

Patch Clamps, Electrophysiology, and the Optimistic Future of Neuroscience at USU

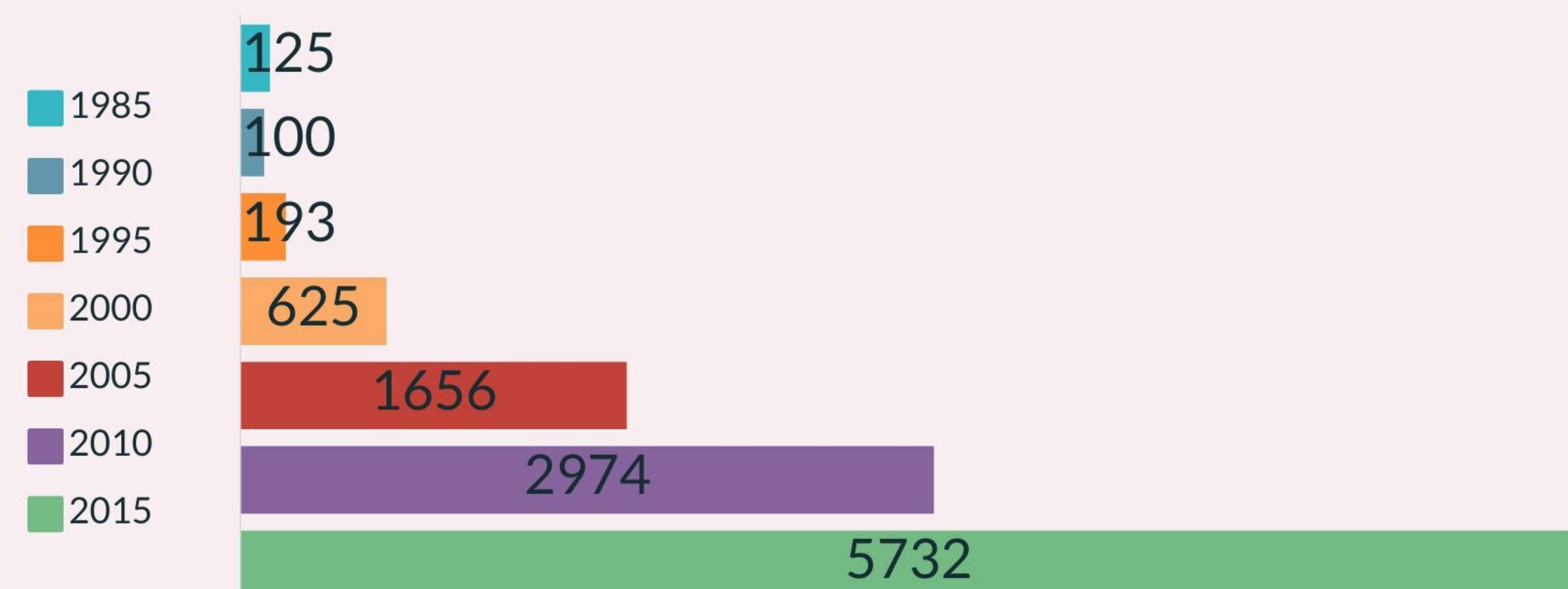
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Introduction

- There is **not** currently a Neuroscience Bachelor's program offered at Utah State University. However, it is **anticipated to be offered** in the near future.
- The neuroscience courses available to students generally fall in the **Biology** or the **Psychology** department. There are affiliated faculty from **seven other** departments within the neuroscience program.
- Neuroscience enrollment is exponentially increasing in the United States (Ramos et al., 2017).

