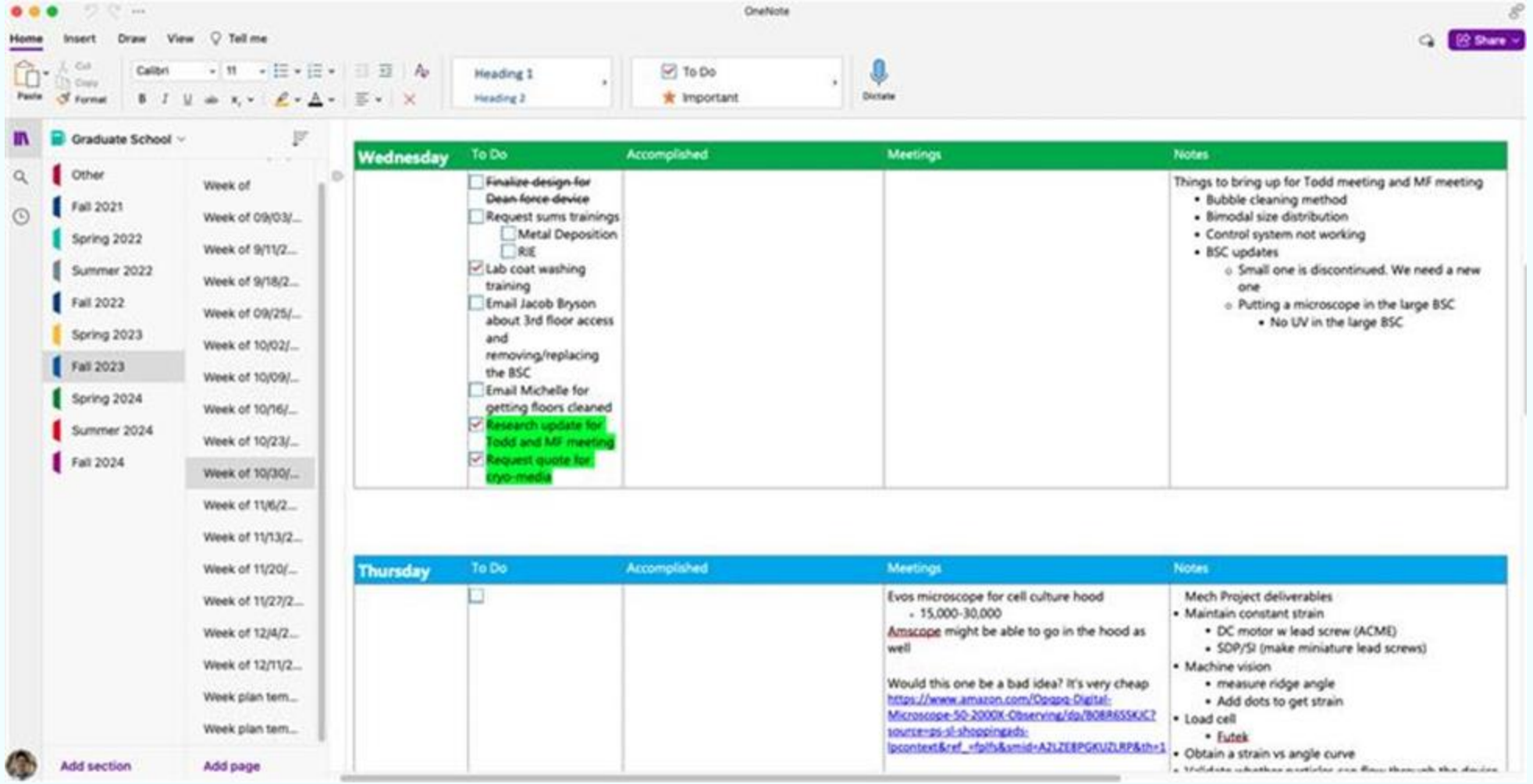
2. Extra-curriculars
    - Student Clubs
        - RIC
            1. Academic resource committee
            2. Finance
            3. Marketing
    - Mentorship Programs
    - Competitions

