

EDITORIAL

For the FUN of It

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This has been an exciting year for neuroscience educators. The FUN workshop at Dominican University hosted by Bob and Irina Calin-Jageman last July was a highlight for me. The Workshop committee, chaired by Eric Wiertelak and including Bob, Irina, Jean Hardwick, Veronica Acosta and me, organized the pre-workshop lab activity day and the weekend main workshop presentations and poster sessions. The conference website has links to posted presentation slides and handouts, photos and even local news coverage (videos of some talks will also soon be posted). You can access this material at <https://funfaculty.org/conference/fun-2017/>. The details of the FUN Workshop presentations will appear as articles in a special summer 2018 issue of *JUNE*.

I announce our 2017 *JUNE* "Editor's Choice Awards" for especially noteworthy papers appearing in the most recent *JUNE* Volume (Vol. 15, 1 & 2). These papers are chosen by a subcommittee of the editorial board chaired by Barbara Lom. Of the many excellent articles published in these two *JUNE* issues (see <http://www.funjournal.org/archives/>) two stood out for special recognition. For "Outstanding Neuroscience Pedagogy Article," the committee chose "An Algebra Based Introductory Computational Neuroscience Course with Lab." This article introduces students to theoretical models of neural information processing and techniques for analyzing neural data in an introductory computer lab course (Fink, 2017). Experience in calculus and computer programming is not required, and thus this course is a gateway into computational neuroscience for neuroscience students who lack deep quantitative backgrounds. This theme is continued by a full article in this *JUNE* issue which describes an interactive simulation program to illustrate concepts of auto-associative memory through computational approaches (Fink). The article entitled "The Use of Modular, Electronic Neuron Simulators for Neural Circuit Construction Produces Learning Gains in an Undergraduate Anatomy and Physiology Course" is awarded the "Outstanding Neuroscience Laboratory Article." This article describes using electronic hardware simulators (NeuroBytes) to build a patellar reflex model. Students completing this hands-on activity showed greater learning gains than students who studied diagrams of reflex arcs and demonstrated the patellar reflex on each other with hammers (Petto et al., 2017). The NeuroBytes hardware simulators were also presented at the 2017 FUN workshop. A full article on this workshop session will appear in the FUN Workshop issue of *JUNE*.

The editorials in this *JUNE* issue include two educational Perspectives and a Workshop Report. Robert Calin-Jageman, co-author of the "Introduction to the New

Statistics" (Cumming and Calin-Jageman, 2017), presents the first of a running series of articles in *JUNE* addressing statistics curricula for neuroscience majors. The present topic is the transition from a reliance on null hypothesis testing with p value significance to more descriptive and transparent methods to determine the significance of experimental results. The other Perspective describes a group problem solving project to construct a clinical key that accesses the self-awareness of Wernicke's Aphasia patients. Students learn experimental design principles, fundamental neuroscience concepts, and their clinical applications. In the Workshop Report, Dzakpasu et al. detail an outreach program for junior faculty participants who teach undergraduate neuroscience at Nigerian universities. With low cost neurophysiology hardware and neuronal teaching simulations, the workshop faculty taught the participants straightforward neurophysiology lab exercises and computer tutorials for use in their neuroscience classrooms. I introduced this workshop in my Editor-in-Chief editorial for the Spring 2017 issue of *JUNE* (Johnson, 2017).

This is another *JUNE* issue rich with a variety of interesting educational articles. I mentioned above the description of a simulation exercise examining auto-associative memory in this issue (Fink). Two articles continue a running series of attempts to descriptively quantify the neuroscience student experience. The first describes the demographics of undergraduate and graduate students who get their degrees from neuroscience programs in the U. S. (Ramos et al.). The second article characterizes course and research requirements for undergraduate neuroscience majors across U. S. institutions of varying size and financial resources (Pinard-Welyczko et al.)

