

Neuroscience High School Summer Camp Schedule
10 a.m. to 4 p.m.

WEEK ONE

Mon 7/11 Introduction to the Brain and Central Nervous System

9:30–10 a.m. Orientation: Camp program and BB Learn explained.

10 a.m.–12 p.m. Jed Shumsky, PhD, course director of Medical Neuroscience, will provide an overview of the neuroanatomy of the brain and central nervous system.

1–4:00 Students will work in groups in the Gross Anatomy Lab to identify structures on an actual human brain with guidance from Drs. Lane, Shumsky, Brenan-Rothschild, Peterson, and Howe and graduate student Adam Hall. Doug Whitmire will be available to show human cadavers.

Tue 7/12 Spinal Cord Injury and Neuroplasticity

10:00-12:00 Michael Lane, PhD, and Jed Shumsky, PhD, will describe the structure and function of the spinal cord, detailing various sensory and motor pathways and the consequences of spinal cord injury.

1:00-4:00 Students will work in groups in the Gross Anatomy Lab to identify spinal cord and spinal nerves with guidance from Drs. Lane, Shumsky, Brenan-Rothschild, Peterson and Howe, and graduate student Adam Hall. Doug Whitmire will be available to show human cadavers.

Wed 7/13 Cellular Neuroscience

10:00-12:00 Dr. Lane will discuss advances in stem cell biology, and graduate student Shrobona Guha will describe how neurons differentiate, sprout axons, form synapses on the cellular level.

1:00-4:00 Graduate students Trevor Smith, Shrobona Guha and Sophie Cohen will demonstrate animal survival surgery and methods used in cellular neuroscience research and other research techniques.

Thu 7/14 Sensory systems

10:00-12:00 Francis Sessler, PhD, course director of Human Structure and Function, will describe the human sensory systems, comparing and contrasting the various receptors, transduction mechanisms and pathways leading to sensory perception.

1:00-4:00 The afternoon will include a presentation from Drexel Admissions on how to apply to college. Then students will explore visual illusions and sensory discrimination capabilities led by graduate student Arron Hall.

Fri 7/15 Nerve Conduction and Systems Neuroscience

10:00-12:00 Dr. Shumsky will give a lecture on how nerve conduction works. Arron Hall will discuss systems neuroscience and provide some demos.

1:00-4:00 Drs. Shumsky and Lane, and graduate students will introduce the research projects for the coming week. Students will work in groups as amateur neurologists to solve clinical cases involving various brain and spinal cord pathologies.

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WEEK TWO

Mon 7/18 Neuropharmacology

10:00-12:00 Dr. Shumsky will describe neurotransmitter receptor systems and explain how these have been used to design pharmacologic treatments for psychiatric disorders.

1:00-4:00 Research groups will work on their research projects under graduate student supervision.

Tue 7/19 Animal Care and Use

10:00-12:00 Rick Huneke, DVM, director of University Laboratory Animal Research, will speak about the ethics of animal research and lead a tour of the Animal Facility.

1:00-4:00 All of the available graduate student helpers will chat with the group about their journeys to choose to pursue neuroscience. Research projects will continue.

Wed 7/20 Research Projects

10:00-12:00 Research projects will continue.

1:00-4:00 Dr. Shumsky will give an overview of how to design presentations to best convey the information we have. Groups will begin planning their presentations to provide an overview of what they have learned on that topic, and a future experiment that they think would be an interesting “next step” to explore. Research groups will meet with graduate students to finalize research projects as needed and to plan presentations.

Thu 7/21 Comparative Neuroanatomy

10:00-12:00 Haviva Goldman, PhD, course director for Microanatomy and Human Structure and Function, will discuss the evolutionary origins of the skull and the brain. Graduate student Trevor Smith will discuss how the nervous system has evolved to adapt to challenges for different organisms.

1:00-5:00 Field trip for a “behind the scenes” tour of the Academy of Natural Sciences with Ted Daeschler, PhD, and to the Franklin Institute to see the Brain Exhibit and other exhibits of interest.

Fri 7/22 Brain Machine Interfacing

10:00-12:00 Simon Giszter, PhD, researcher in the neurorobotics and motor systems, will describe recent advances in the field of how the brain can control machines such as prosthetics for rehabilitation.

1:00-2:00 Students will finalize research projects and practice their group presentations.

2:00-3:00 Students will present the results of their projects to the graduate students and faculty.

3:00-4:00 Camp wrap-up and awarding of certificates of completion.