3. Health & Wellness
    - Meal prep/recipes
    - Work out plan
    - Health Insurance

4. Finances
    - Budgeting
    - Bills & Payments
    - Savings & Investments
    - Taxes

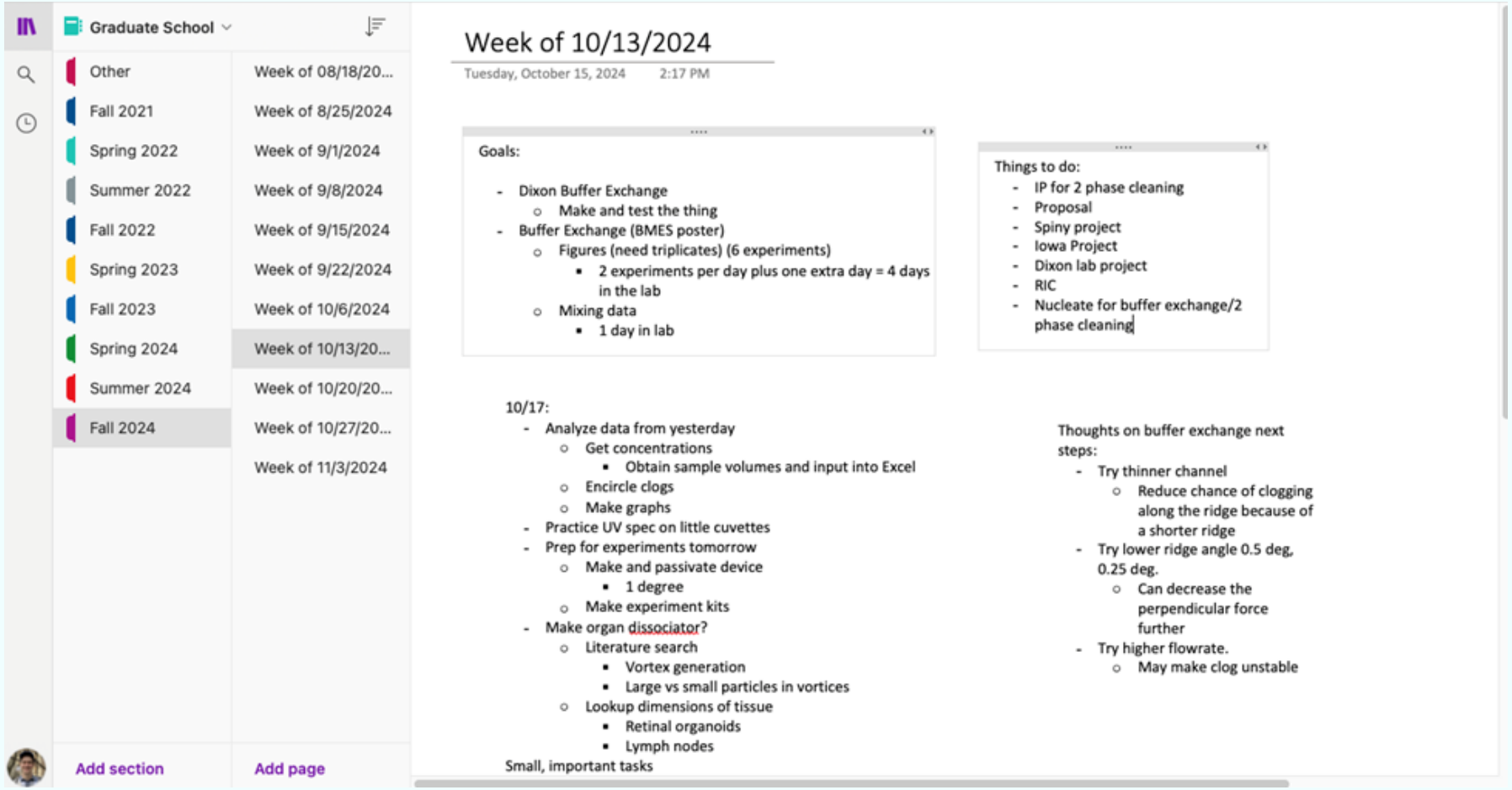
Software/Tools to organize

