

FUN NEWSLETTER

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Newsletter Staff

Elizabeth Becker
Saint Joseph's University

Carlita Favero
Ursinus College

Jade Zee
Northeastern University

SPOTLIGHT ON THE 2017 FUN WORKSHOP

UNDERGRADUATE NEUROSCIENCE EDUCATION: ACTIVITIES, LABORATORIES, AND BEST PRACTICES FOR DEVELOPING, ASSESSING, AND SUSTAINING INCLUSIVE CURRICULA

FUN 2017 was a fantastic meeting thanks to the amazing roster of participants and presenters, the support of Dominican University, the backing of our wonderful sponsors (AD Instruments, INCF, Backyard Brains, and Neurobytes), and the tireless efforts of our programming committee (Robert Calin-Jageman, Irina Calin-Jageman, Veronica Martinez Acosta, Jean Hardwick, Bruce Johnson, and Eric Wiertelak).



Parmer Hall, Dominican University

The materials and videos generated from the meeting are all preserved (website: <https://funfaculty.org/conference/fun-2017/>) and we know that participants will carry forward the energy and ideas from FUN 2017 into their classrooms and beyond.

Looking forward, the Faculty for Undergraduate Neuroscience is pleased to invite you to attend the 2020 FUN workshop held at Davidson College in Davidson, NC.

If you are interested in volunteering, in the programming committee please contact Erik Wiertelak (wiertelak@macalester.edu).

JUNE EDITOR'S CORNER

BRUCE R. JOHNSON
NEUROBIOLOGY AND BEHAVIOR
CORNELL UNIVERSITY

The most recent JUNE issue (Spring 2017) contains a selection of interesting articles on lab exercises that are straight forward, low cost, and contain sophisticated intellectual content (<http://www.funjournal.org/current-issue/>). The editorial section of this JUNE issue starts with a celebration of a quarter century of FUN honoring the FUN co-founders and others responsible for important FUN initiatives (Ramirez). These include Nu Rho Psi, the equipment loan program, the FUN SfN booth, and of course, JUNE. In addition, José-Edwards et al. present a thoughtful guide for undergraduates to get the most out of and survive a SfN meeting. Savory and Gifford discuss their experience using easily available, web-based student/audience response systems in large introductory courses as well as in smaller, public science cafes.

Most of the main articles in this JUNE issue highlight that creative teaching, especially in the student laboratory, is only limited by our imagination. These lab teaching articles address the following topics: 1) adaptation of neurogaming technology to create an affordable EEG lab exercise that has student research potential (de Wit et al.), 2) using publicly available fruit fly lines that are engineered to display a variety of behaviors for student observation (McKellar and Wyttenbach). The supplemental videos for this article can be an important resource to teaching behavioral analyses. The articles continue with: 3) a taste memory processing lab exercise in the context of a survival-based evolutionary perspective, 4) using the rat fetal alcohol syndrome model for students to study the behavioral deficits caused by early alcohol exposure (Kehrberg et al.), 5) constructing simple neural circuits with modular, electronic neuron simulators (NeuroBytes; Petto et al.), 6) examining the role of an identified insect neuron in the escape response to looming stimuli with an open-source and low-cost electrophysiology set-up (Nguyen et al.), 7) introducing students to theoretical models of neural information processing and techniques for analyzing neural data in an introductory computer lab course, not requiring experience in calculus and computer programming (Fink), 8) improving student motivation in a large neuroscience laboratory class, coming to the conclusion that faculty teaching objectives can be subverted by disengaged teaching assistants (Tu and Jones). The full articles are rounded out by a critical thinking exercise where students analyze fictional data sets to identify major characteristics of drug tolerance (Cammack). The last article describes an analysis of student preferences for learning styles, and the impact of an active, case-based structure on teaching evaluations (Nagel and Nicholas).

José-Edwards et al. present a thoughtful guide for undergraduates to get the most out of and survive a SfN meeting.