Students Enrolled in Neuroscience Bachelor's Programs in the United States

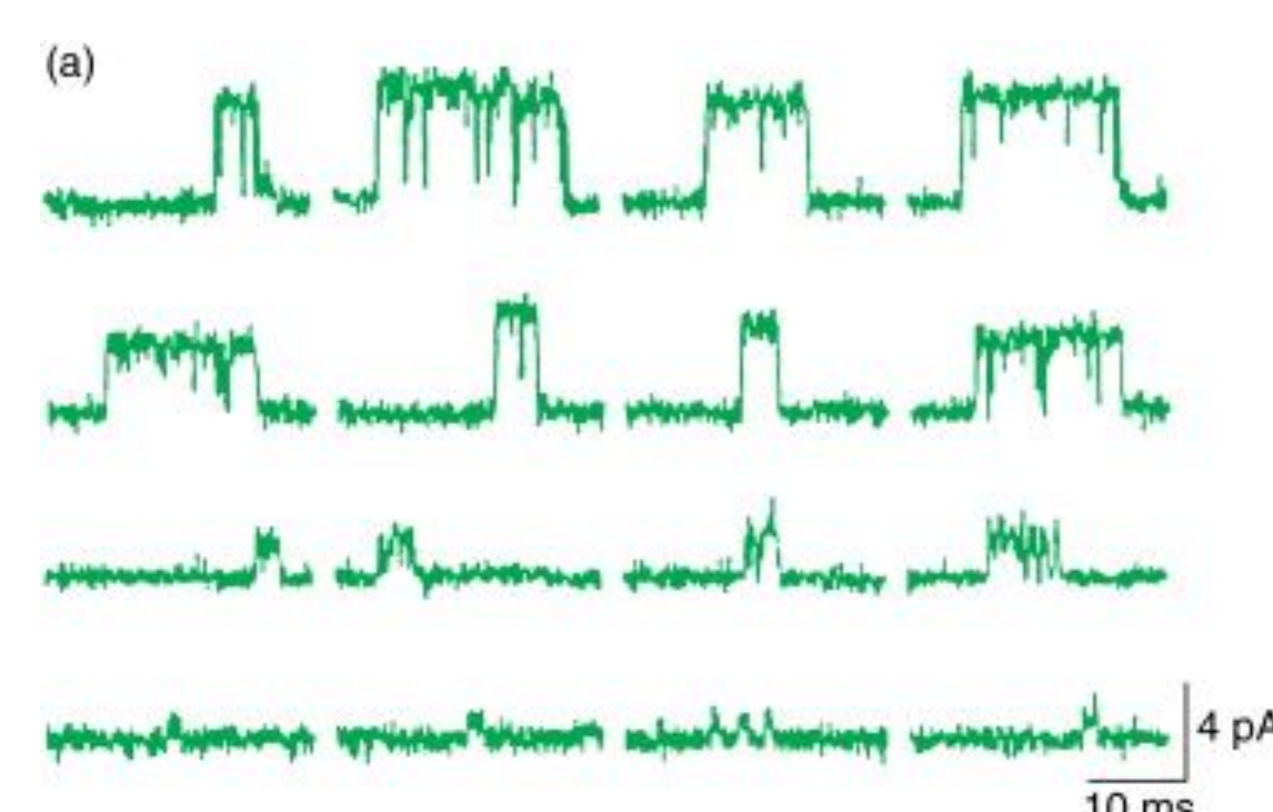
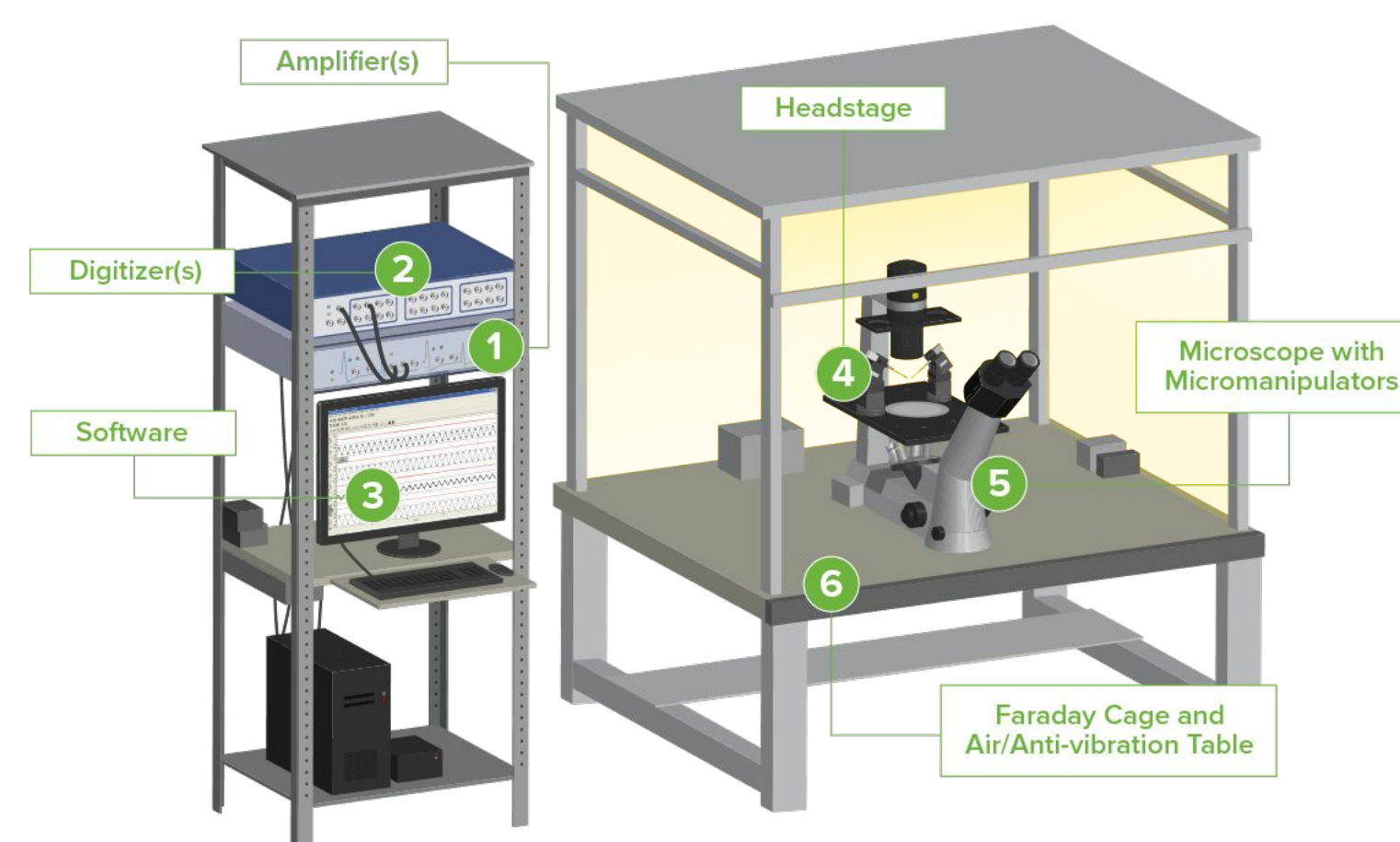