1. OneNote: use the notebook and section layouts to categorize projects, notes, and data.



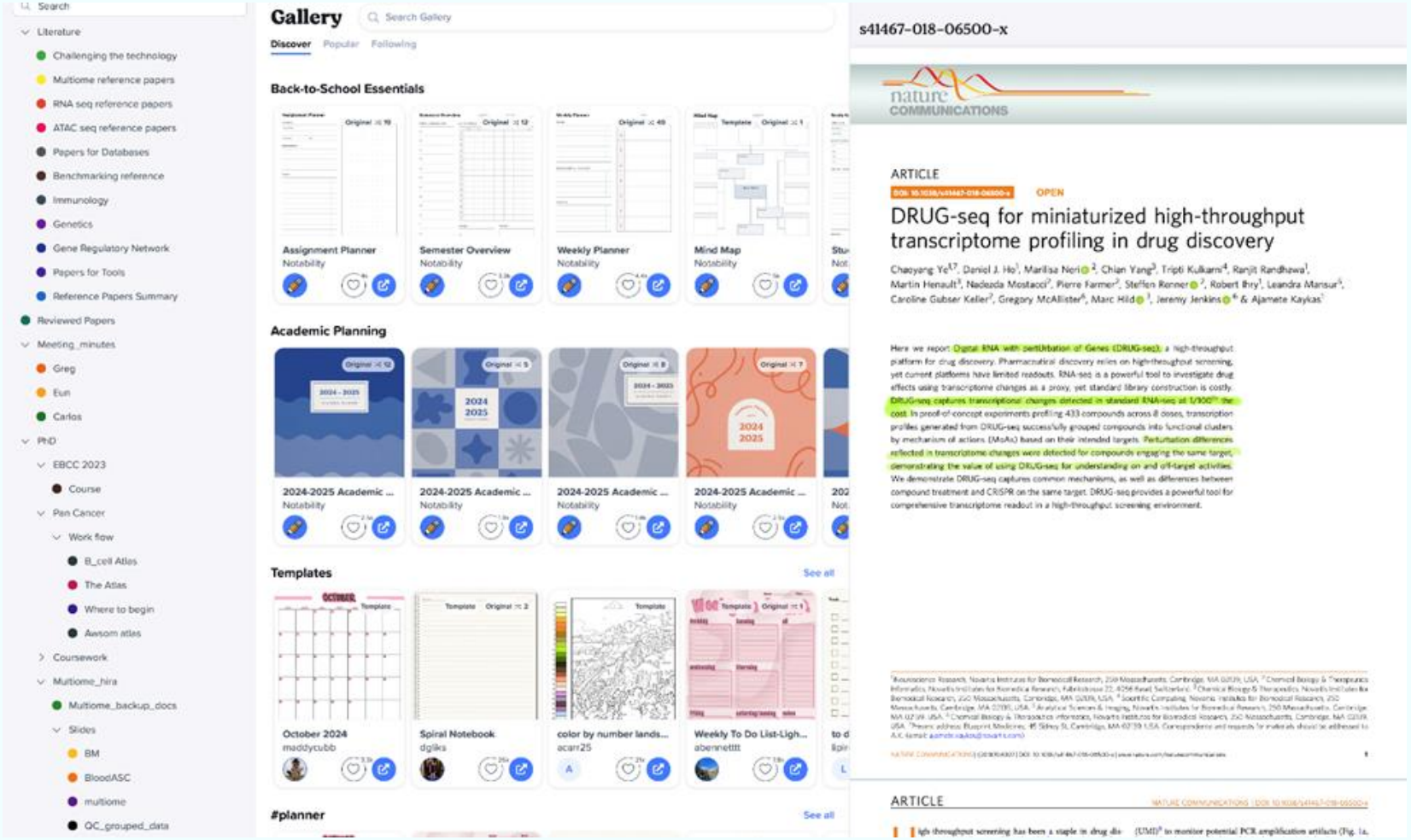
Software/Tools to organize

1. OneNote: can create pages within sections of a notebook



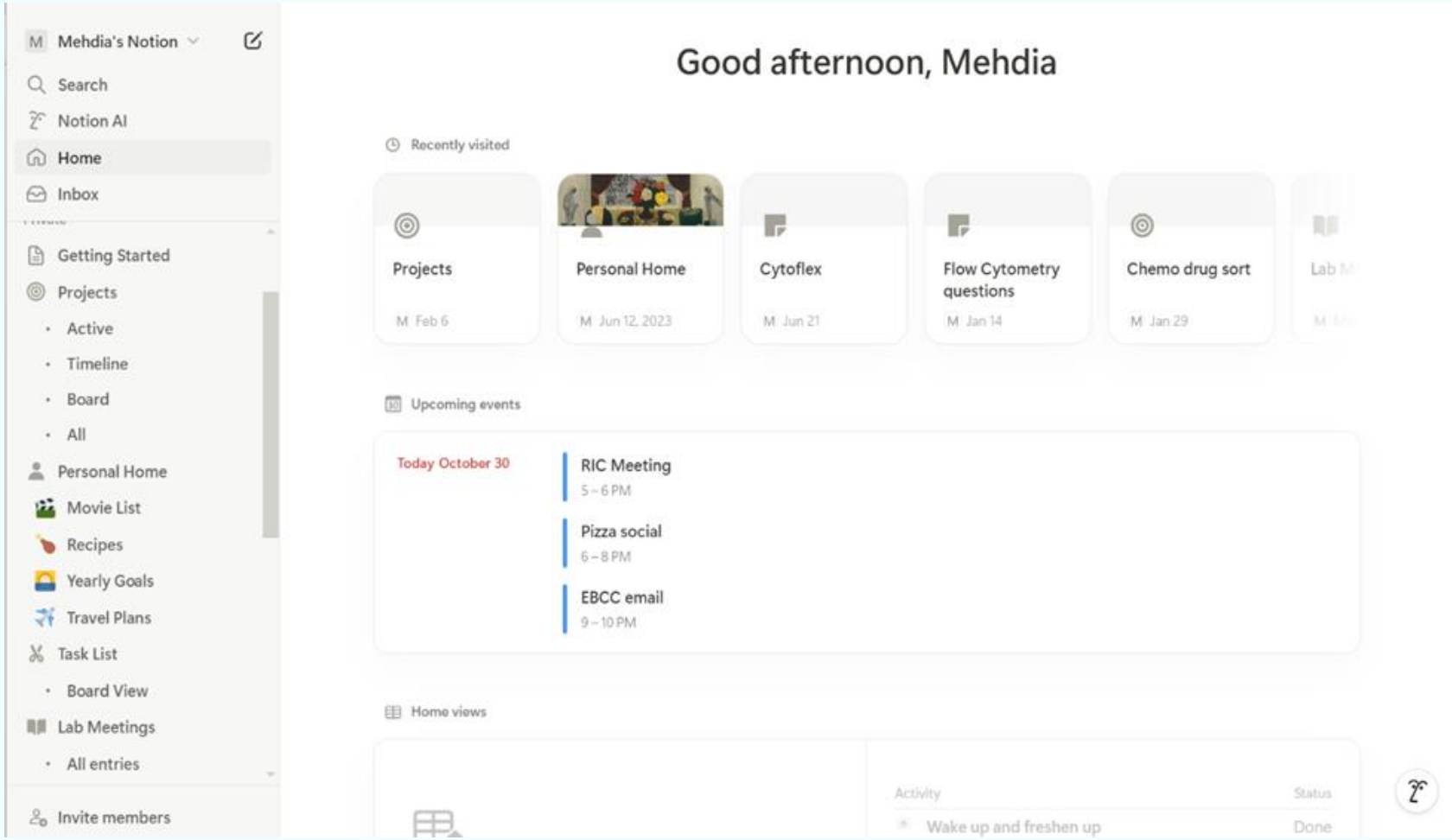
Software/Tools to organize

