

Session 3 Guide

Visiting the Center for Biomedical Imaging (CBI) at the Medical University of South Carolina

Session Description

Neuroimaging is a critical approach to studying the structure and function of the brain. The Ambassadors will gain exposure to an area of the STEM area and give the students a real-world experience in the MRI system and models highlighted in session two's talk. The Center for Biomedical Imaging (CBI) supports two MRI systems available to the MUSC research community. During this session, the Ambassadors will tour one of the MRI systems, the mock scanner room, and engage with our neuroscience models. Through this session, the students will explore neuroscience connections to their research projects, learn how the Youth Collaborative (or similar research teams) uses neuroimaging in research studies, and gain exposure to neuroscience-related STEM fields.

Session Objective

By the end of the session, the Ambassadors will **complete the neuroscience reflection, MRI tour or activity, and at least one neuroscience station.**

Ambassadors	Near-peer Mentors	Senior Mentors
<ul style="list-style-type: none">Ambassadors who complete the MRI tour will complete at least one neuroscience station of their choice.Ambassadors who cannot complete the MRI tour will complete the MRI activity and at least one neuroscience	<ul style="list-style-type: none">Near-peer mentors support the Ambassadors at one of the neuroscience stations.One near-peer mentor will assist the Ambassadors on the MRI tour.	<p>Senior mentors will help their Ambassadors complete the neuroscience reflection activity.</p> <p>2023 Modification</p> <ul style="list-style-type: none">Reflection activity will be substituted for OurDay

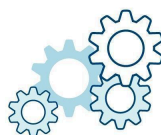
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station of their choice.		
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Session Standards and Guidelines

Next Generation Science Standards (NGSS)	
<i>This session will focus on the NGSS science and engineering practice of:</i>	
<ul style="list-style-type: none"> • Asking Questions and Defining Problems • Analyzing and interpreting data. • Constructing explanations and designing solutions. • Obtaining, evaluating, and communicating information. 	
Common Core Standards	
<ul style="list-style-type: none"> • Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. (CCSS.ELA LIT.CCRA.SL.1) • Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CCSS-RST.11-12.7) 	
The Universal Design for Learning Guidelines	
<i>Provide multiple means of engagement</i>	
<ul style="list-style-type: none"> • <u>Optimize individual choice and autonomy</u> 	<ul style="list-style-type: none"> • <u>Heighten salience of goals and objectives</u>
<ul style="list-style-type: none"> • <u>Vary demands and resources to optimize challenge</u> 	<ul style="list-style-type: none"> • <u>Promote expectations and beliefs that optimize motivation</u>
<i>Provide multiple means of representation</i>	
<ul style="list-style-type: none"> • <u>Illustrate through multiple media</u> 	<ul style="list-style-type: none"> • <u>Highlight patterns, critical features, big ideas, and relationships</u>
<i>Provide multiple means of action and expression</i>	
<ul style="list-style-type: none"> • <u>Vary the methods for response and navigation</u> 	<ul style="list-style-type: none"> • <u>Enhance capacity for monitoring progress</u>

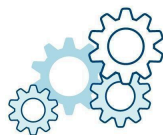


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Session Organizer and Learning Organizer

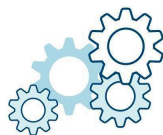
Time	Activity	Materials
4:00 – 4:25pm	<p><i>Pre-session activities</i></p> <ul style="list-style-type: none"> • Dinner will be served (Ambassadors, Near-peer mentors, Senior mentors, and the program team) • Complete session 3 feedback surveys (Ambassadors, Near-peer mentors, and Senior mentors) • Students will confirm their MRI tour group number. • Eligible* Ambassadors will complete the MRI safety forms. 	<ul style="list-style-type: none"> • Meeting Schedule projected/visible for mentors • Group schedules printed for Senior Mentors
4:15 – 4:20pm Group 1	<p><i>Group 1 Huddle at the back of the meeting space.</i></p> <ul style="list-style-type: none"> • (1) Program team member will accompany the Ambassadors. • (1) Senior Mentor with an MRI focus will accompany the Ambassadors. • (1) Near-peer Mentor with MRI training <ul style="list-style-type: none"> ○ This Near-peer mentor will be responsible for collecting the MRI Safety forms from tour participants. ○ This student will attend both tours • (6) Ambassadors (eligible for the MRI tour) 	<ul style="list-style-type: none"> • MRI safety forms
4:15 – 4:30pm Mentors and Program Team	<p><i>Senior mentors</i></p> <ul style="list-style-type: none"> • Due to limited space CBI, the tours will focus on the Ambassadors. • Senior Mentors will arrive as their schedules allow. <p><i>Near-peer mentors</i></p>	<i>Neuroscience station materials</i>