Our “Case Studies” feature, which uses clinical themes to teach basic neuroscience content, continues with two new case presentations. The first is centered on a fictitious patient with neurological symptoms caused by a brain lesion (Lemons). Consideration of the patient’s symptoms lead students to predict which brain anatomical pathway may be damaged. The second presents the study cases used in the non-majors neuropharmacology course described in the full article by Nagel and Nicholas mentioned above.

We present 2 reviews in this Spring 2017 JUNE issue: The first summarizes creative methods for integrating primary literature into the classroom (Hartman et al). The second reviews a Spanish language article written by Dr. Jose Delgado which was obscurely published in 1981 in an encyclopedia on bull fighting (Marzullo). This manuscript is the source of the famous photograph seen in text books of Dr. Delgado stopping a bull in mid-charge by wireless stimulation of implanted brain electrodes (for example, see Watson and Breedlove, 2016). The context of this and other Delgado experiments on “mind control” are colorfully described. With the Delgado family’s permission, the original Spanish text of the manuscript is presented through JUNE as Supplementary Material.

The following papers are in press for the upcoming Fall JUNE issue (<http://www.funjournal.org/new-issue-preview/>):

- “An Interactive Simulation Program for Exploring Computational Models of Auto-Associative Memory” (Fink)
- “Diversity of Graduates from Bachelor’s, Master’s and Doctoral Degree Neuroscience Programs in the United States” (Ramos et al.)
- “A Case Study in the Use of Primary Literature in the Context of Authentic Learning Pedagogy in the Undergraduate Neuroscience Classroom” (O’Keeffe and McCarthy)
- “Measuring Salivary Alpha-Amylase in the Undergraduate Neuroscience Laboratory” (Bañuelos et al.)
- “An Attitudinal Survey of Undergraduate Neuroscience Students Regarding Their Views on the Relevance of Lectures to their Education” (O’Keeffe et al.)

Fourteen more full articles, and several Case Studies and Amazing Paper submissions are in various stages of processing for the next JUNE issue. Look for the new issue in October.

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- Watson NV, Breedlove SM (2016) The Mind’s Machine: Foundations of Brain and Behavior. Sinauer Associates, Inc. Publishers. Sunderland, MA.

Most of the main articles in this JUNE issue highlight that creative teaching, especially in the student laboratory, is only limited by our imagination.

INCREASING ACCESS TO EDUCATIONAL LABORATORY PROTOCOLS FOR EVERYONE

ROBIN L. COOPER, PH.D.
DEPT. OF BIOLOGY
UNIVERSITY OF KENTUCKY



Another approach, as a class instructor, is to make a class project as an authentic research endeavor and provide substantial details on the methodology used.

Reading the various requests on the FUN listserv for physiology and specifically neurophysiology labs is a reminder how nice it would be to have one repository for lab protocols or links to them. Journals such as Comparative Biochemistry and Physiology use to publish lab protocols back in the 60's. Specialty journals specifically targeted for methods and teaching such as Association for Biology Laboratory Education (ABLE), National Science Teacher Association (NSTA) and JUNE are dedicated educational journals; however some student/instructor feedback on assessment to accompany articles is preferred. A journal which has garnered a lot of attention over the past few years is Journal of Visualized Experiments (JoVE). Also, JoVE has a neuroscience category of educational experiments. As for other journals, one needs a subscription or join as member for access if the institution does not

provide paid access. One can also submit educational content to an open resource and open peer review to an up and coming journal F1000Research (F1000Research: Immediate & Transparent Publishing for Life Scientists).

A way to insure a broad readership is if the authors pay for the open access. Another approach, as a class instructor, is to make a class project as an authentic research endeavor and provide substantial details on the methodology used. This way others can readily modify for their own class project on a similar preparation. Such undergraduate student based driven research projects can be submitted to journals such as IMPULSE (The Premier Undergraduate Neuroscience Journal. <https://impulse.appstate.edu/issues/2017>) and American Journal of Undergraduate Research (AJUR) by the students in the course. If the authentic research being addressed is substantial then even publishing in a research based journal while providing detailed methods can be an approach. Extreme care is needed to provide accuracy in student driven laboratories for data acquisition and analysis.