2. Notability: can create folders, annotate PDFs, audio recording, calendar and in-built templates

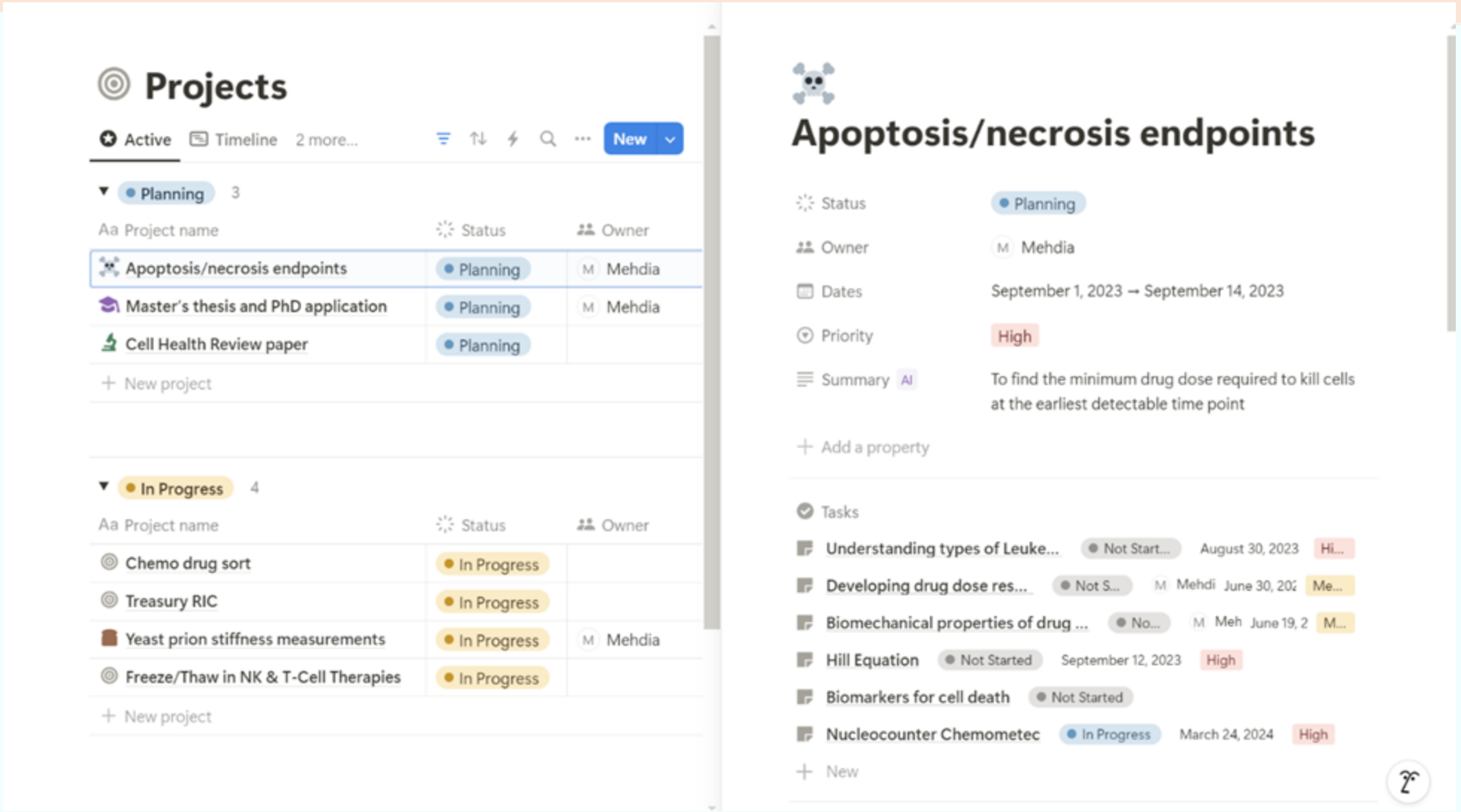


Software/Tools to organize

3. Notion: flexible database structure, manage notes, tasks, and project timelines



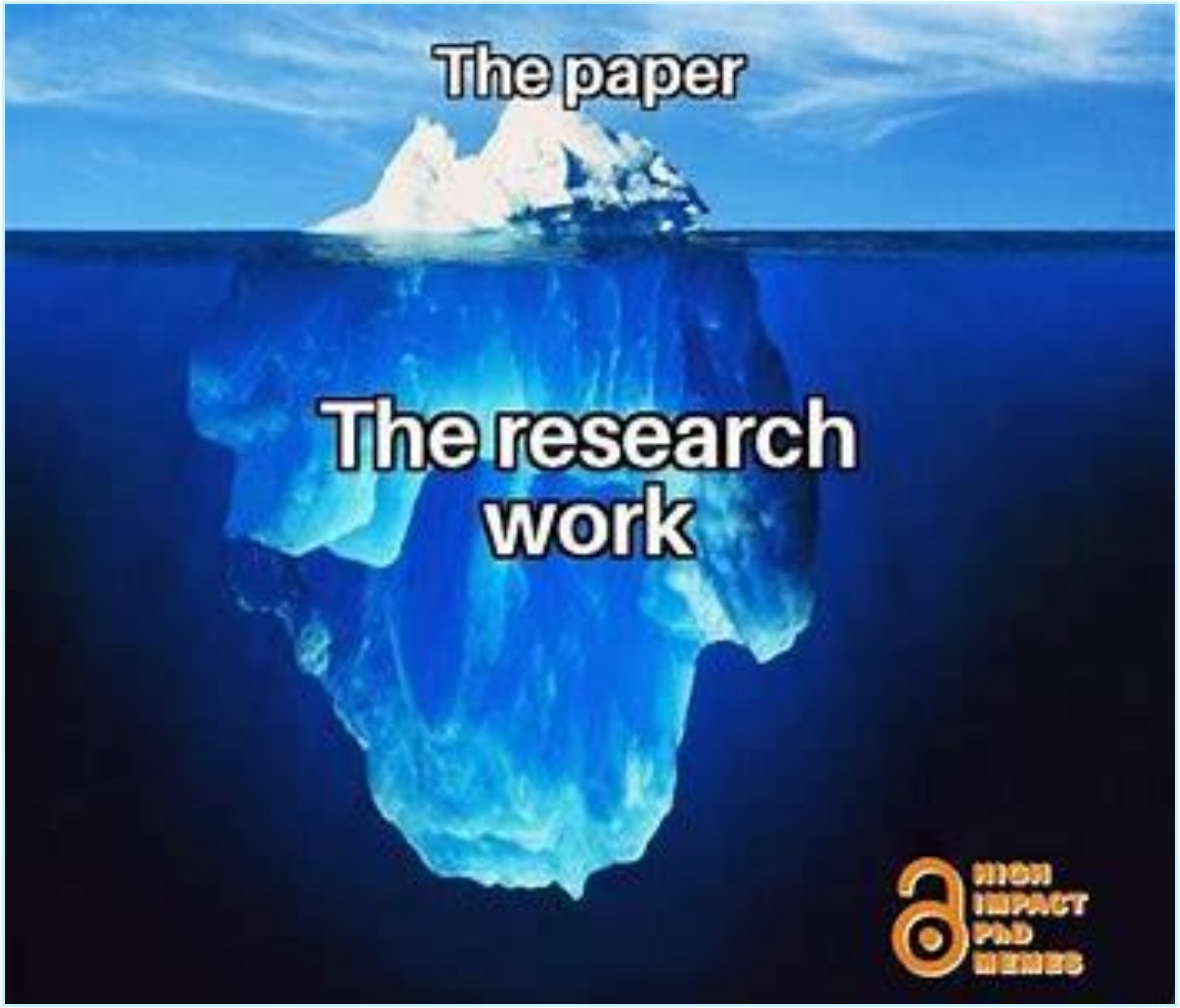
Software/Tools to organize



