

## SUPPLEMENTARY MATERIAL: EXAMPLE STUDENT ESSAY BY CATALINA MONTIEL

Below is an example student essay, written by Catalina Montiel while an undergraduate student at NC State University, Fall Semester, 2016.

### Neurobiology, an experience that has changed my life

By Catalina Montiel

#### Introduction

The neurobiology class, BIO 488, has the purpose of introducing us, the students, into the field of neuroscience while teaching the fundamental biological aspects of the nervous system. As a student who is majoring in Biological Sciences with a concentration in Neurobiology and Physiology, I have a big interest in learning how the nervous system and brain work. Classes tend to teach us what is known about the field, the discoveries accomplished over time, and their applications in other areas of study. However, they sometimes miss the behind-the-scenes: the process of how things are discovered and what is like to be a neuroscientist. Therefore, to increase my learning experience with this course and to understand better how my major and career could develop into neuroscience, I developed and carried out an honors project which would help me satisfy my inquiry.

From this honors project I intended to learn the behind-the-scenes of the neuroscience field in more detail; how the career progresses from one level to another — bachelor's degree, doctorate, postdoc—; how neuroscientists' passion is driven and discover if neuroscience is perceived in different ways depending on what aspect is being studied. To accomplish this leaning experience, I interviewed two neuroscientists from my university, North Carolina State University. I chose two neuroscientists that study very different aspects of the nervous system to be able to possibly see very contrasting points of view and striking similarities on their field perspectives. Finally, I reviewed their recent work and with my knowledge of neuroscience I wrote 10 questions to guide myself during the interview. Still, these were not set questions given that the conversations were probably going to go in different ways, and some questions could be answered within other questions.

Here, as the final product of the project, I will present my personal gain from the interviews. Additionally, both transcriptions of the interviews and the questions that guided them will be provided. As I was expecting, I was able to see how the approach to neuroscience varied from one scientist to another depending on their specific area of work, and how I personally have a different perspective because of my personal experiences and trajectory in the field.

#### Reflection Essay

What drives us in life? What are we supposed to do in life? Why are some people scientists, others business people, social workers, non-workers? Why have some known what their goal in life is since they were little, while others struggle their whole life to find their true calling? These questions will never have a definite answer, but still I wanted to discover what drove some neuroscientists to dedicate their life to learn about the nervous system and how their life has been shaped by their true passion.

In my case, I am part of the small group of people who since they were little knew what they wanted to do in life, and is not to be a neuroscientist as you may think, but to be a doctor. However, there was a point in my life in which something came across my path into medical school and it was able to redirect it by putting the neuroscience route in front of me. My end goal is still becoming a doctor, but now, how I will get into it and what I will do to get to it has a different face. Now the path is different, but why has not neuroscience become my end point? Even though the answer for this question was previously unknown I was able to discover it with this project.

I interviewed two neuroscientists who described their passions, their work and how everything has changed throughout their lives. I learned a lot about the neuroscience life, as I wanted, but my greatest learning was realizing how little things have the ability to shape us and define our life. Even though we might have or try to have a path to follow, true living is allowing little things to sum up together and make us who we are. I have now been able to realize why working on neuroscience is not my end goal in life, but becoming a doctor is not either. Although I am working towards becoming a doctor, I now have a different perspective of its part in my life. I have now realized that living is not reaching a goal, it is accepting every experience we go through and obtaining something from each of them. That is what will define who we end up being, that is living.

The two scientists I interviewed, Dr. Mishra and Dr. Godwin, started their career in neuroscience from two very different standpoints and with different ideas in their minds. Even though they both ended up in the field of

neuroscience, their work is completely different and their perspectives of the field are mostly opposite, but defined by their path and experiences. Dr. Mishra knew he wanted to be a scientist since he was little, but he did not talk about it. He saved his dream to himself to be able to accomplish it. He believes that his curiousness, one he has had since he was a young kid, led him to love the complexity of the nervous system. Also, he mentioned that although our interests start to be shaped when we go from high school, to undergraduate and then to graduate school, there is a point in which we truly find our passion. He worked in neurogenesis and neural stem cells, and then in sensation, but he did not experience his true passion on neuroscience until he started working on pain and itch, specifically because this was a field that linked him with his family in a personal and emotional way. On the other hand, Dr. Godwin's interest in science started with zoology. Then it was more oriented to animal ecology and community behavior but he eventually ended up in a neuroscience lab in which neurology and zoology intertwined. However, he mentions that he was always interested in behavior and that is how his neuroscience passion is driven, by the behavioral study of animals. In conjunction, both scientists are interested in the basics of neuroscience but express it in different ways, greatly affected by what they study. Dr. Mishra studies the underlying circuits behind pain and itch while Dr. Godwin studies where behavioral changes come from. Even though they study the causation of neurological outcomes, Dr. Mishra sees it as breaking up the complexity of the sensations and understanding the basis of them, but Dr. Godwin studies it as a mixture of disciplines that sum up to end in behavioral change analyzed from the genetic standpoint. Here we can see how they both contribute and dedicate their lives to neuroscience but from different stand points.

