## **Teaching Notes**

### Pratima Jindal and Sheela Vemu

*svemu@waubonsee.edu**pjindal@waubonsee.edu*

*Assistant Professor Physics*

*Assistant Professor Biology*

**Course Information**

Department: Science and Mathematics

Level: **Lower Undergraduate** -Two Year Community College

Course type: **Lab/Lecture/Both**

Students: **Majors - HealthCare**

Number of Students: 48

**Module Information**

Original Module Name: Understanding neurophysiology - Scientist Spotlights and Data Nuggets

Original Primary Literature:

[A low-cost computational approach to analyze spiking activity in cockroach sensory neurons](https://journals.physiology.org/doi/abs/10.1152/advan.00034.2020)

David J. Torres, Andres Romero, Wes Colgan III, and Ulises M. Ricoy

Advances in Physiology Education 2021 45:1, 145-153

Work in progress:

Transcript based on the interview will be uploaded soon

Scientist Interview:  Dr. Ulises M. Ricoy

<https://neurosci.arizona.edu/news/2020/09/dr-ulises-ricoy-named-inspiring-hispaniclatinx-scientist-cell-press>

<https://neurosci.arizona.edu/news/2020/12/dr-ulises-ricoy-receives-grant-grass-foundation>

https://neurosci.arizona.edu/news/2020/10/dr-ulises-ricoy-receives-national-award-excellence-public-service



Files associated:

* Class Worksheet
* Data Excel sheet
* Primary Literature - PowerPoint

**Learning Goals**:

**Quantitative learning Goals**

Create and interpret informative graphs and other data visualizations.

Interpret the biological meaning of quantitative results

Analyze data, summarize patterns, and draw appropriate conclusions.

**Content learning Goals**:

Describe the components of the membrane that establishes the resting membrane potential.

Describe how movement of ions across the neuron membrane leads to an action potential

Describe the changes that occur to the membrane that result in the action potential

Understand the components of the action potential that are involved in the frequency coding of the nervous system.

**Social justice and/or diversity/equity/inclusion learning goals**

Evaluate diverse perspectives of what sort of people do science

Reassess one’s own personal perspective when appropriate through reflection

**Teaching Notes**

The main crux of this activity was to integrate three existing frameworks. The first framework is based on the ideas of Scientist Spotlight Initiative. The second framework is to build and solidify the quantitative reasoning skills in our students. The third framework is to integrate primary literature as a fundamental way to improve the science process skills.

We know that science identity and science belonging can be improved in a community college biology classroom by having representations of diverse scientists as part of the curricular content learning. Students from traditionally under represented communities strive to access role models in science especially in their classroom. These students are also looking to interact with primary literature based on the non-stereotypical scientists’ area of expertise. In this module we have specifically included a non-stereotypical scientist profile that matches our community college student profile.

In our courses, we use textbooks that have basic content that matches our state mandated curriculum. Now a days, more employers and transfer courses are requiring hands-on quantitative skills as part of their experiential learning process. Exposure to authentic science can be a valuable tool to our students as they navigate the post-pandemic healthcare employment. Exposure to authentic science can be provided by guiding students through primary literature which provides direct access to science. This direct access provides the flexibility of course design to the instructor because parts of the primary literature can be conveniently added when needed. Many students entering healthcare professions may be required to build expertise on quantitative skills using primary literature. Students choose to take pre-requisite classes in a local community college setting, in the interest of time, money and familial obligations.

A teaching module that incorporates quantitative data nugget from primary literature produced by the minority underrepresented scientist population will help in systematically connecting real scientists work with classroom content. These strategies will help in promoting not only diversity and inclusion but also raise awareness with an equity minded lens. We hope that these interventions such as this module will shift systematically the ideas towards counter-stereotypical descriptions of scientists and enhance the ability of students to perceive themselves as scientists even if they are headed for healthcare careers.

**Expected date or dates of implementation**

Date(s) go here.  Spring 2022