Research Organization

Anthony Compton

Research Organization



Core Tenets of Research Organization

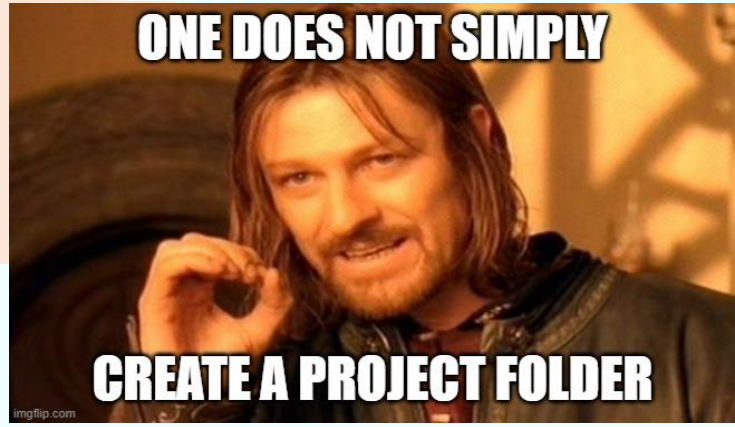
- Recording as much as you can
- Information storage and upkeep
- Working with others on the project
  - Coordination/Communication
  - Conveying information