As their career developed both scientists were highly impacted and influenced by research given that it was what allowed them to answer their questions about neuroscience. Dr. Godwin mentions that his passion for neuroscience was probably triggered by research mentors he had early in his career and by how he could use animals as models to answer the specific questions he had about the underlying aspects of behavior. On the other hand, Dr. Mishra explains that what triggered his own passion was analyzing how specific situations within the nervous system can lead to diseases like Alzheimer's or the suffering from pain, both of which attacked his grandfather and mother. On the other hand, as researchers and owners of a lab, they both spend a lot of time working in many different aspects of the field. They have to do bench work and carry out experiments, but given that they are the principal investigators of the lab this has become a secondary activity, and now they focus on investigating, analyzing data, developing new questions to solve, managing the lab and applying for grants. All together, these activities take a lot of time

from their days, but given that it is their passion they do not find it hard.

Another aspect of the research world that they both share is having to integrate other disciplines into their work to be able to solve inquiries about the nervous system. They both use genetics but with different approaches, from defining which genes are behind certain neural aspects, either pain, itch or behavior; the phenotype that a junction of genes provide, and by visualizing genes with the use of optogenetics. Additionally, they rely on other disciplines like pharmacology, behavior and endocrinology to be able to complete their experiments. Once again, they might be working on very different aspects of neuroscience but the fact that they are scientists and researchers, brings them together on the basics of methodology and activities of their daily work.

These two scientists, Dr. Mishra and Dr. Godwin, they did not start in the same point to end in the field of neuroscience, nor they study the same aspect of the field. However, even though their lives may seem to work towards the same goal, it can be seen how it is every little aspect that actually defines what they live for. Their careers have taken them through many different paths, they have worked in several labs, and have had many changes in interest in their life, which all have shaped who they are today. They might have had the idea in mind of wanting to be scientists and answer questions about how things are and how they work, but where they are now is defined by every unique experience they have gone through. Where they will be in ten years; where the field will be in ten years cannot be foreseen now. It will depend on new discoveries, who joins the field and continues to contribute to it and what new technologies, as they both mentioned, continue to drive the exponential growth of the field. Their lives will be shaped by all of these aspects and how they react to them. At the end their lives will be the sum of their take away from every experience.

Finally, from my perspective, I can try to find the answer to every one of my questions but they will not be definite answers. I would never have imagined that a book was going to trigger my passion for neuroscience, lead me to study Neurobiology and Physiology in college and to work in a neurobiology lab before going into medical school. However, this new row in the path has allowed me to start learning about medicine, the human body and diseases from a different standpoint. By understanding the underlying mechanisms behind every aspect of the human body, how everything works and how any little disturbance of the system can have catastrophic consequences for me has been a new way of thinking about medicine, compared to the classic 'helping others' mentality. Studying neurobiology and pursuing this degree, has been an experience that has changed my way of thinking and shaped me in a specific way. I will continue to plan my journey to achieve my

passion of becoming a doctor, but that will only be something that keeps me going; what I will actually do in life and what is going to define who I'll become is in which way I decide to take advantage of my experiences and learn from them.

	1	2	3	4	5	Rating (0-5)	Weight	Rating x Weight
<b>Completeness</b>	Many required parts missing or incomplete	Between 1 and 3	A few key parts missing or incomplete	Between 3 and 5	Essay complete -introduction -references to interviews -discussion of broader themes -clear identification and discussion of what was learned from the project	5	5	25
<b>Organization</b>	No logical sequencing of information	Between 1 and 3	Information presented in somewhat logical sequence	Between 3 and 5	Information presented in logical, interesting sequence	5	5	25
<b>Relevance</b>	Essay content not relevant to project goals	Between 1 and 3	Some inappropriate sections	Between 3 and 5	Clearly relevant to project goals	5	5	25
<b>Written Presentation</b>	Many grammatical errors, incomplete sentences	Between 1 and 3	Good grammar, few errors	Between 3 and 5	Excellent grammar and sentence structure, no typographical errors	5	5	15
<b>Comments:</b> Your essay is beautifully framed and elegantly composed and contrasted the very different experiences of Drs. Mishra and Goshwin. I am so pleased with how you pulled together broader themes from their interviews, related it to your own journey, and arrived at a personal perspective that incorporates what is best about U.A. New Scientist and neuroscience in general. It has been a real pleasure to work with you on this project. Let's try to get it published so that they can benefit from what you've accomplished!					SUM (s)	N/A	25	90
					Maximum (M) [5 * Sum of Weight]	N/A	N/A	100
					Percentage (100 x [Sum of Rating x Weight/Maximum])	N/A	N/A	90%
					Letter Grade	N/A	N/A	Pass (C)