Data courtesy of Ramos et al., 2017

Equipment

Some of the equipment planned for use in the Neurophysiology course is:

- Faraday Cage,
- Micropipette puller
- AC/DC Patch-clamp amplifier
- Micromanipulator
- Suction electrodes
- Dissection microscopes
- Other electrophysiological recording software.



We are developing a neurophysiology course that engages students, capitalizes on existing equipment, and promotes interest in the growing neuroscience community at USU.

Support



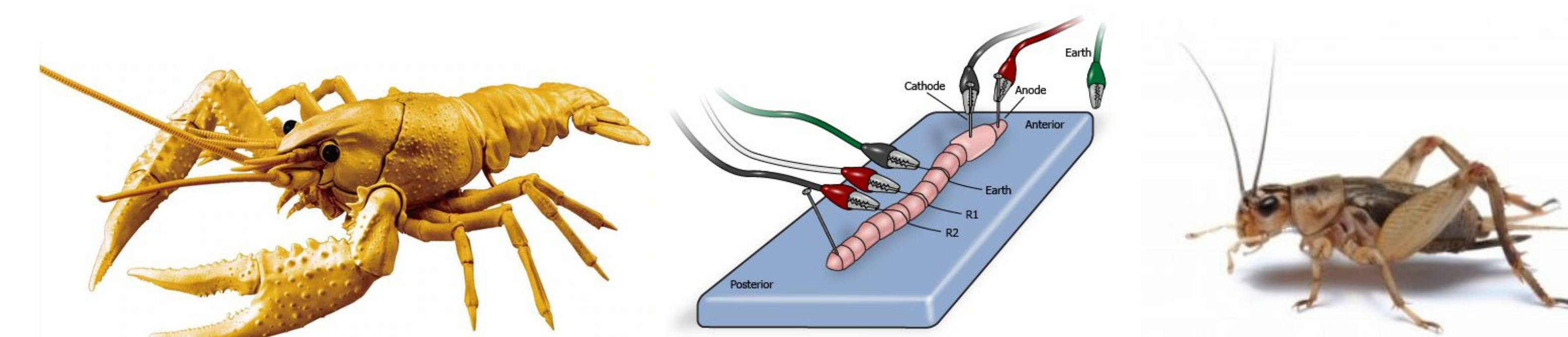
Dr. Freeman received a small grant from the Office of Empowering Teaching Excellence to support this work..

Methods

- Time was spent **identifying** and figuring out the **mechanics of equipment** left by previous professors.
- Experiments were chosen based on **difficulty, time, and principle** of neurobiology associated with the experiment.
- **Patch-clamp electrophysiology** is being used to study the muscle receptor organ (MRO) in crayfish (Lekrisawat et al., 2010).
- We contacted more than 5 academic representatives from across the country to **acquire new ideas** for experiments, inquire about the **best equipment**, and **discuss how to further neuroscience** knowledge within the community.

Results

- We have successfully built much of the equipment and are currently doing **preliminary experiments** with much of the equipment.
- We will begin testing experiments **mid-April**.
- We have decided to use a variety of physiological techniques to study organisms such as **earthworms, crickets, crayfish, and humans**.



Conclusions

- The growing neuroscience program at Utah State University reflects the **rapidly developing advancements** in the neurobiology industry.
- While we predict to see **higher rates of involvement, research, and neuroscience course enrollment** on our campus, we will also see qualitative results as students obtain **invaluable lab experience in digestible ways**.