First Rule of Research Organization…

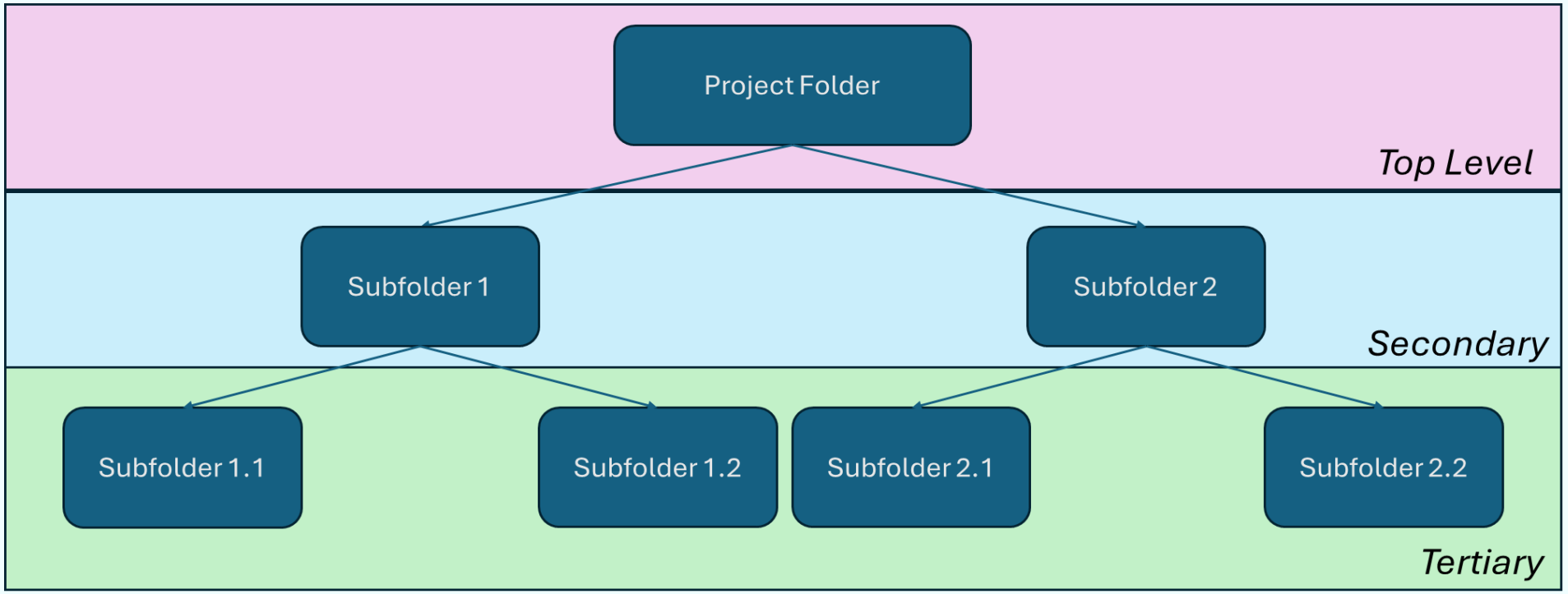
SET UP A SHARED FOLDER!!

- Project Folders are..
  - Online and backed up
    - Dropbox, OneDrive, Benchling
  - Shared with anyone working on the project
  - Contains related information
  - Organized into subfolders with specified information

How does one set up a project folder??



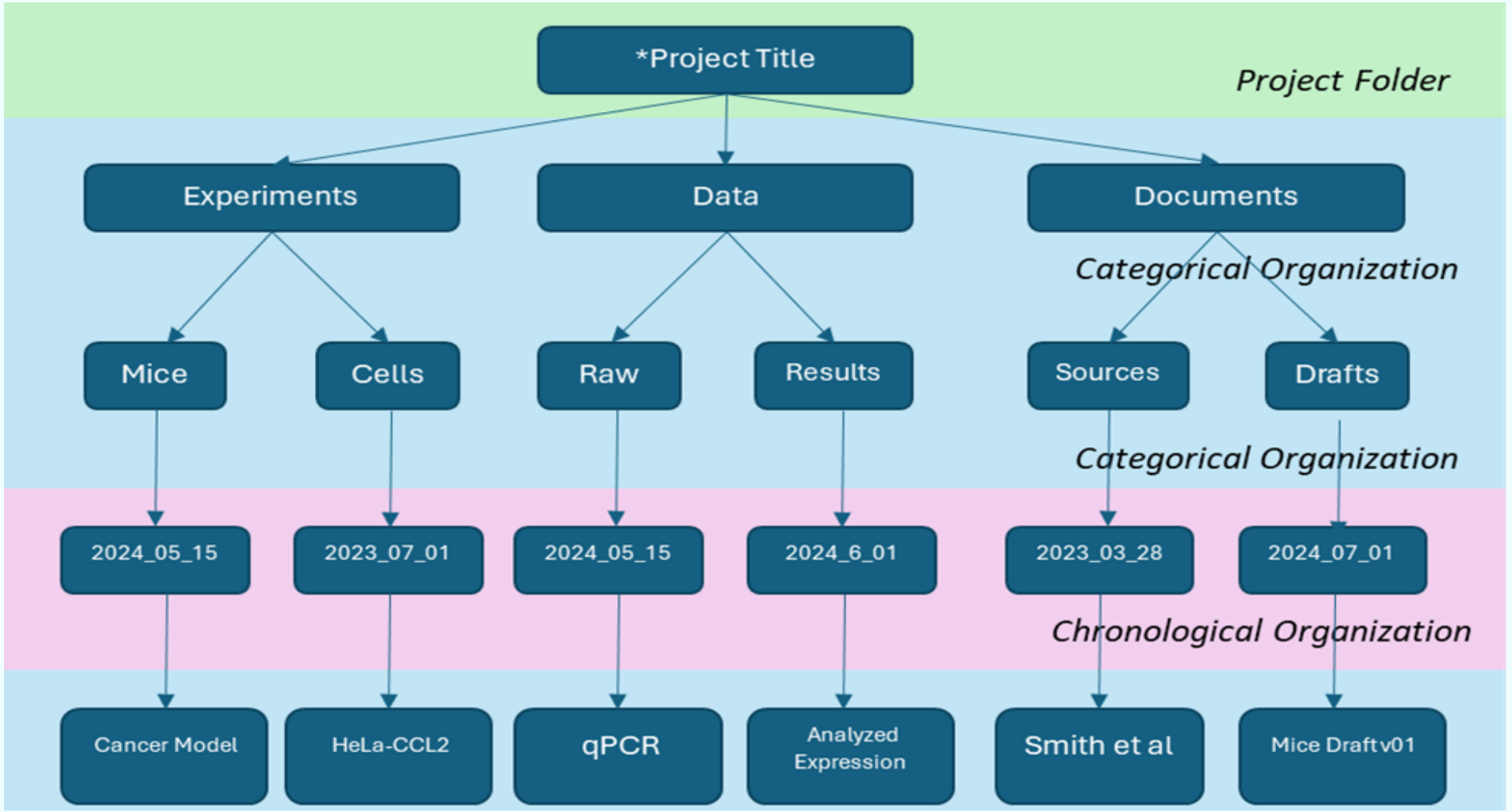
- File Hierarchy
  - Order of subfolders within the primary folder
  - Any file/folder within a folder should be related to the bigger folder