Having a repository, such as a web site, to provide wide listing of easily accessible educational material will be beneficial. Below is listed a few of the educational media platforms on neuroscience and physiology laboratory exercises I have provided as open access through JoVE and other venues.

Cooper, A.S., and Cooper, R.L. (2009) Historical view and demonstration of physiology at the NMJ at the crayfish opener muscle. *Journal of Visualized Experiments (JoVE)*. JoVE. 33. <http://www.jove.com/index/details.stp?id=1595>; doi: 10.3791/1595.

Bierbower, S.M. and Cooper, R.L. (2009) Measures of heart and ventilatory rates in freely moving crayfish. *Journal of Visualized Experiments (JoVE)* 32: <http://www.jove.com/index/details.stp?id=1594> , doi: 10.3791/1594.

Cooper, A.S., Rymond, K.E., Ward, M.A., Bocook, E.L. and Cooper, R.L. (2009) Monitoring heart function in larval *Drosophila melanogaster* for physiological studies. *Journal of Visualized Experiments (JoVE)*. 32: <http://www.jove.com/index/details.stp?id=1596> ,

Leksrisawat, B., Cooper, A.S., Gilberts, A.B. and Cooper, R.L. (2010) Response properties of muscle receptor organs in the crayfish abdomen: A student laboratory exercise in proprioception. *Journal of Visualized Experiments (JoVE)*. 45: <http://www.jove.com/index/details.stp?id=2323> doi:10.3791/2323 [PDF of paper]

Wu, W.H. and Cooper, R.L. (2010) Physiological recordings of high and low output NMJs on the Crayfish leg extensor muscle. *Journal of Visualized Experiments (JoVE)*. Jove 45: <http://www.jove.com/index/details.stp?id=2319> , doi:10.3791/2319 [PDF of paper]

Robinson, M.M., Martin, J.M., Atwood, H.L. and Cooper, R.L. (2011) Modeling biological membranes with circuit boards and measuring conduction velocity in axons: Student laboratory exercises. *Journal of Visualized Experiments (JoVE)*. Jove. 47: <http://www.jove.com/details.php?id=2325> , doi: 10.3791/2325 [PDF of paper]

Cooper, A.S., Leksrisawat, B., Mercier, A.J., Gilberts, A.B. and Cooper, R.L. (2011) Physiological experimentations with the crayfish hindgut. *Journal of Visualized Experiments (JoVE)*. Jove 47: <http://www.jove.com/details.php?id=2324> doi: 10.3791/2324, [PDF of paper]

Baierlein, B., Thurow, A.L., Atwood, H.L. and Cooper, R.L. (2011) Membrane potentials, synaptic responses, neuronal circuitry, neuromodulation and muscle histology using the crayfish: Student laboratory exercises. *Journal of Visualized Experiments (JoVE)*. Jove 47: <http://www.jove.com/Details.php?ID=2322> doi: 10.3791/2325, [PDF of paper]

Holsinger, R.C., and Cooper, R.L. (2012). Effect of Environment and Modulators on Hindgut and Heart Function in Invertebrates: Crustaceans and *Drosophila*. *Tested Studies for Laboratory Teaching*, Volume 33 (K. McMahon, Editor). *Proceedings of the 33rd Conference of the Association for Biology Laboratory Education (ABLE)*. <http://www.ableweb.org/volumes/vol-33/v33reprint.php?ch=7> <http://web.as.uky.edu/Biology/faculty/cooper/labWWW-PDFs/ABLE%20MTG%20PAPER.pdf>

Titlow, J., Majeed, Z.R., Nicholls, J.G. and Cooper, R.L. (2013). Identifiable neurons in the central nervous system of a leech via electrophysiology and morphology, sensory field maps in skin and synapse formation in culture: Student laboratory exercises. *Journal of Visualized Experiments (JoVE)*. (81), e50631, doi:10.3791/50631. Professional movie and peer reviewed manuscript. <http://www.jove.com/video/50631/intracellular-recording-sensory-field-mapping-culturing-identified>

Titlow, J., Majeed, Z.R., Hartman, H.B., Burns, E., and Cooper, R.L. (2013). Neural Circuit Recording from an Intact Cockroach Nervous System. *Journal of Visualized Experiments (JoVE)*. (80), e51050, doi:10.3791/51050. Professional movie and peer reviewed manuscript.

