Scripps Research Alcohol Center Neuroscience Course

Introduction, being a scientist and the scientific method

Amanda Roberts

Senior Scientific Director

Animal Models Core

Alcohol Research Center Dissemination Core

Sahithi Chekuri

Monte Clark

Interns

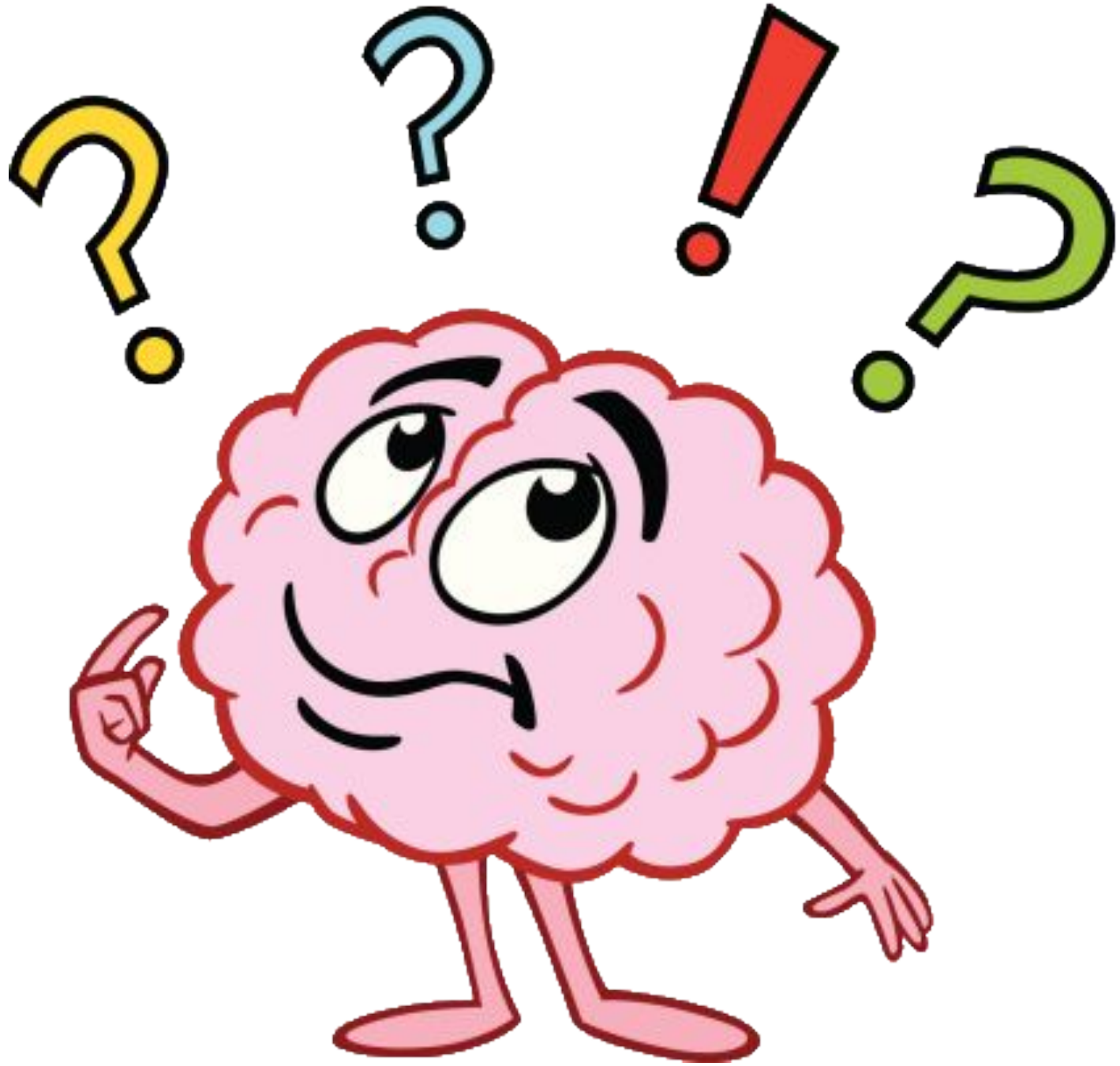
June 24, 2024

Scripps Research

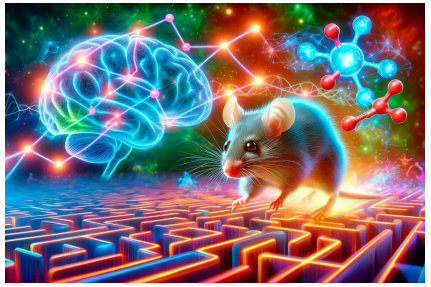
Science Changing Life

Today's Topics

- Introduction
  - Course structure
  - Scripps Research
  - Alcohol Research Center
- Being a scientist
- The scientific method



My career path



2024

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Fremont High School Firebirds

OHSU

1982

My Career Path

Monte Clark

Scripps Research Intern

San Jose State University Graduate

Research Interest:

- ADHD Treatments
- ADHD & Alcohol/Substance Use Disorder

Career Goal:

Neuroscience College Professor & Researcher

Hobbies/Interest:

- Boxing
- Football (Raiders)
- Concerts/ Music Festivals
- Working out
- Traveling

San Diego, CA

- Morse High School
  - Upward Bound
  - AVID

Southwestern Community College San Diego, CA

- Associates in Psychology

Involvement:

- Pre-med club
- Black Student Union
- Akbayan
- Chemistry Club
- Biology Club

Spring 2024

San Jose State University

- Bachelors in Psychology
  - Minor in Biology & Sociology

Involvement:

- Delta Sigma Phi Fraternity
- Pre-med Club
- Biology Club
- Psychology Club
- Black Student Union

Scripps Research

TSRI-ARC Research Intern

Fall 2024

Cal State San Bernadino

Cognitive Neuroscience Masters Program

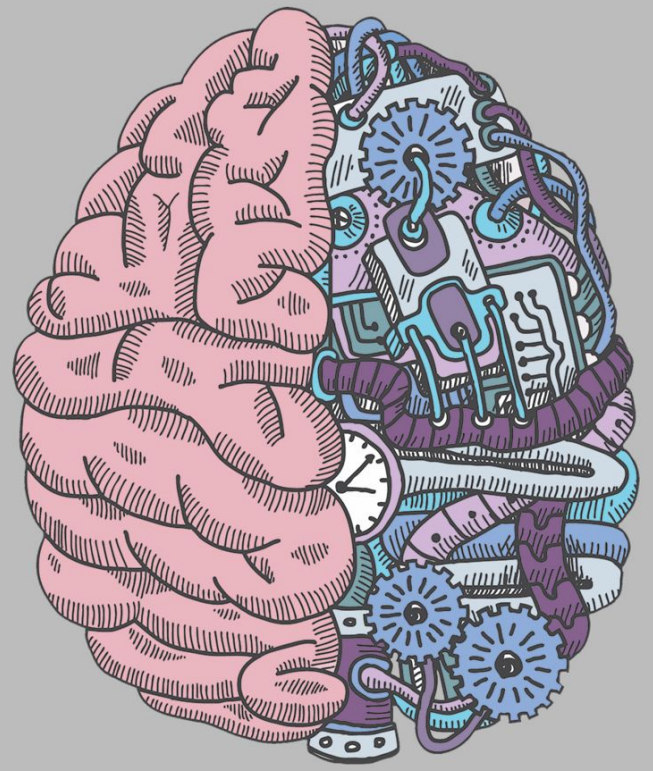
My Pathway

- **Mountain House High School**
  - 4 year biomedical pathway program
  - American Cancer Society
  - Leukemia Lymphoma Society
- **University of California San Diego - Bioengineering**
  - Engineering Without Borders
  - Gender Minorities in Bioengineering
  - Project Rishi
  - Ideathon
  - Scripps Research Intern
- **Future Plans**
  - Pursue Masters or join the industry