Five articles address student lab or related active learning activities. Banuelos et al. introduce a new bio indicator for stress, salivary alpha-amylase, as a measure for sympathetic nervous system activity; Wooten and Ferragamo teach methods of behavioral neuroscience by having students discriminate different mouse strains with varying levels of anxiety by the rodents' performance on behavioral tests; and Calin-Jageman describes "Cartoon Network," an open source simulator for constructing neural networks that can be connected to a "Finch" robot to produce behavior. This was also presented at the 2017 FUN Workshop, and an article on this session will appear in the special *JUNE* issue next summer. A hybrid lab course is described that offers students pre-lab online instruction which generates better student performance on moderately difficult exam questions than post-lab activity instruction (White et al.). Another active learning

contribution summarizes presentations at the 2016 Neuroscience Teaching Workshop, sponsored by the Society for Neuroscience and organized by William Grisham and Richard Olivo (Grisham et al.). The focus of this session was on big data sets from the Allen Brain Atlas, the Mouse Brain Library, GeneNetwork, NeuroData, OpenfMRI, NeuroVault, and Neurosynth that can be mined for student learning activities.

The remaining articles address a variety of topics. Two articles focus on student learning through reading primary research literature. O’Keeffe and McCarthy used primary research articles in a flipped Developmental Neurobiology course. Students watched lecture material on line before class, in class the lecturer summarized the main points of the online material and then students discussed key experiments of a primary research paper that related to the lecture. The goal was for students to model the reasoning of a research scientist as they learned the course material. In the second article, Carter et al. taught experimental design principles to undergraduate students working in a research lab with primary research literature. Students started with watching an online screencast that explained interpretation of scientific data figures, and this was followed up by small group discussions of primary research papers. A crafted, step-by-step approach to scientific writing with students meeting writing benchmarks over a semester is described by Cyr. The students enjoyed the guidance, flexibility, time and space to build writing and presentation skills. Montiel and Meitzen detail the development of an honors research project that requires students to interview active research scientists. The student interviewer reports the investigator’s approach to science and their career path, and then writes a personal reflection essay on how this experience affects their own career goals.

The last few main articles are eclectic. O’Keeffe et al. ask students if the classical straight lecture format is still relevant to their undergraduate education. Ninety percent agree it is. The factors influencing students’ decision to attend a class lecture include the quality and clarity of the lectures, the time demands of work for other courses, and the lecturer’s ability to engage the students. The theme of “interdisciplinary awareness” (application of knowledge and tools from the various disciplines for solving complex problems) was explored in an introductory neuroscience course for first year and non-major students in a flipped course format (Basu et al.). Students were asked to apply their knowledge of basic STEM concepts (for example: Cells, Membranes, Ions, Biomolecules, Water, Current, Voltage, Resistance, Amino Acids and Proteins) in a neuroscience framework. Franssen et al. describe an “Action-Mapping” approach to teaching neuroeconomics to first-year students. This approach comes from business training techniques which focus tightly on measurable learning goals and what is needed for students to answer and ask specific and appropriate questions in a narrow area of study. The last full article in this *JUNE* issue describes a unique, interdisciplinary course that combines teaching neuroscience material with yoga practice (Wolfe and Moran, both yoga teachers and Wolfe also a

neuroscientist). The goal of this course is to teach health related neuroscience content that be applied to students’ personal experiences, especially non-science majors, in a low anxiety atmosphere.

Our “Case Studies” article for this issue continues this feature’s theme of using clinical stories to teach basic neuroscience content. It is also another article designed to help students become comfortable with using primary literature as a knowledge source. Literature-based case studies on the pretzel syndrome and amyotrophic lateral sclerosis are used to teach synapse formation and axon degeneration and repair in a cellular and molecular neuroscience class. Student evaluations support the above literature-based case studies as effective learning tools, with students identifying these cases as the most valuable aspect of the course.

The Medial Review section of this issue presents a “Guerilla Guide” to statistical problems common to neuroscience data (Smith). It complements and extends the statistical Perspective by Calin-Jageman mentioned above. The “Amazing Papers in Neuroscience” contribution for this issue highlights three sets of research papers that define three different neuroscience controversies (Brasier). Each controversy emphasizes different fundamental aspects of the scientific method, and how knowledge evolves.

Finally, *JUNE* is, of course, not the only educational journal where neuroscience educators can find interesting and helpful articles. Here are a few recent ones that caught my eye. In *CBE Life Sciences Education*, Deane-Coe et al. (2017) examine the relationship between their learning goal that students in an introductory biology lab class should be able to apply what they learn along axes of increasingly novel and complex problems, and actual student performance. In *Advances in Physiology Teaching*, one article suggests a method to help undergraduates better understand the forces driving ions across membranes (Crowther, 2017), and another stresses the importance of humor in our teaching (Savage et al., 2017). I invite *JUNE* readers to send me the links to recent educational articles in other journals that I can highlight for all our readers.

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