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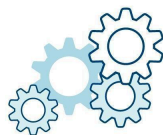
	<ul style="list-style-type: none"> The remaining near-peer mentor will prepare for their neuroscience station. <p><i>Program Team</i></p> <ul style="list-style-type: none"> She will wrap up dinner, transportation, and admin support. 	
4:20 – 4:30pm Group 1	<i>Group 1 walks over to CBI</i>	
4:25 – 4:30pm Group 2	<i>A Senior Mentor with a neuroscience focus will lead the group 2 huddle at the front of the meeting space.</i>	<ul style="list-style-type: none"> PowerPoint Projector
4:30 – 4:35pm Group 1	<p><i>Group 1 will split up into two smaller groups.</i></p> <ul style="list-style-type: none"> MRI system tour- CBI led <ul style="list-style-type: none"> (1) Program team member (3) Ambassadors MRI mock scanner tour- Mentor led <ul style="list-style-type: none"> (1) Senior Mentor (1) Near-peer Mentor (3) Ambassadors 	
4:30 – 4:55pm Group 2	<ul style="list-style-type: none"> Group 2 will complete at least one neuroscience model station. Also, each Ambassador will complete their neuroscience reflection activity on Google Classroom. Ambassadors can engage with the other neuroscience models if there is extra time. Eligible Ambassadors will complete their MRI Safety form 	<i>Neuroscience station materials</i>
4:35 – 5:00pm Group 1	<i>The Ambassadors will rotate between the MRI systems tour and MRI mock scanner tour.</i>	
4:55 – 5:00pm Group 2	<i>Group 2 will clean up their neuroscience models and meet at the back of the meeting space.</i>	



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5:00 – 5:10pm Group 1	<ul style="list-style-type: none"> ● Group 1 walks over to the meeting space. ● Halfway through, the neuroscience team will meet the students and walk them back. 	
5:00 – 5:10pm Group 2	<p><i>Group 2 walks over to CBI</i></p> <ul style="list-style-type: none"> ● Halfway through, the MRI team will meet the students and walk them back. ● The near-peer mentor will collect MRI Safety forms. 	
5:10 – 5:15pm Group 1	<p><i>A Senior Mentor with a neuroscience focus will lead the group 1 huddle at the front of the meeting space.</i></p>	
5:10 – 5:15pm Group 2	<p><i>Group 2 will split up into two smaller groups.</i></p> <ul style="list-style-type: none"> ● MRI system tour- CBI led <ul style="list-style-type: none"> ○ (1) Program team member ○ (3) Ambassadors ● Mock scanner tour- Mentor led <ul style="list-style-type: none"> ○ (1) Senior Mentor ○ (1) Near-peer Mentor ○ (3) Ambassadors 	
5:15 – 5:45pm Group 1	<ul style="list-style-type: none"> ● Group 1 will complete at least one neuroscience model station. ● Also, each Ambassador will complete their neuroscience reflection activity on Google Classroom. ● Ambassadors can engage with the other neuroscience models if there is extra time. ● Students who did not participate in the MRI tour will complete an MRI-related activity during this rotation. 	<i>Neuroscience station materials</i>