Hobbies

- Hiking
- Reading
- Swimming

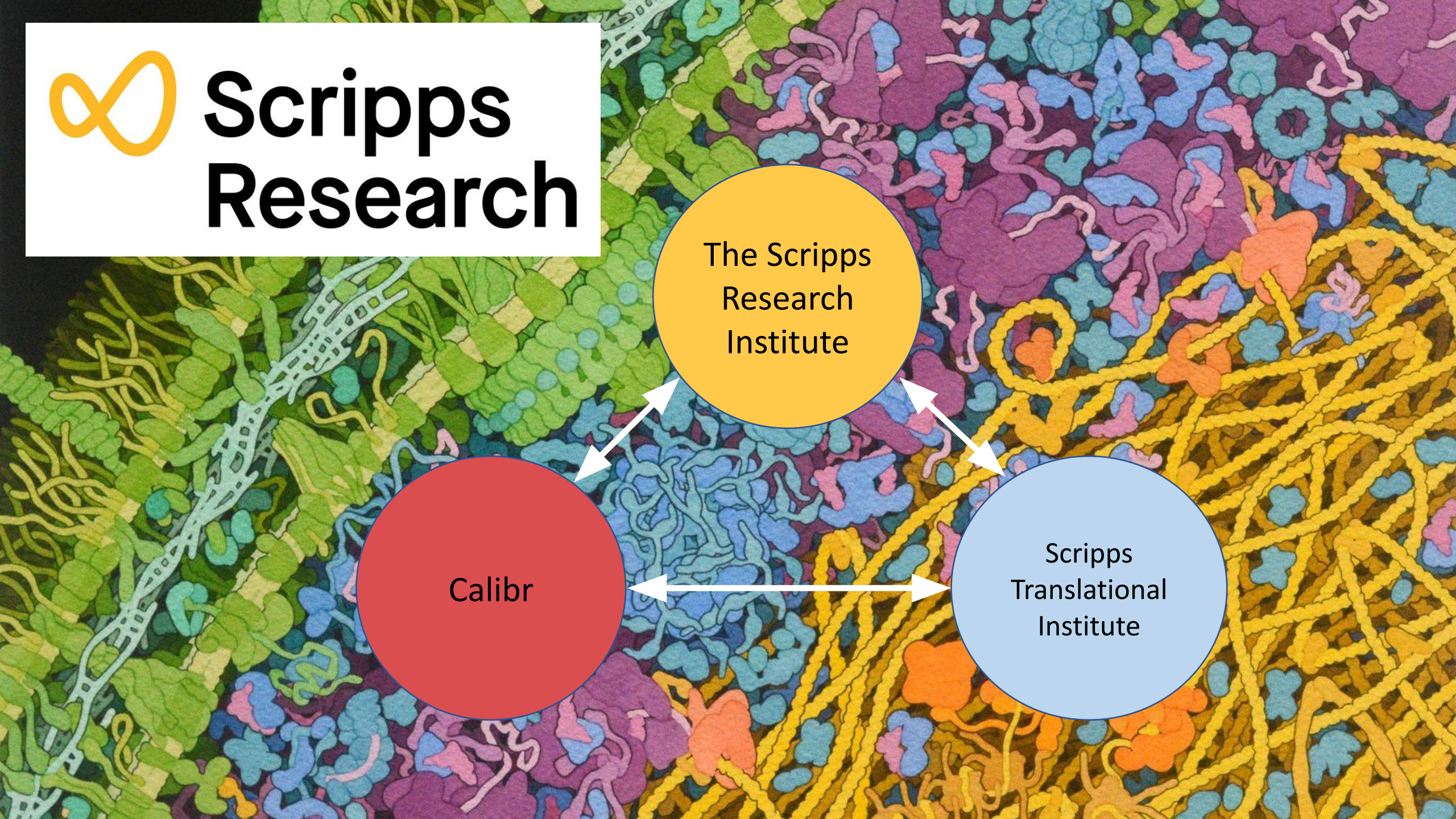
Course Structure



- Start each day with a lecture of about an hour
- Have a break
- Learn about a project or work on your project

The projects have been designed to teach you about useful computer tools and to expand on topics covered in the lectures

The goal is to create media that can be shared with family & friends and be posted on social media


Scripps Research
The Scripps Research Institute
Calibr
Scripps Translational Institute

Biomedical Science

- focuses on the prevention and treatment of diseases that cause death and sickness in human beings
- biomedical scientists can work at universities, governmental institutions, non-profit organizations or at for-profit biotechnology companies
- biomedical scientists may work with humans, animals (mostly rodents), human or animal tissues or cells, pathogens (viruses, bacteria, parasites), and/or computers

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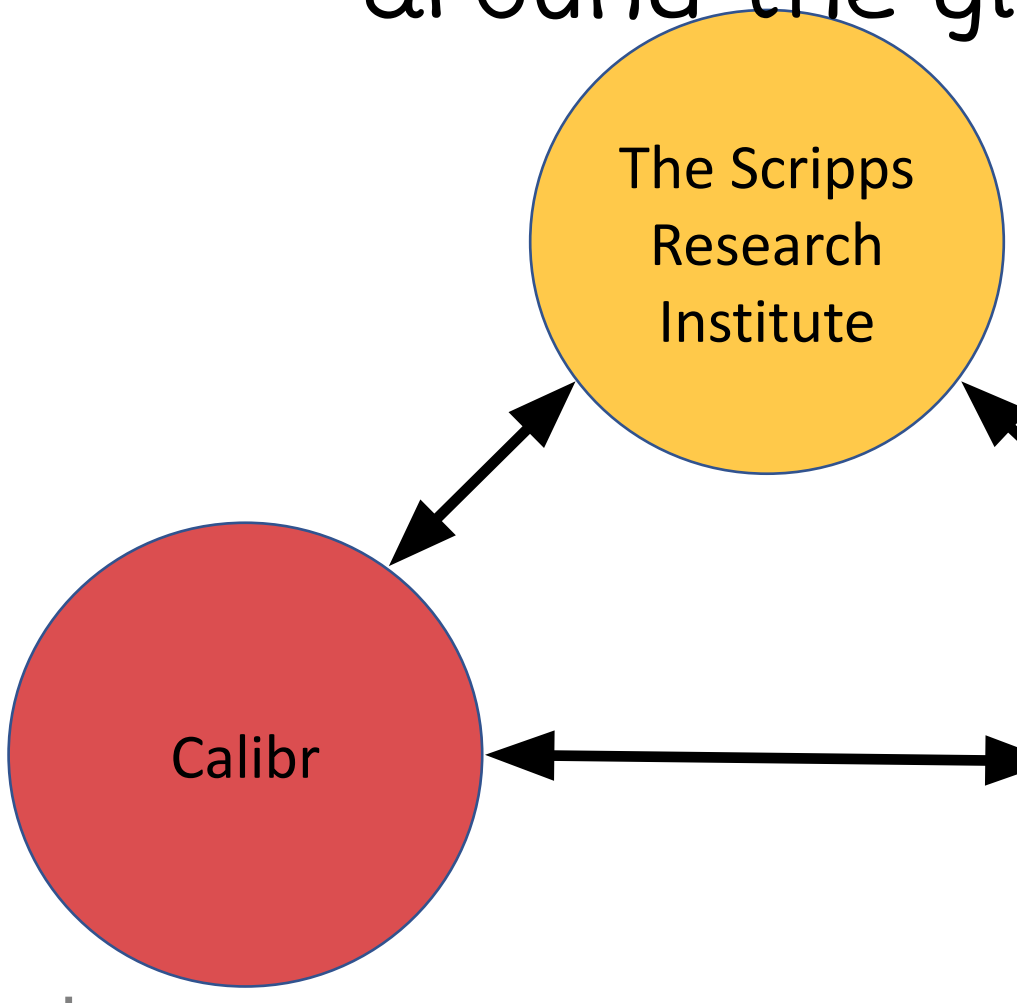
MISSION: Accelerating the creation and delivery of medical breakthroughs to better human health around the globe