<http://www.jove.com/video/50584/neural-circuit-recording-from-an-intact-cockroach-nervous-system>

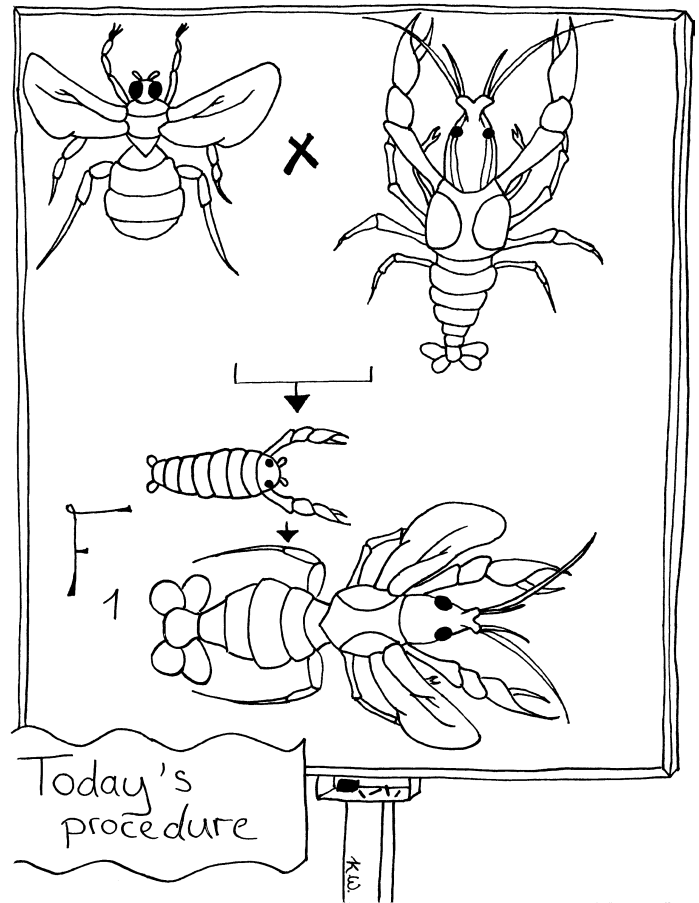
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<http://www.jove.com/video/51050/proprioception-tension-receptors-crab-limbs-student-laboratory>

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Neuroscience Education Forum

Marsha Penner
Psychology and Neuroscience
UNC Chapel Hill

Please consider joining the Neuroscience Education Forum on Facebook! Members of the Forum have been sharing teaching resources (e.g., syllabi, methods for promoting inclusiveness), giving some great advice, and are there to give you some support on those days when you just need a pep talk! To join this closed group, search for 'Neuroscience Education Forum' and request an add. Everyone is welcome! Hope to see you there!



Outreach Opportunity!

Do you have suggested experiments on invertebrates that can be used for hypothesis-driven neuroscience with high school students (or know of resources)?

Are you a neuroscientist in the Chicago area interested in talking with high school students?