Different Types of Levels

- Categorical
  - Folders are named using words
  - Qualitatively describes the information stored within
- Chronological
  - Folders are named using dates
  - All of the information stored within are related to that date

Putting it all together...

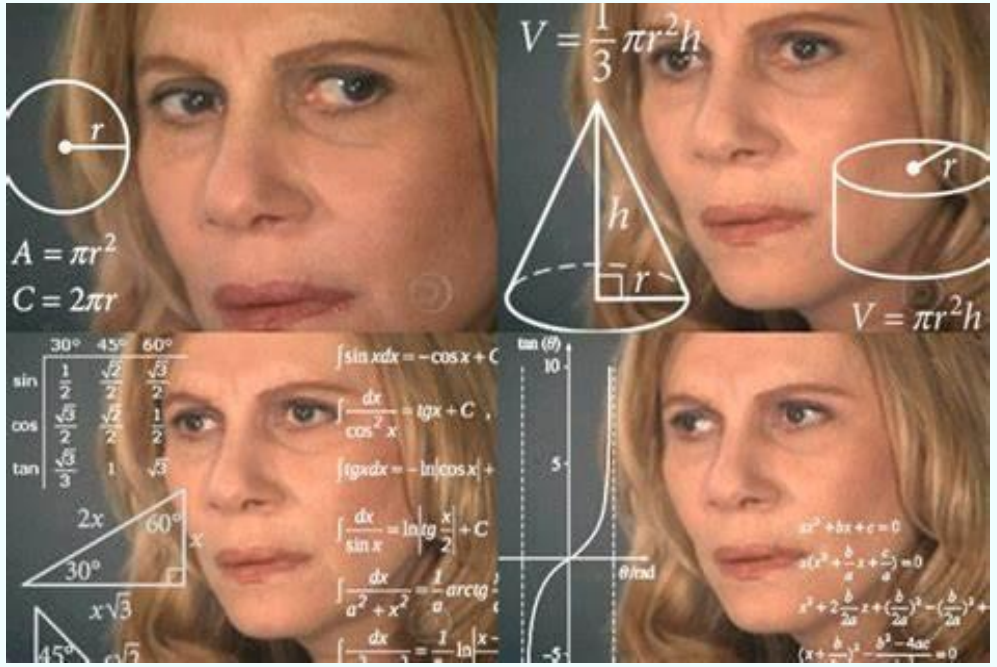


Organize to your taste!

- Many different projects will consist of different levels of organization
- Not all subfolders have the same number of hierarchal levels
- Files tend to be at the bottom of the hierarchy
- Do what works for you
  - Be consistent
  - Be descriptive
  - Easy to follow

File Comprehension

- Tells everyone going through the project folder what in the world is going on
  - Includes yourself! You can't remember everything!
- Improve comprehension?
  - Descriptive Filenames
  - "ReadME" Files



Me looking at my old files

File Comprehension: Filenaming

- Start with the date of the file's creation
  - Convention: yyyy_mm__dd or yyyymmdd
- Any specific descriptors
  - Information type, conditions, equipment used, etc.
- End with numbers when applicable:
  - Replicate numbers
  - Version numbers: v01
  - Use 0s to fill in the higher place numbers to maintain numerical order
    - "V02" would be ordered before "V10" unlike "V2"