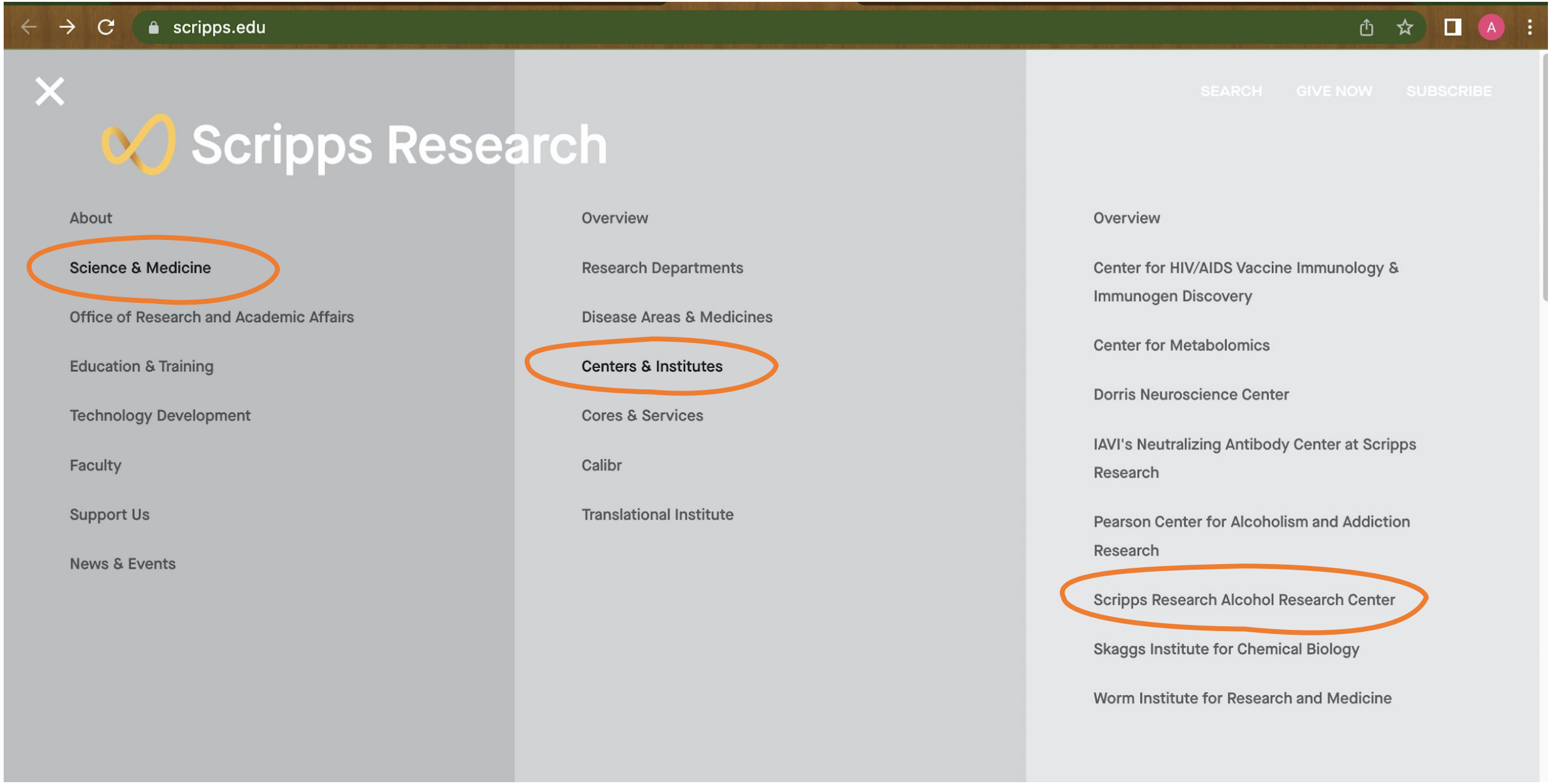
- Chemistry
- Immunology & Microbiology
- Integrative Structural & Computational Biology
- Molecular Medicine
- Neuroscience

- Drug discovery
- Medications development

- Individualized medicine
- Multidisciplinary research
- Community engagement
- Education & training

Scripps Research

https://www.scripps.edu/

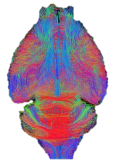


Alcohol Research Center

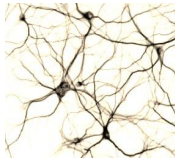
Community

Behavior

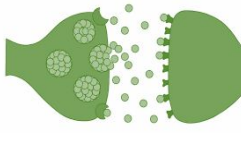
Circuits



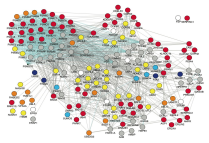
Cellular

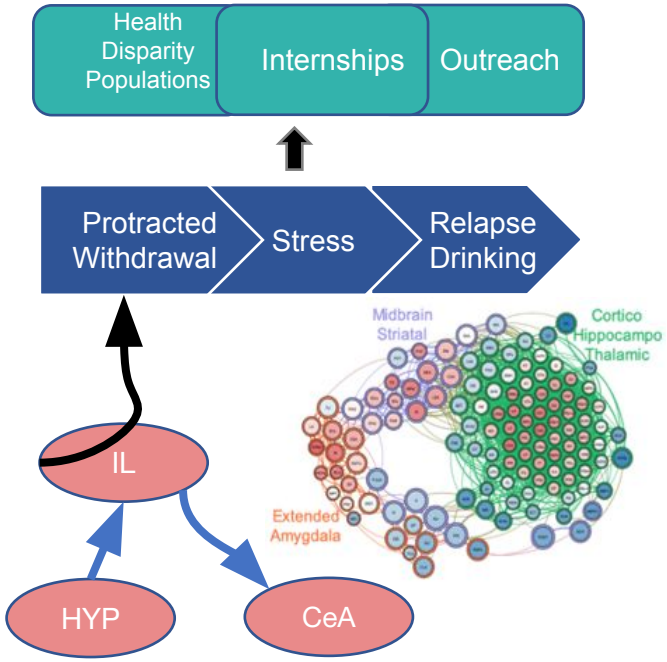


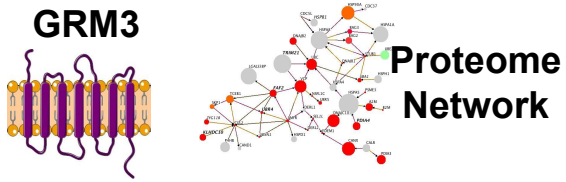
Synaptic



Molecular







Dissemination Core
PL: Roberts
Co: Mason

Animal Models Core
PL: Roberts
Co: Zorrilla

Connectomics
PL: George
Co: Carrette

Neurocircuitry
PL: Zorrilla
Co: Bertotto

Neuropharmacology
PL: Martin-Fardon
Co: Flores-Ramirez

Neurophysiology
PL: Roberto
Co: Bajo

Molecular
PL: Contet
Co: Dunning

Proteomics Core
PL: Yates
Co: Diedrich

Dissemination

Preclinical models of stress and protracted withdrawal

Neural circuits underlying excessive drinking and stress-induced relapse in protracted withdrawal

