Teaching Statement **Christopher T. Smith**

We live in a quickly evolving world where, particularly in the biological sciences, our understanding of concepts changes daily. The fluidity of our knowledge of biological systems, especially one as complex as the human brain highlights the need to develop curious, creative-thinkers as opposed to students that memorize "facts" that are ever changing. I see my goal as a teacher as developing students' abilities to synthesize new knowledge into a broader framework while also developing a passion for the scientific method and new discoveries.

Before they can be expected to create new knowledge and contribute to future innovation, students need a strong fundamental grounding in the basics of their field of study. For neuroscience, this starts with understanding the functions of various components of the brain's computational cells (neurons) and how these cells communicate with one another. Building off this knowledge, my Biological Psychology course at **XXXX** University's learning objective would be for students to ultimately be able to explain how the brain functions at a variety of scales: molecular, cellular, and circuits/systems to produce behavior. Other critical objectives would include ensuring students can draw the key parts of a neuron, describe the process of synaptic communication, and explain the role neurotransmitters play in cell-to-cell communication. During the course, students would learn the essential components of these processes, be able to illustrate them visually, and ultimately speak to how they can go awry in a variety of situations and diseases. My goal would be to ensure students can both describe and understand key neurobiological processes as well as think critically on their importance.

While starting with key learning objectives is important, determining students' prior knowledge will provide insights into their diverse learning backgrounds. Having this information will allow me to tailor my early course content to ensure everyone is able to learn from the same knowledge foundation during the course. This approach emphases **my focus on inclusion** in my teaching. I won't assume some knowledge base that is uniform across the students I teach. Thus, I favor the use of a pre-term assessment containing a few questions that gauge students' familiarity with material that will be needed in any course I teach. Depending on the results of the pre-term assessment, we will spend our first few class sessions ensuring everyone is proficient in the course fundamentals. One way to do this and bring everyone along is for the students who think they know a concept (such as "neurotransmission") to try explaining it to others who might not in a small-group format. The goal of these groups would be to submit an agreed upon summary statement to me for review and feedback. These group consensus statements can be continued based on assigned chapter reading topics throughout the course.

In this world of increasingly divided attention, **we as instructors must try to engage and excite our students**. I think this starts with allowing students to be active participants in their own instruction, offering insights to guide the direction of the course. I favor the idea of using brief pre-class polls to gauge students' familiarity with that day's planned lecture topic and to get information on which particular areas they may need additional instruction. For example, the assigned reading for a lecture on the action potential may discuss the various cellular components that go into generating one (membrane potential/ion gradients, sodium and potassium channels). So, a pre-class poll based on this reading might ask students where are sodium ions more concentrated initially (intracellularly or extracellularly) and explain how this differential concentration is used in generating a current in neurons as they depolarize. Based

on students' answers to this multi-part question, I can better understand how much class time needs to be spent on ion gradients and their importance in action potential generation.

To push students to apply their knowledge from readings and class material, they need to spend time outside class thinking about application and deeper dive questions I will propose to them at the end of key lectures such as: Why might an action potential fail to propagate down the axon? And do the issue(s) you propose occur in any human diseases? At the start of the next class session, students would break into groups, share their thoughts with one another, and then provide an agreed-upon group answer (a good answer might be demyelination that occurs in multiple sclerosis) to share with the class (if class size permits or with me for email feedback if not). With this approach, **students learn from one another and a diverse set of perspectives are shared and discussed** before a final answer (or, more likely and accurately, a set of answers) is provided. Not only do critical thinking assignments like this help students understand why what they are learning is important, **they also learn the value of listening to a variety of ideas before settling on a solution(s)**. This will be a critical skill in the working world where teamwork and troubleshooting problems collaboratively is often essential.

To ensure students are able to apply course concepts to real-world problems, I would also have them focus on a few take-home neurological case studies over the course of the semester. These assignments would encourage them to think about how to apply concepts we had learned in class in a novel context. On the case study due date, I would then try to foster collaborative learning in class by having students break into groups to discuss how they approached the case studies. Then, students will have a chance to edit their initial responses and submit a final one to be graded, noting what additions/edits came out of the discussion. In this way, **students are learning from and acknowledging each other's perspectives and insights**. Through this, they gain a richer understanding of the myriad ways to approach complex problems that sometimes lack clear (or single) answers.

While my courses will still have a traditional lecture component, I think it is crucial to students' engagement that they discuss material and related course questions and problems with their peers. In this way, they can work collectively toward understanding and application of key concepts. In-class group discussion assignments would be interspersed with more traditional quizzes and tests, whose questions would assess students' ability to explain, describe, and outline the processes we discuss in class. Some questions would also test their ability to solve the types of problems they have encountered during the discussion assignments.

In closing, we live in an exciting time for neuroscience with public interest in the brain at an all-time high. I think tapping into that excitement in my courses (which could range from Introduction to Psychology to Cognitive Neuroscience or Drugs, Brain and Behavior) would not only keep students' interest high but also prompt some of them to want to contribute to the field by doing ground-breaking neuroscience research of their own. **My goals for any course I teach are that students will leave with a greater appreciation of the topics covered, how these topics relate to understanding real-world issues, the essential knowledge needed to comprehend the scientific basis of these topics, and finally an appreciation for considering multiple viewpoints and perspectives.** If in the process, I also convey to them how exciting the field of neuroscience is and how much remains to be discovered, then I know I will have done my part in promoting the evolution of this exciting field of biology.