File Comprehension: Filenaming

- Personal Example

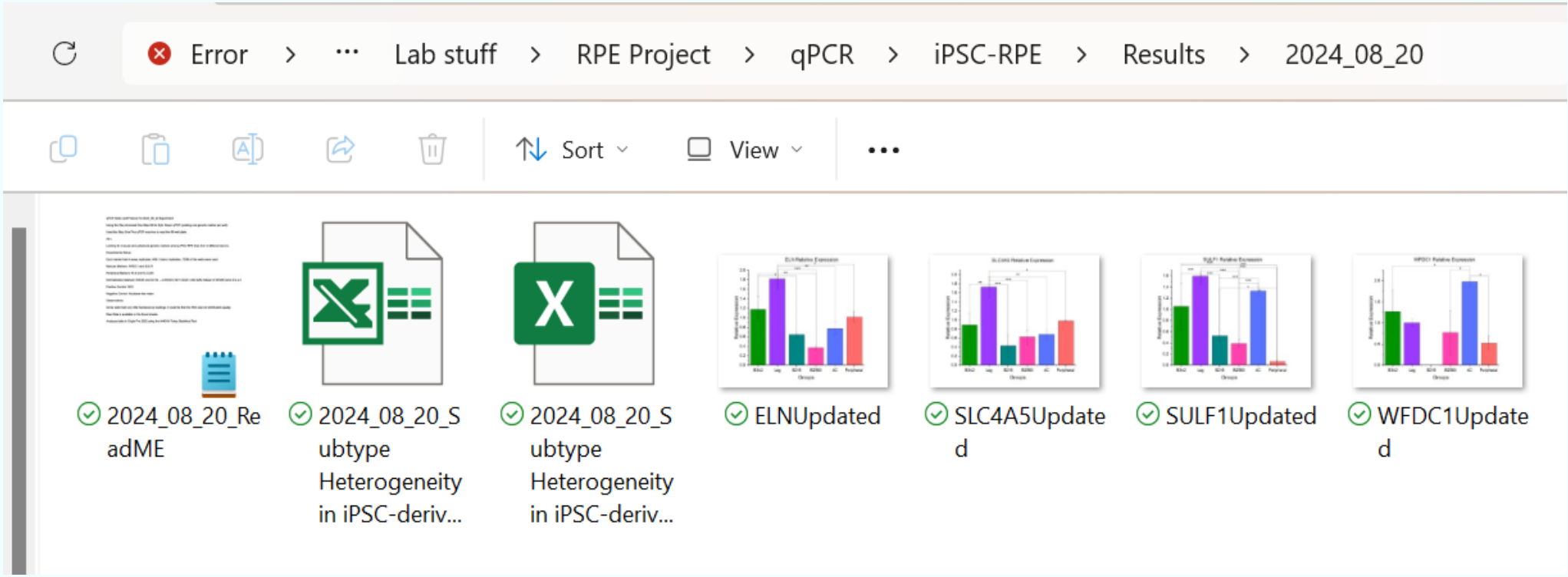
Name	Status	Date modified	Type	Size
2024_07_24_ARPE_C11_10_7um_Outlet_01_sort_02	✓	8/1/2024 10:27 AM	Microsoft Edge PDF ...	196 KB
2024_07_24_ARPE_C11_10_7um_Outlet_02_sort_02	✓	8/1/2024 10:28 AM	Microsoft Edge PDF ...	196 KB
2024_07_24_ARPE_C11_10_7um_Outlet_03_sort_02	✓	8/1/2024 10:27 AM	Microsoft Edge PDF ...	195 KB
2024_07_24_ARPE_C11_10_7um_Outlet_04_sort_02	✓	8/1/2024 10:28 AM	Microsoft Edge PDF ...	195 KB
2024_07_24_ARPE_C11_10_7um_Outlet_05_sort_02	✓	8/1/2024 10:28 AM	Microsoft Edge PDF ...	195 KB

File Comprehension: "ReadMe" Files

- What are ReadMe files?
  - Text files that describe the files/folders that are organized at the same level of hierarchy
    - Observations, Comments, Procedures, Notes, Mishaps, etc
    - Filename acronyms
  - Facilitate you, your project team, and your readers' understanding of what went right and/or wrong
  - Info dump

File Comprehension: "ReadMe" Files

- Personal Example



File Comprehension: "ReadMe" Files

qPCR Notes and Protocol for 2024_08_20 Experiment

Using the iTaq Universal One-Step Kit for Sybr Green qPCR (probing one genetic marker per well).

Used the Step One Plus qPCR machine to read the 96-well plate.

Aim:

Looking for macular and peripheral genetic markers among iPSC-RPE lines from 3 different donors.

Experimental Setup:

Each marker had 4 assay replicates. With 3 donor replicates, 72/96 of the wells were used.

Macular Markers: WFDC1 and SULF1

Peripheral Markers: ELN and SLC4A5

Normalization Markers: RPE65 and ACTB ---UPDATE 09/11/2024: USE B2M instead of RPE65 since it is a more stable marker for normalizing expression

Positive Control: ROX

Negative Control: Nuclease-free water

Observations:

Some wells had very little fluorescence readings. It could be that the RNA was not distributed equally.

Raw Data is available in the Excel sheets.

Analyzed data in Origin Pro 2022 using the ANOVA-Tukey Statistical Test

Questions?

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Research Insights Club