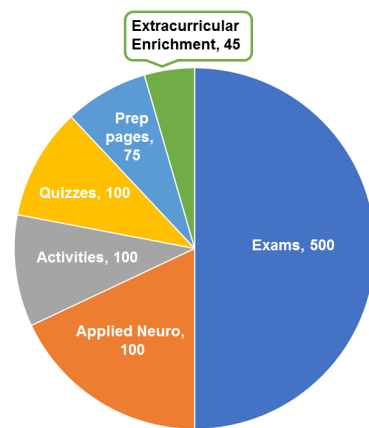
If so, please contact
Kyle Leonard
Biology teacher
George Washington High School
Kleonard6@cps.edu
630-880-5953

SHARING INSPIRATION

COMPILED BY CARLITA FAVERO
BIOLOGY AND NEUROSCIENCE
URSIUS COLLEGE

The Faculty for Undergraduate Neuroscience Education Workshop on Activities, Laboratories, and Best Practices for Developing, Assessing, and Sustaining Inclusive Curricula deeply inspired me and I came across many ideas that I thought were too good not to share. In talking with colleagues at my own institution after I returned from the conference, I found out even more good ideas. Here are a few things I felt compelled to do this semester.

- I made small, but intentional changes to make the syllabus more accessible. Most of these were inspired by my colleague in Psychology, Jennifer Stevenson.
- I used at least 12 point font and added more white space (e.g. spaces between headings and each bullet point)
- I avoided using abbreviations
- I added visuals
- ◆ For example, I put a relevant image at the top, next to the title, and included an inspiring/engaging quote
- ◆ I included visuals of the course materials (e.g. textbook)
- ◆ I put my grading assessment into a pie chart (this was a game changer for me!)
- ◆ I included a table of contents so students can easily find the information they are looking for
- ◆ I include a note letting students know I am there to support them and included phrases in the syllabus to communicate these intentions. For example, in the section where I talk about office hours, I was inspired by Alo Basu's (College of the Holy Cross) syllabus to add the sentence "Come to see me in office hours; I will be happy to see you."
- ◆ I wrote it as a dialogue between me and the student. For example, I changed my old header "Email Etiquette" to "How do I contact you?" and wrote the syllabus in first person (e.g. I will.... You will....)
- ◆ Another game changer I plan to implement in spring 2018: change the header "Office Hours" to "Student Hours"
- ◆ I also tried to make my rhetoric positive rather than negative. For example, instead of saying "Any assignment turned in late will lose 10% of its value" I switched to "Any assignment turned in late will receive 90% of its value".
- ◆ I gave students advice about how to succeed in the course. I tried to be as explicit as possible. There are also more great ideas on The Learning Scientists blog about this <http://www.learningscientists.org/blog/2017/9/1-1>



- On the first day of class,
 - I hand out 5X8 notecard and go through a series of getting to know you questions via PowerPoint (e.g. Why are you taking this course, What personal skills would you like to develop in this course)
 - I let students know that I would like to schedule a getting to know you appointment within the first week. I do this to follow-up with students on their responses on the first day notecards and also so they can find my office (and demystify the experience of going to office hours). If you have a large class and such individual appointments aren't possible, you can simply take the first 2 weeks of class to write an email to each student responding to something they said on the notecard. (e.g. "I noticed that you mentioned on your Info sheet that you were interested in research. You should come to the Biology/Neuroscience/Psychology research open house on XX date to learn more about research going on at Ursinus.")
 - I revisited the statements about inclusive climate and sexual and gender-based misconduct on the syllabus
 - I reviewed my advice for how to succeed in the course and reiterate that I am there to support them
- I've made attempts at scaffolding—I walk through a major repeated assignment in class before it's due and require student prep work as a grade. I'm trying out Barbara Lom's (Davidson College) Prep Pages this semester. In the past I've required that students turn in some of the strategies I give for being successful in the course before a major assignment or exam for a grade.
- In the past I've graded papers and exams blind by instructing students to write their names on the back only so I don't see it (or in the case of digitally submitted assignments, to use a unique 4-digit code rather than their name when they submit). I am now trying to grade all assignments I can blinded. This is automatically accomplished in our learning management system, Canvas.