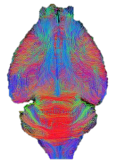
Cellular and molecular mechanisms underlying relapse and protracted withdrawal

Alcohol Research Center

Community

Behavior

Circuits



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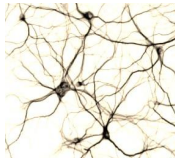

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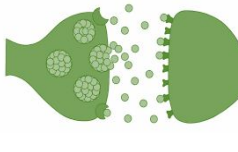
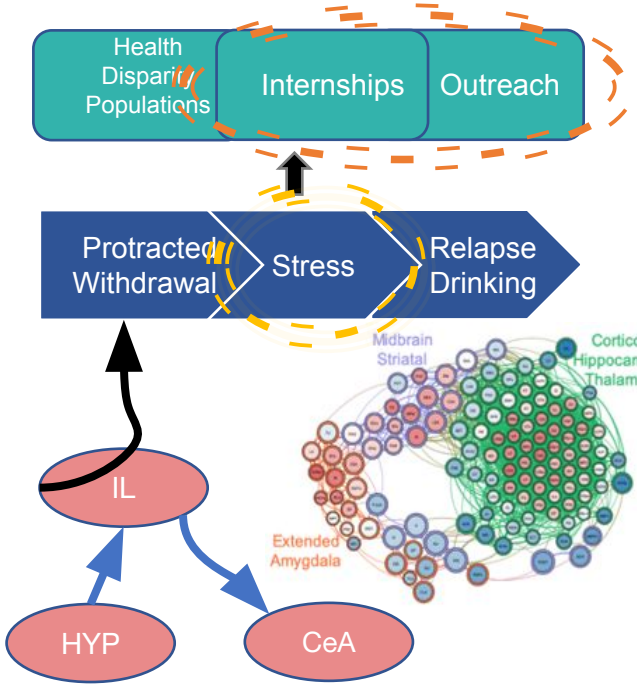
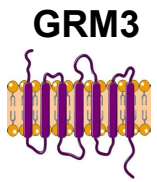
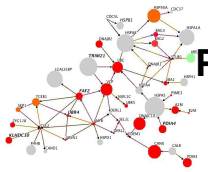


Molecular







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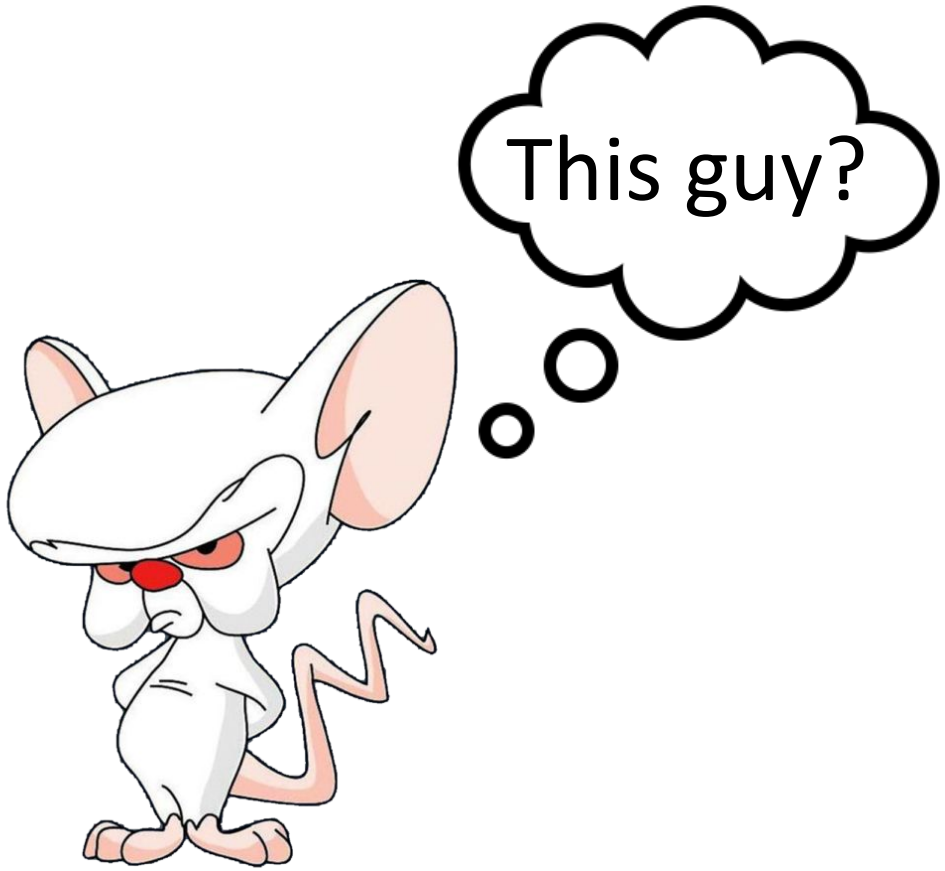
Dissemination

Preclinical models of stress and protracted withdrawal

Neural circuits underlying excessive drinking and stress-induced relapse in protracted withdrawal

Cellular and molecular mechanisms underlying relapse and protracted withdrawal

Who can be a scientist?



Who can be a scientist?

- Anyone who is curious, creative, patient, courageous, detail-oriented, persistent, communicative, open minded, free of bias (or is willing to practice these traits)
- Anyone who asks questions and likes puzzles
- Anyone who ever thinks “I wonder why…..”
- Anyone who wants to contribute to the world/environment/humanity

S: Science…or Super fun!

T: Technology…or Totally awesome!!

E: Engineering…or Excellent!!!

M: Mathematics…or Most cool!!!

Who can be a scientist?

