



# University of New England

## Center for Excellence in Neuroscience K-12 Outreach Program

Alexandria D'Ambruoso, Kelsey Schwarz, Alex Deal, Kristen Erickson, Edward Bilsky, Michael Burman  
University of New England, Biddeford, Maine

Don't be Insane  
Cover your Brain!



### About

- The Center for Excellence in Neuroscience (CEN) at UNE was founded in 2009 with three main areas of focus: research, scholarship and community outreach. It includes over 40 faculty members affiliated with neuroscience research and/or education.
- The Neuroscience Outreach Program was established in 2009 with the goal of bringing fun, interactive neuroscience lessons to schools to engage students in learning about neuroscience.
- Undergraduate and professional students present the lessons in classrooms with support from UNE faculty and staff.

### The "Grow-Up, Grow-Out" Model

- We want our program to "grow-up" and "grow-out" with the K-12 students:
  - "Grow-up"** – vertical integration: developing modules that can be introduced in elementary school and built upon throughout middle and high school; following K-12 students as they progress in their education.
  - "Grow-out"** – interdisciplinary modules: developing modules that become more advanced as well as integrative to incorporate other scientific fields in order to demonstrate the interdisciplinary nature of neuroscience.



Former UNE Outreach Staff Coordinator Kristen Erickson presents the sheep brain dissection module



### Goals

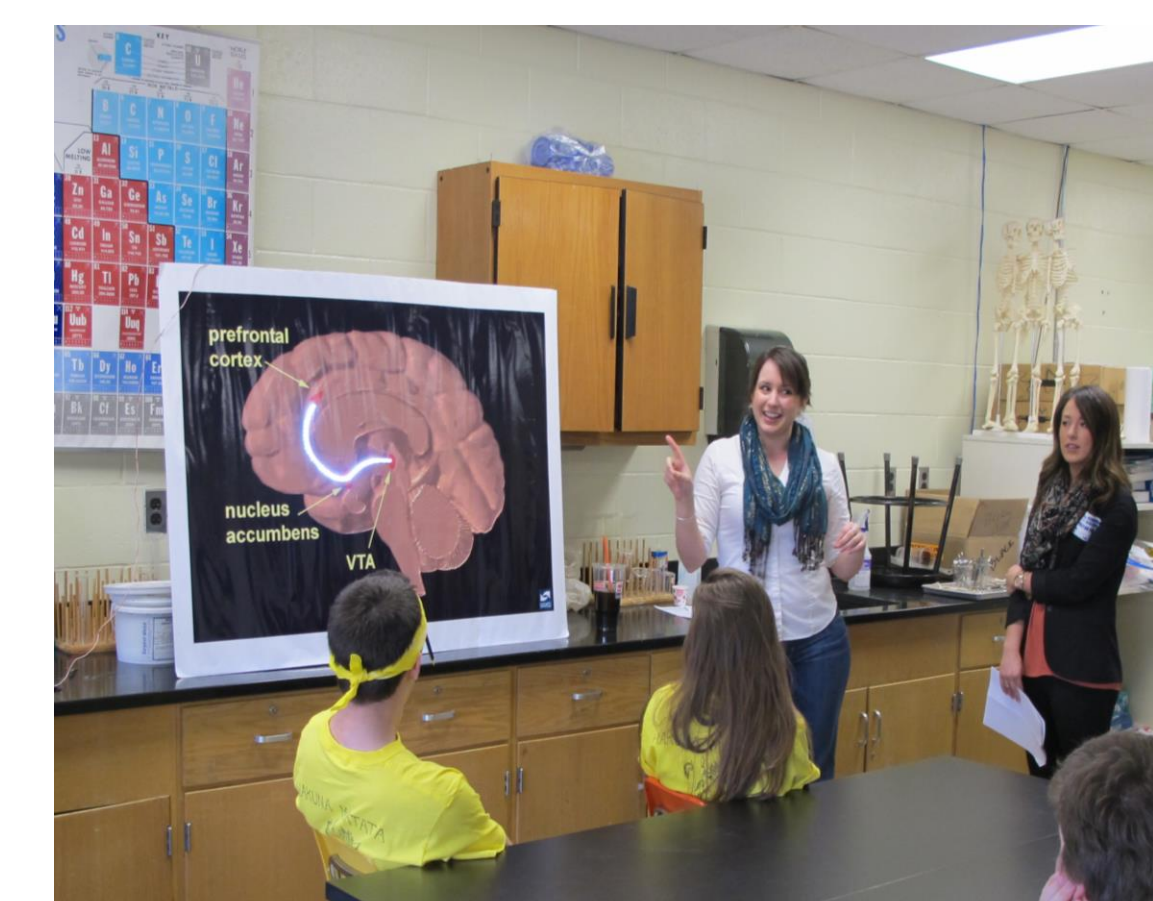
- Foster student interest in neuroscience and improve attitudes towards science.
- Improve student competency in neuroscience and other science, technology, engineering and mathematics (STEM) subjects.
- Promote student awareness of brain health and safety to help prevent brain injury.
- Support local school systems and encourage development of STEM education.
- Create strong community ties between UNE students and faculty and the surrounding communities.