ALL GENDERS
ALL BELIEFS
ALL ABILITIES
ALL AGES
ALL ORIENTATIONS
ALL CULTURES
ALL COLORS
ALL SIZES

welcome

So far these changes have been well received. I had one student in the getting know you appointment the first week thank me personally for asking about personal pronouns. I also feel generally there is a positive spirit in the classroom each day and students have been comfortable approaching me for help.

On the next pages are more ideas I received from other FUN members!

I move students every class period, at least every week or so. This semester I'm doing group work with the "person you know least in the class". I'm trying to deliberately rotate students around so they interact with each other better and so there aren't any exclusive cliques, divided on any lines.

Catherine Franssen
Longwood University

I use Arial font in all course materials because it is one of the less-problematic fonts for dyslexia and other learning disabilities.

Jen Schaefer
College of St. Benedict/
St. John's University

1. I will start out the quarter with a discussion of inclusion. I want us to set class norms for being inclusive in our conversations and respectful of diverse opinions and perspectives.
2. We discuss a lot of primary articles. This year, I plan on creating a webpage highlighting the first and last author of each paper including their background in science. This will help me be more conscious of discussing articles featuring a diverse set of scientists.

Christelle Sabatier
Santa Clara University

1. I use my course management system to create forums where students share news stories and study aids.
2. I have problem sets that students turn in at exams for participation points and are encouraged to bring before the exam with questions. Before each exam, have students fill out a notecard with their muddiest point. I use these to guide my evening review sessions and check-in with students before the exam.
3. I use padlet to get class-wide participation and feedback.

<https://padlet.com/lhester2/neuro1>

Laurel Hester, Keuka College

I ask students what name/pronoun they use and to provide phonetic spelling of their name.

In preparation for the start of the term, I came across this great resource from Faculty Focus:

<https://www.facultyfocus.com/free-reports/diversity-and-inclusion-in-the-college-classroom/>

They have many different special reports that summarize a large amount of pedagogical literature. There is one specifically about diversity and inclusion.

Shara Stough
Augustana College

Remember that the FUN doesn't stop..we're counting on everyone to keep alive the connections, the community, and the commitment to inclusivity. Email someone who attended the summer workshop, volunteer for a FUN committee, launch a new initiative, let someone know how incorporating their teaching tip did or didn't help, etc.

1. Give a damn.
2. Be patient.
3. Do the work.

inspired by Kelly Mack's
keynote address

Consider requiring an office hour visit before the first major assignment or test in the course or suggesting it by including it as an "assignment" in your course schedule. You can give students a few participation points for stopping by.

inspired by Tyisha Williams
(Wilkes University) and
Laurel Hester (Keuka College)

Check out this article that just came out in Science:

Without inclusion, diversity initiatives may not be enough

<http://science.sciencemag.org/content/357/6356/1101.full>

Christelle Sabatier
Santa Clara University

FINDING NEW CASES TO ENGAGE YOU STUDENTS

KRISTEN FRENZEL AND LEAH ROESCH
NEUROSCIENCE AND BEHAVIORAL BIOLOGY
EMORY UNIVERSITY

The National Center for Case Study Teaching in Science (NCCSTS) defines Case Studies as any story with an educational message. With this broad definition, instructors teaching neuroscience courses have a wide range of types of cases they can use to engaged the students in their courses. Active-learning techniques like case studies can help build and inclusive, student-centered classroom (Tanner, 2013) and women and underrepresented minorities may especially benefit from the techniques (Freeman et al., 2014, Preszler, 2009; Dong and Chen, 2014). Unfortunately, published cases with neuroscience content have been quite limited and hard to find. A new grant from the National Science Foundation, NeuroCaseNet, seeks to help remedy this problem by supporting networks of neuroscience faculty to create and publish more cases for neuroscience. As the NeuroCaseNet gets going, I'd like to draw your attention to some recently published neuroscience cases and encourage you to keep your eyes out for more!