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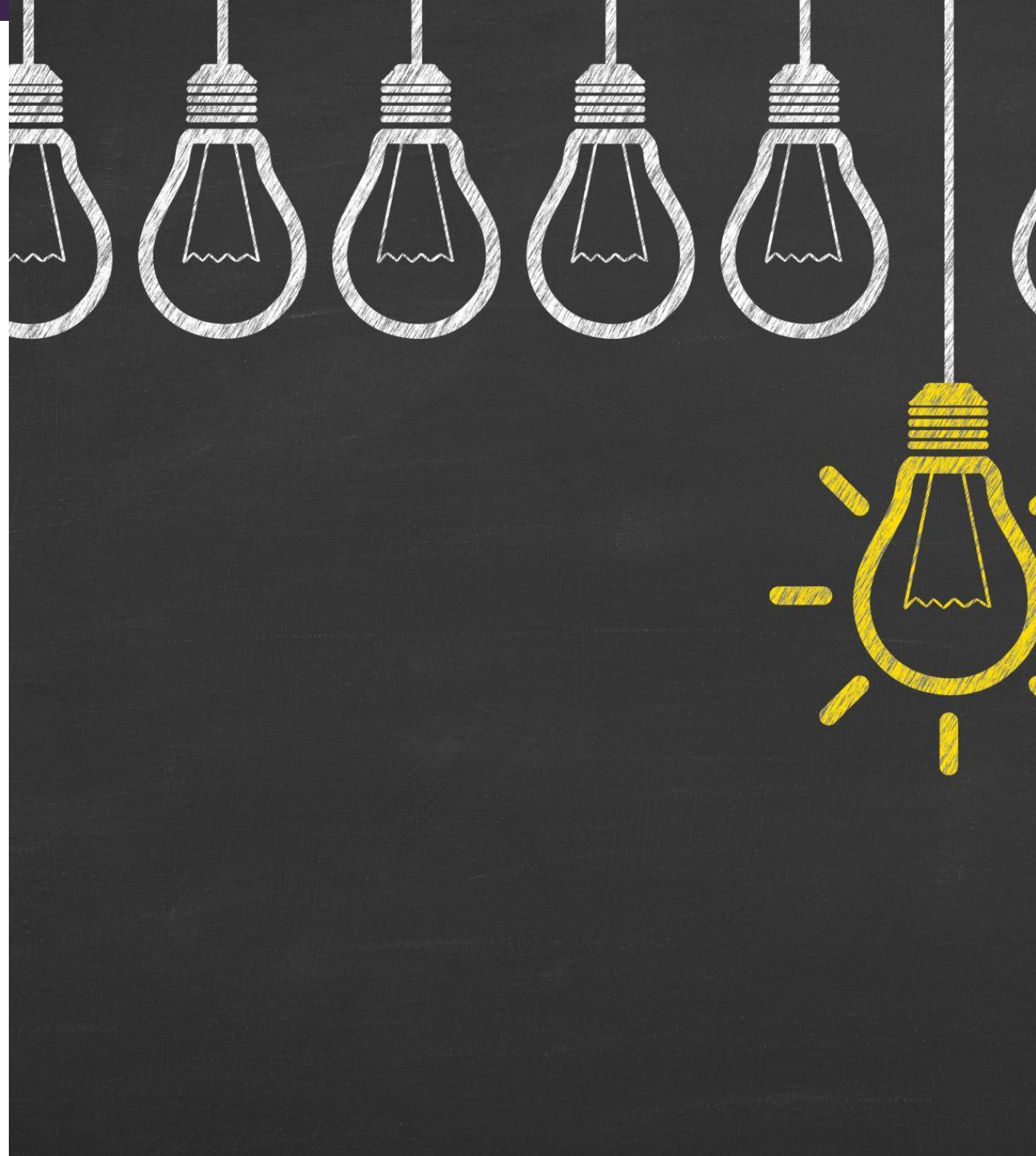
Scientists

The typical duties of a research scientist, regardless of their industry and position, include:

- Helping to identifying research needs
- Collaborating with others
- Conducting research and experiments
- Writing laboratory reports
- Writing grant proposals
- Analyzing data
- Presenting research to appropriate audiences
- Developing research-related plans or projects



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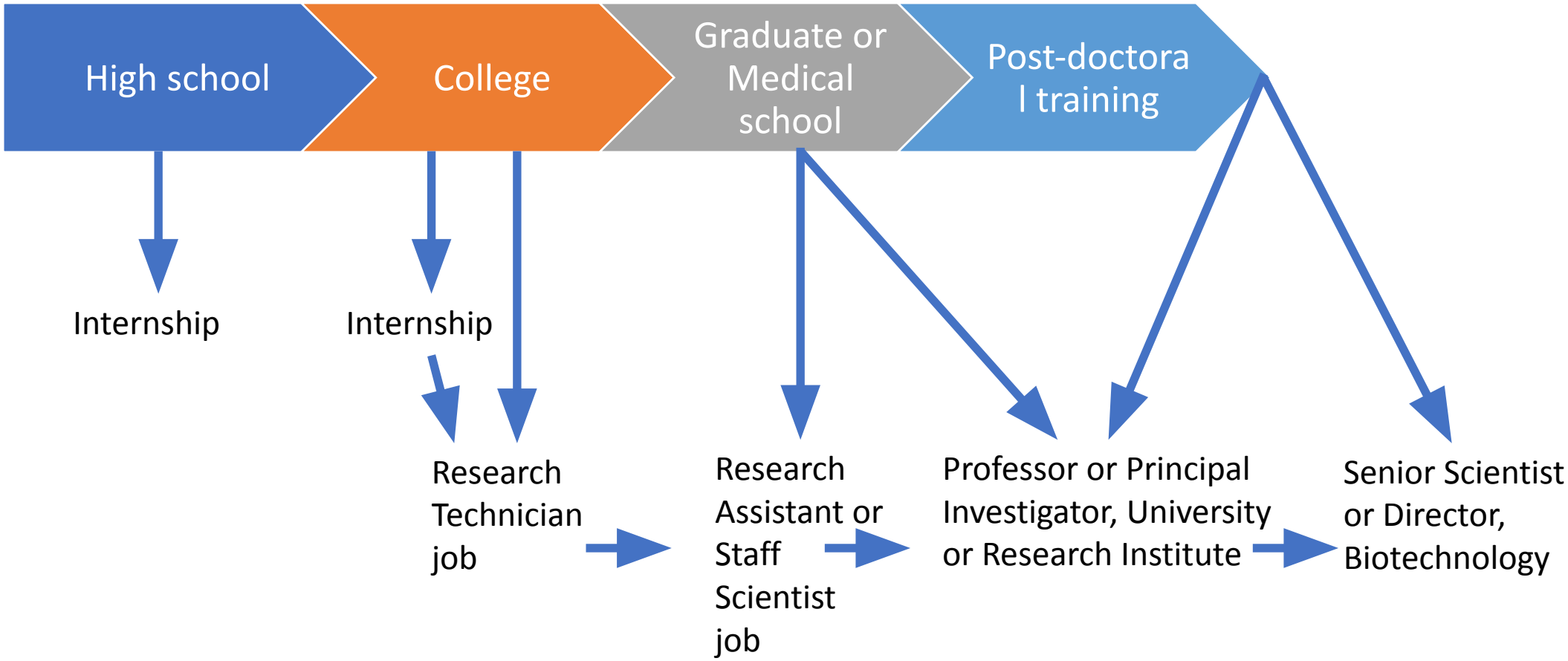
Example Specialties

Life science researchers like botanists, biologists and geneticists study living things and their environments.

Physical research scientists, like chemists and physicists, explore non-living things and their interactions with an environment.

Earth science researchers like meteorologists and geologists study Earth and its features.

Research Scientist Career Paths



This week, please go to the link provided on your Week 1 syllabus to watch interviews (Catherine & Allison) & read the paragraph by Francisco