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5:15 – 5:40pm Group 2	<i>The Ambassadors will rotate between the MRI systems tour and MRI mock scanner tour.</i>	
5:15 – 5:40pm Group 2 (not eligible for the MRI tour)	<ul style="list-style-type: none"> Students who did not participate in the MRI tour will complete an MRI-related activity during this rotation. 	
5:40 – 5:50pm Group 2	<ul style="list-style-type: none"> Group 2 walks over to the meeting space. If the group returns early, they will start working on the session 3 feedback survey. 	
5:45 – 5:50pm Group 1	<ul style="list-style-type: none"> Group 1 will clean up their neuroscience models. Ambassadors will complete the session 3 feedback survey. 	
5:50 – 6:00pm Everyone	<p><i>Closing</i></p> <ul style="list-style-type: none"> Introducing next week's session- Building Confidence Guest Speaker Spotlight 	

Learning Activities (Neuroscience Stations)

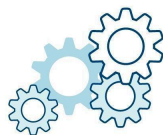
All Ambassadors will complete the neuroscience reflection station.

- Ambassadors who complete the MRI tour will meet at least one neuroscience station of their choice.
- Ambassadors who cannot complete the MRI tour will complete the MRI activity and at least one neuroscience station of their choice.

“MUSC Ourday” Station (2023 Modification)

OurDay is a cloud-based Workday platform utilized by MUSC employees and volunteers.

Students will use their net IDs to log into the MUSC OurDay system at this station using their assigned iPads, to ensure access.



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Brain Model Station

At this station, the Ambassador will see a real human brain and explore myths about the brain. Our brain and central nervous system serve as the base for neuroscience. The brain plays such a critical role in all our lives. It is incredible to share this experience with the Ambassadors. We estimate that this station will take 5-7 minutes.

Directions

1. Ren will showcase the brain and highlight distinct parts of the brain.
2. The Ambassador, Ren, and Near-peer mentor will talk about distinct parts of the brain using their hands as a point of reference.
3. The Ambassador, Ren, and Near-peer mentor will play a brain-themed myth or truth.

Neuron Station

Neurons are the basic unit of cells for our central nervous system. We have over 100 billion neurons in our bodies. When neurons communicate with each other, they release chemicals called neurotransmitters. At this station, Ambassadors will learn about the anatomy of the neuron and more about the types of neurotransmitters we focus on within the Youth Collaborative research. Through devices like MRI, our team can learn more about these neurons. Overall, this station will help our Ambassadors connect to topics discussed in sessions 2-3. We estimate completing this station will take groups 7-10 minutes.

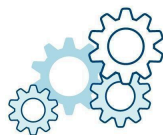
Directions

1. A mentor will lead the students through the neuron background information.
2. The students will have the chance to build a neuron using pipe cleaners.
3. The group will play a game to learn more about the diverse types of neurotransmitters.

Neurotransmission Station

Neurotransmission is the process that allows neurons to communicate with each other. We will demonstrate this process at this station in a few different methods. The purpose of this station is to serve as an extension of the topics introduced in the neuron station. We estimate completing this station will take groups 7-10 minutes.

1. Telephone



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2. Neurotransmission models.

Extension Activities

- <https://www.dana.org/wp-content/uploads/2019/05/fact-sheet-9-12-how-does-brain-develop.pdf>

Impairment Goggles Station

The alcohol and cannabis impairment goggles are designed to mimic the altered perception that individuals may experience when under the influence of these respective substances. Through this simulated experience, students will have an understanding of how these substances can affect cognitive and motor functions.

Directions:

1. *The Jenga game will be set up on a table.*
2. *Students will attempt to play the game while wearing a set of the goggles*

VR Headset Station

At this station students will explore the effects of alcohol on the brain using the VR set and a virtual game from the National Institute on Alcohol Abuse and Alcoholism (NIAAA), part of the National Institutes of Health (NIH). The game takes players on a virtual rollercoaster ride through the brain to learn about alcohol's effects on the primary brain areas affected by alcohol. Stops include the prefrontal cortex, nucleus accumbens, amygdala, hippocampus, and cerebellum.