Active-learning techniques like case studies can help build and inclusive, student-centered classroom and women and underrepresented minorities may especially benefit from the techniques

CASES IN NCCSTS

This database of nearly 700 peer-reviewed cases contains many different types of cases covering a wide range of STEM disciplines. General descriptions of the cases are available to all, but teaching notes and keys are only available to subscribers. [There are just under 40 cases in the neuroscience category](#), including 3 from this year:

[A Botched Botox Party in the Hamptons](#) by A Kleinshmit

[Agony and Ecstasy: Party Drug or Breakthrough Treatment for PTSD?](#) By AB Dounay et al.

[Bringing Home More Than a Medal: An Olympian's Battle Following Zika Virus Infection](#) by TM Addy, KA Phillips and MO Stevenson



CASES IN JUNE



Launched in the [Spring 2016 issue with an editorial](#) describing the types of cases and the power of cases for engaging students, each issue of the Journal of Undergraduate Neuroscience Education now features case studies. Through Spring 2017, we've published 5 new, peer-reviewed cases which cover a variety of teaching objectives and represent different styles of cases. Articles describing the cases are linked below and teaching materials are available by request at CAS-ES.at.JUNE@gmail.com:

[Nora's Medulla: A Problem Based Learning case for teaching neuroscience fundamentals](#) by LA Roesch and K Frenzel

[The Woman Born Without a Cerebellum: A Real-Life Case Adapted for Use in an Undergraduate Developmental and Systems Neuroscience Course](#) by J Brielmaier

[Professor Eric Can't See: A Project-Based Learning Case for Neurobiology Students](#) by JM Ogilvie and E Ribbens

[Locate the Lesion: A Project-Based Learning Case that Stimulates Comprehension and Application of Neuroanatomy](#) by ML Lemons

[Drugs & the Brain: Case-Based Instruction for an Undergraduate Neuropharmacology Course](#) by A Nagel and A Nicholas

Have you written or modified cases for your classes?

Get them published so the rest of us can use them!

For more ideas about where and how to publish your cases, contact Leah Roesch and Kristen Frenzel via

CASES.at.JUNE@gmail.com.

WORKS CITED

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Faculty for Undergraduate
Neuroscience

Website
<https://www.funfaculty.org/drupal/>



Nominations for the following leadership positions in FUN are open until 9/20:

President-Elect

Secretary

Councilor (3 needed)

A complete description of these positions can be found at <http://www.funfaculty.org/drupal/bylaws>

Nominations can be sent to the current President-Elect, Hewlet G. McFarlane (McFarlaneh@kenyon.edu)

Self nominations are welcome!

FUN Poster Session Submission is Open

Any FUN member (regular or pre-faculty status) in good standing (that means dues are paid) can sponsor one submission for the FUN Social and Poster Session. In addition, Institutional members can sponsor one submission, but it is up to the home institution to determine which project. We have a total of 175 board faces, with 20 reserved for Travel Award winners, which leaves 155 to be filled on a first-come, first-served basis. Your student does need to be registered for the SfN meeting to participate in the FUN Poster session, but does not need to be presenting their poster during the main conference.

Please be sure that your student can attend the session, Sunday, November 12th 6:45-8:45 pm at the Renaissance Grand and Central Ballroom before they submit.

The application will remain open until September 29th, or until we have 175 total submissions. <https://www.funfaculty.org/applications/index.php/695628?lang=en>



FUN EXHIBITOR BOOTH AT SFN 2017

Faculty for Undergraduate Neuroscience members are needed to staff the FUN exhibit booth during the Society for Neuroscience (SfN) Annual Meeting in Washington, DC. While at the booth, you talk about FUN with those who visit, sell some merchandise, and hang out with your FUN colleagues. The exhibitor booth is open Sunday through Wednesday. Some exhibitor badges (which gives you FREE convention registration) are available for FUN members working at the booth. Please note, if you are awarded one of these exhibitor badges, you would not register for the SfN meeting through the SfN site, nor would hotel bookings go through SfN until the exhibitors are allowed to register.

Contact Veronica Acosta (vgmartin@uiwtx.edu) to volunteer or for more information about the exhibitor badges.