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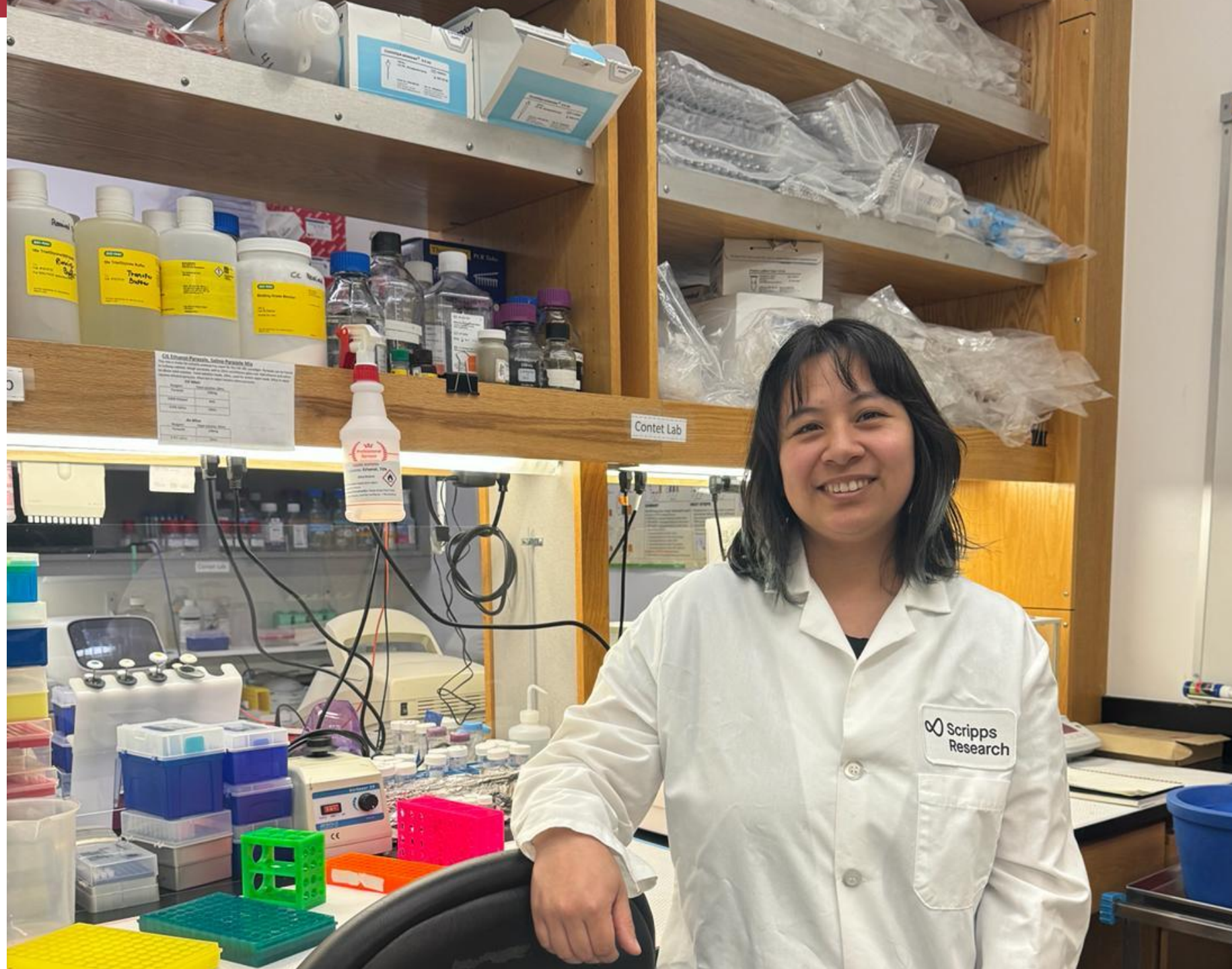
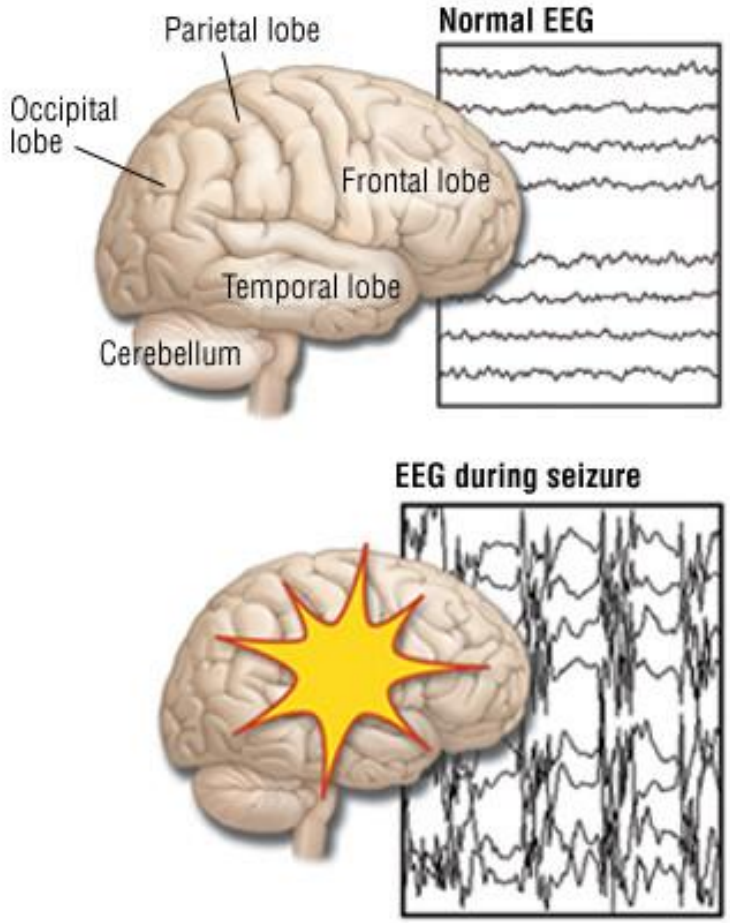


The scientific method

1. Make an observation
2. Ask a question
3. Form a **hypothesis**, or testable explanation
4. Make a prediction based on the hypothesis
5. Test the prediction
6. Iterate: use the results to make new hypotheses or predictions

Make an observation

People with severe alcohol use disorder (AUD) can have life-threatening seizures



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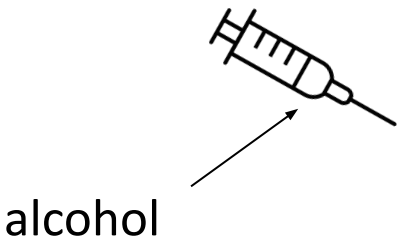
Ask a question

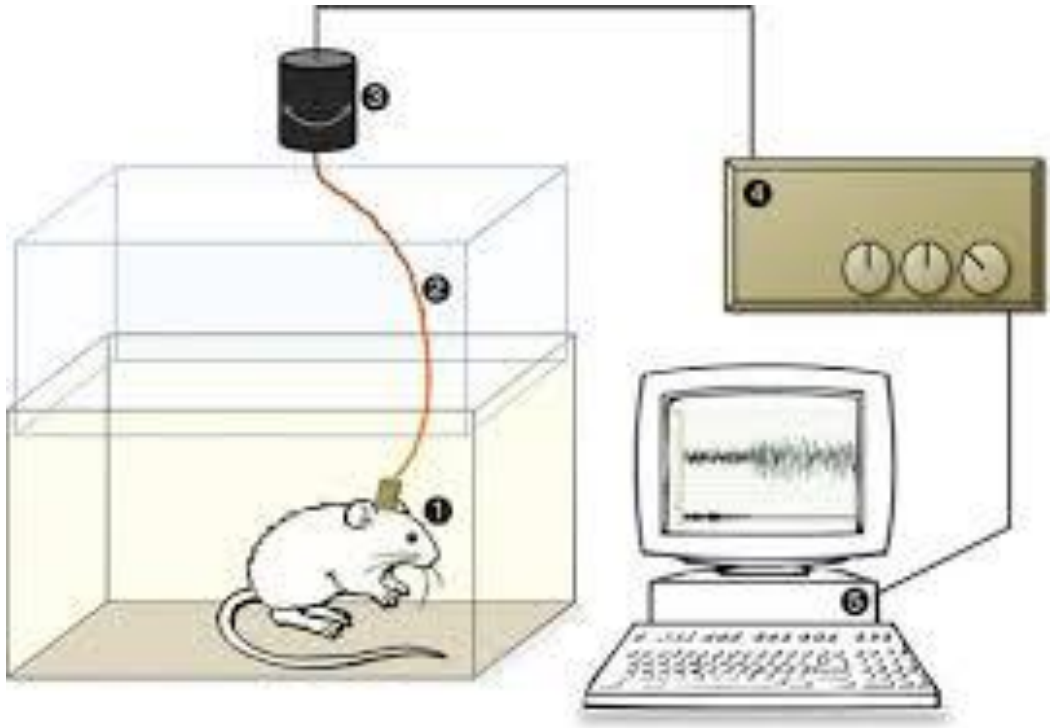
Seizures are seen with severe AUD, but does the brain show increased activity with short-term alcohol exposure, like a bad hangover you might get following binge drinking?

https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/binge-drinking

Form a **hypothesis**, or testable explanation

- Maybe a hangover is like a little version of full-on alcohol withdrawal. In fact, maybe hangovers kind of “prime” the brain for future withdrawal seizures.
- We can test this is our laboratory mice.