### Modules

- With assistance from faculty; undergraduate and professional student volunteers designed interactive neuroscience lessons, called modules, for the program. Our completed modules are available for download at:

<http://www.une.edu/research/cen/k-12-outreach>

|                           | Neurological and Psychiatric Disorders                                 | Neuroanatomy   | Brain Safety  | Cognition and Brain Function                                      | Drugs of Abuse and Addiction                    |
|---------------------------|--|--|---|---|---|
| Primary School (K-3)      |  | "What does your brain do?" drawing activity          | Read <i>Franklin's Bicycle Helmet</i> OR watch <i>Bike Safety</i> with Bill Nye the Science Guy | Review the 5 senses<br>Sensory tests with textures and illusions  |   |
| Intermediate School (4-5) |  | Color the 4 lobes of the brain                       | Discuss the importance of helmets   | Discuss learning and memory<br>Stroop test<br>Timed maze activity |   |
|                           |  | Build-a-neuron with pipe cleaners                    | Melon-drop helmet demonstration   |   |   |
| Middle School (6-8)       | Introduce neurological disorders                                       | Sheep brain dissection with comparative neuroanatomy | "Build-a-helmet" egg drop activity  | Discuss short-term and long-term memory                           | Discuss types of drugs and their effects        |
|                           | "What is a migraine?"<br>"What is Multiple Sclerosis?" (model neurons) |  |   | Short-term memory test activities                                 |   |
| High School (9-12)        | "Thread-the-needle" activity   | Human Neuroanatomy with preserved specimens          | Discuss signs and symptoms of concussions   | Selective attention task (Simon & Chabris, 1999)                  | Effects of Drugs on Daphnia microscope activity |
|                           | "What is Alzheimer's Disease?"   |  |   | Waterwheel demonstration of dopamine depletion                    |   |
|                           | Telephone activity   |  |   | Multitasking test   |   |
|                           | Short-term memory test   |  | Cranial Nerve examination   |   |   |



UNE Pharmacy students lead a demonstration on the activation of the reward pathway during a module on drug abuse and addiction