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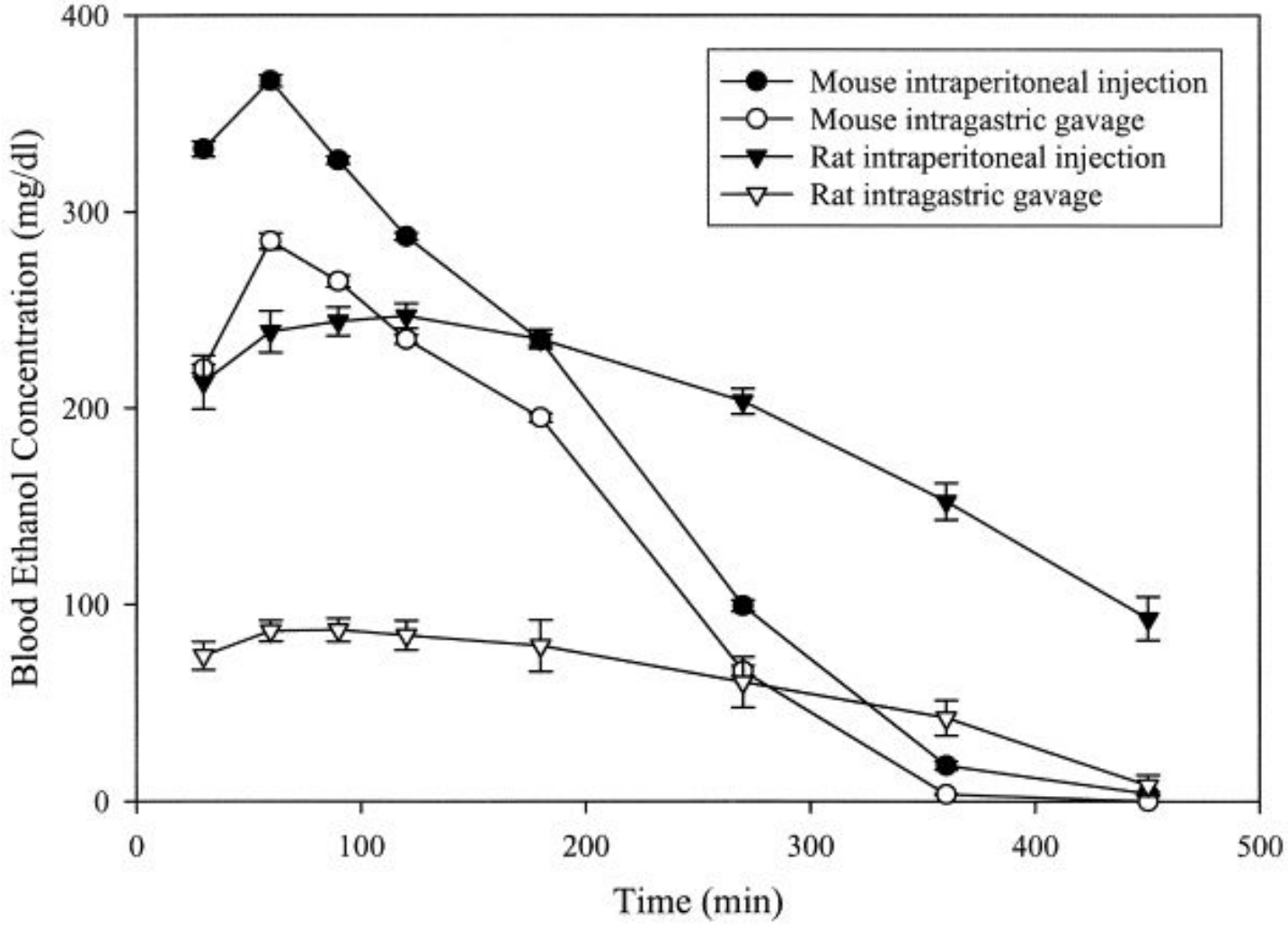
Make a prediction based on the hypothesis

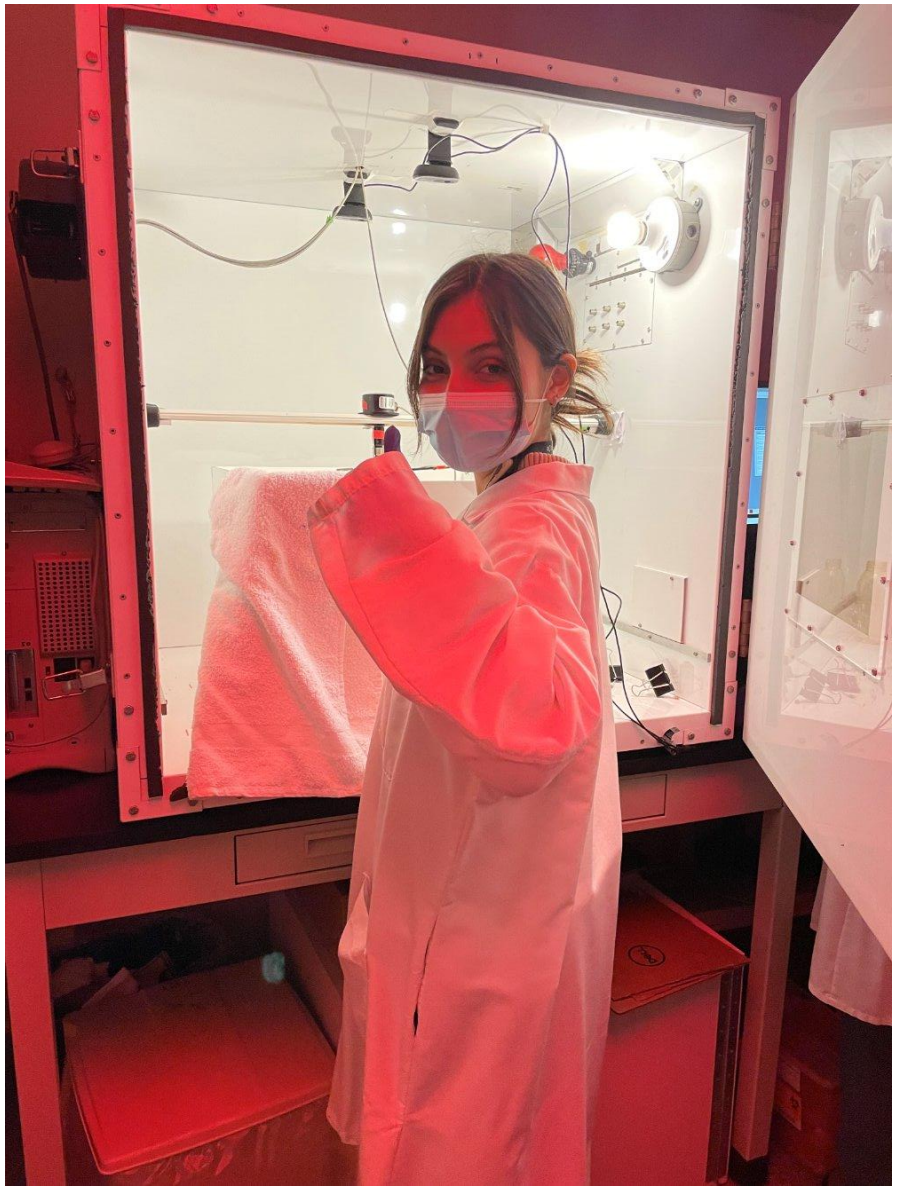
A high dose of alcohol will lead to increased brain activity after the alcohol has been metabolized (6-8hr)



Livy et al., 2003
(https://www.sciencedirect.com/science/article/pii/S0741832903000259)

Test the prediction

Surgically implant electrodes through skull to brain surface



Use electroencephalography (EEG) equipment to record mouse brainwaves before and after alcohol injection

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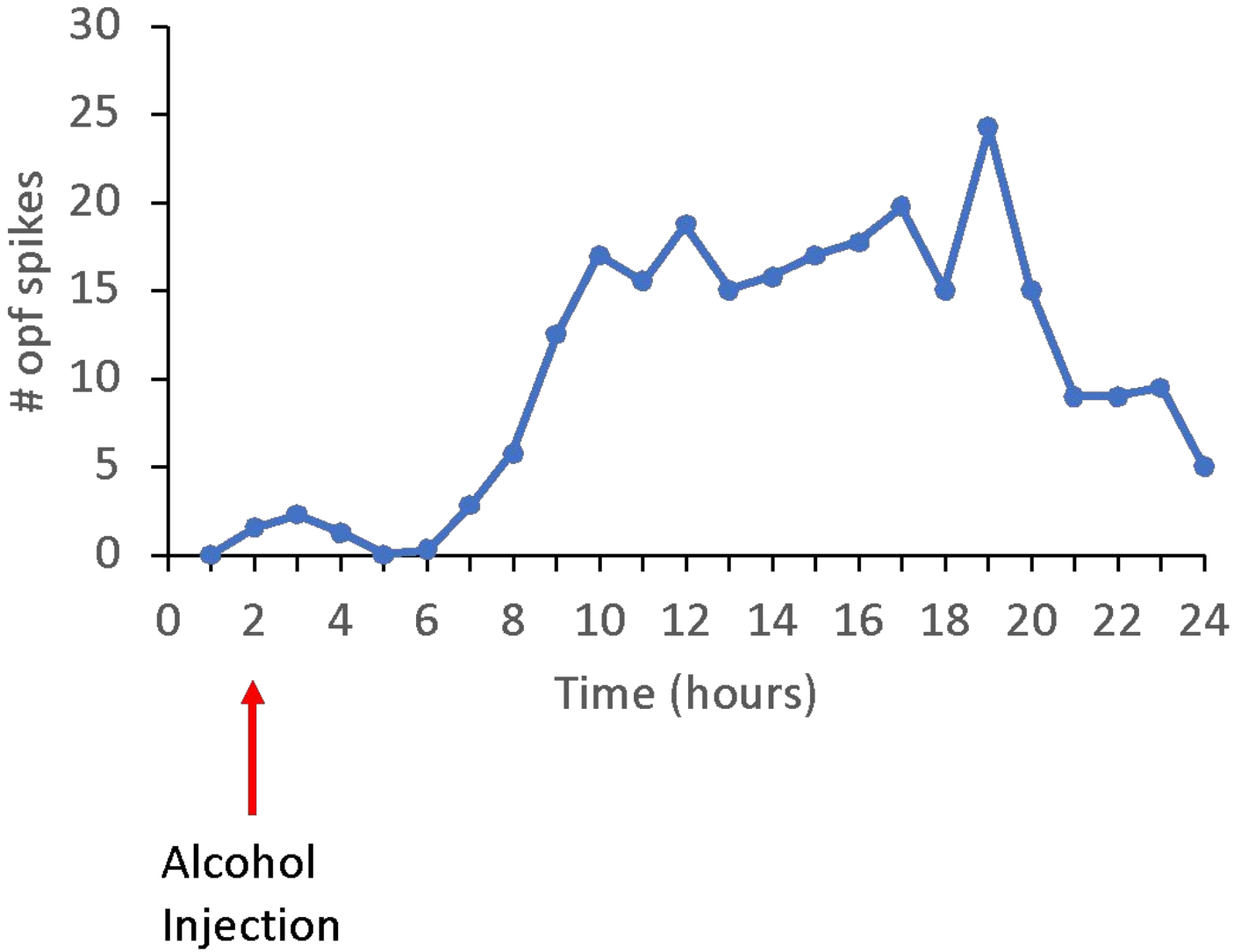
Test the prediction

The interns observed increases in number of spikes after the alcohol was metabolized – during “hangover”

These are not seizures, but show the brain activity is increased



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Iterate: use the results to make new hypotheses or predictions

- If we did this repeatedly would the mouse eventually have a seizure (are these hangovers priming the brain for more intense increases in activity)?
- If we can block or decrease this, could it help to treat alcohol withdrawal seizures?

Break time & then Canva tutorial with Monte

Opening Canva for the first time

Getting Started with Canva

Introduction to Canva
Canva is a user-friendly graphic design tool that allows you to create visually appealing presentations, infographics, posters, and more. This will help you familiarize yourself with Canva's features and explore how to effectively use it for your neuroscience projects and presentations.

Guide

1. **Create an Account**
   - Go to Canva.
   - Click on "Sign up" in the upper right corner.
   - You can sign up using Google, Facebook, or your email address.
2. **Explore the Dashboard**
   - Once signed in, you will be directed to the Canva dashboard.
   - The dashboard includes a search bar, templates, and your recent designs.
   - On the left, there is a sidebar with options like "All your designs," "Brand Kit," "Content Planner," etc.
3. **Choose a Template**
   - Click on the "Templates" tab in the sidebar or use the search bar to find a suitable template.
   - Templates are available for various types of content such as presentations, social media posts, posters, and more.
   - Select a template to start customizing it.
4. **Customize Your Design**
   - **Text:** Click on any text box to edit text. Use the toolbar at the top to change fonts, sizes, colours, etc.
   - **Images:** Click on "Uploads" from the sidebar to upload your own images or use the "Photos" tab to choose from Canva's library.
   - **Elements:** Add shapes, lines, icons, and other elements from the "Elements" tab.
   - **Background:** Change the background colour or add a pattern/image using the "Background" tab.
5. **Collaboration**
   - Canva allows you to collaborate with others.
   - Click on the "Share" button on the top right and invite others via email or link.
   - Use the "Comments" feature to discuss and give feedback on designs.
6. **Exporting Your Work**
   - Once your design is ready, click on the "Download" button on the top right.
   - Select the file type (PNG, JPG, PDF, etc.) and click "Download".

Tips for Effective Design
- **Keep it Simple:** Don't overcrowd your design with too many elements.
- **Consistent Theme:** Stick to a consistent colour scheme and fonts.
- **Readable Text:** Ensure that text is large enough to read easily and contrasts well with the background.
- **Use High-Quality Images:** If using images, make sure they are high resolution for a professional look.

Practice Exercise
To get hands-on experience, try creating a simple poster for a hypothetical neuroscience project. Use the guidelines above to explore Canva's features and submit your design.
Remember, Canva is a powerful tool that can elevate your presentations and projects. Take your time to explore, practice, and ask questions if you need assistance.

Tutorial Video Link