A student demonstrates TBI using a melon

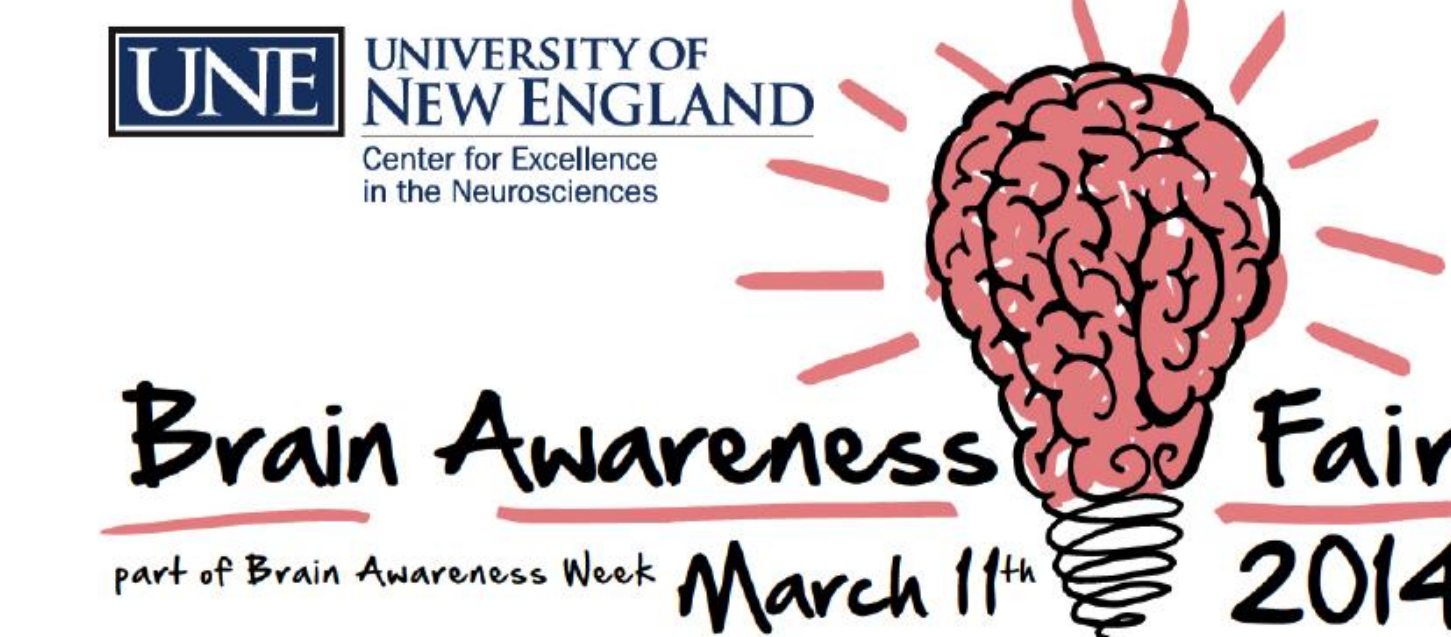


An outreach volunteer reviews the lobes of the brain during a Human Neuroanatomy demonstration



High school students work with Dr. John Streicher of UNE on a sheep brain dissection

### BAW 2014: Brain Fair and Brain Blast



UNE Women's Hockey Team players skate with children at the Brain Awareness Fair



Brain Awareness Fair activities including microscope slides (left) and helmet giveaway (right)

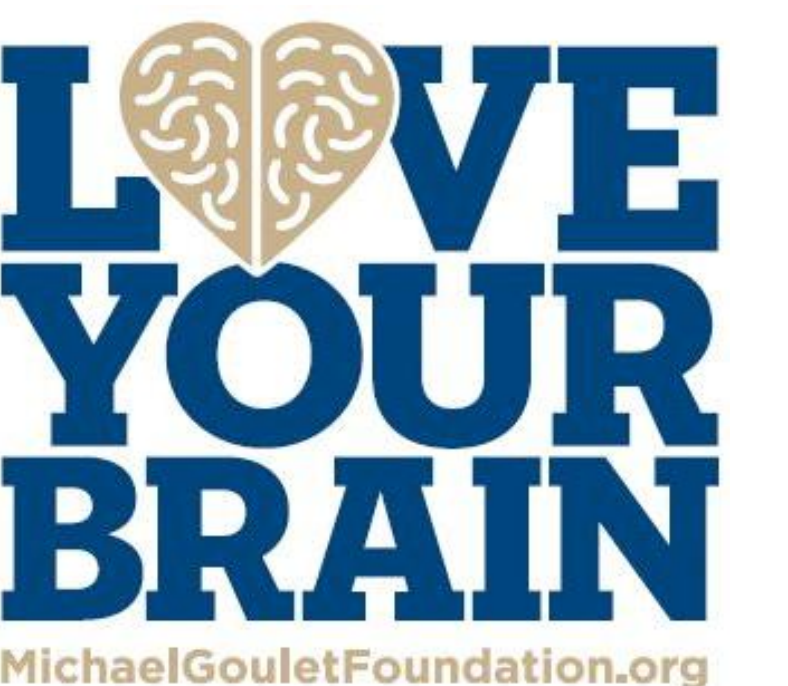
**Brain Awareness Fair:** The event, which drew approximately 100 preK-12th grade students from area schools, included ice skating; a helmet giveaway; learning and cognition activities; microscopes to look at brain tissue and nerves; touchable brains of sheep and rats; and crafts, such as brain coloring sheets, pipe cleaner neurons and more. The Michael T. Goulet Foundation gave out over 100 helmets and student-athletes volunteered for the free skating session with skill-building lessons.



**Brain Blast:** A Pecha Kucha style event open to the public that incorporated a series of brief talks done by students, faculty and community members regarding topics such as chronic pain, head injuries, emotions, and epilepsy. The goal of the event was to engage the community in brain health and safety.

### Collaborations

- The program partners with the Michael T. Goulet Traumatic Brain Injury and Epilepsy Foundation for helmet fittings and helmet give-away events to promote brain and helmet safety.
- The program partners with Engine, an art studio in Biddeford, Maine to host community events such as the Brain Blast and Your Brain on Art.
- We are a member of the Dana Alliance lending library and our modules are featured on Brainfacts.org.



### Future Directions

- Assessment:** implement quantitative and qualitative assessments to evaluate our program for both K-12 students and volunteers.
- Training:** create concise training videos for each module to make the training process easier and more consistent.
- Collaboration:** work with other departments (mathematics, marine biology, chemistry, etc.) to create interdisciplinary modules.