Updated Evaluation Plan of the West Virginia Higher Education Policy Commission: West Virginia Network for Functional Neuroscience and Transcriptomics (WV-NFNT) Project

NSF Established Program to Stimulate Competitive Research (EPSCoR) Track I Program
NSF Project number: OIA2242771

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Evaluation Questions and Purpose

The West Virginia Higher Education Policy Commission: West Virginia Network for Functional Neuroscience and Transcriptomics (WV-NFNT) project is a five-year project (2023-2028) funded by the National Science Foundation's (NSF) Established Program to Stimulate Competitive Research (EPSCoR) Track I program. The evaluation questions and purpose are described below.

Evaluation Questions

- **EQ 1 - (Project Goals 1 and 2: Advance Research Infrastructure and Productivity)**: To what extent has the project been successful in building institutional capabilities in functional neuroscience, including technologies and expertise needed for high resolution structure-function studies of synaptic and circuit plasticity?
- **EQ 2 - (Project Goal 3: Increase Participation)**: To what extent has the project used effective strategies to broaden participation in Science, Technology, Engineering, and Math (STEM) among all citizens, including first-generation college students?
- **EQ 3 - (Project Goal 4: Education and Workforce Development)**: In what ways has the project improved preparation of students, teachers, and early career faculty to create a pipeline for the STEM workforce, specifically in data science and neuroscience?
- **EQ 4 - (Project Goal 5: Partnerships and Stakeholders)**: To what extent has a cooperative, mutually beneficial relationship developed between researchers, stakeholder groups, and the community?
- **EQ 5 -** (**Project Goal 6: Management and Dissemination):** To what extent has the project used effective strategies to achieve project goals and communicate with stakeholders?

Evaluation Purpose

The evaluation of the WV-NFNT EPSCoR Track I project is intended to provide the project leadership team with information regarding project implementation and progress made towards project goals.

Anticipated Evaluation Methods

The evaluation of the WV-NFNT EPSCoR Track I project will include both formative (process) evaluation to monitor the implementation quality of activities and strategies and to provide ongoing feedback to the team and summative (outcome) evaluation to assess achievement of goals and objectives. External evaluators will continuously work with the leadership team to develop and refine the evaluation plan, logic model, and data collection instruments.

Formative Evaluation and Analyses

External evaluators and the project leadership team will finalize output goals and adjust them throughout the award period when necessary. Evaluators will ask for feedback on project activities using formative methods including participant surveys, document review, project tracking, and interviews. Evaluators will share and discuss feedback with leadership in project meetings. The following questions will guide the formative evaluation of the EPSCoR program: To what extent 1) Are leaders implementing effective strategies and activities to successfully achieve project goals and communicate with stakeholders? 2) Is the project on schedule and expected to meet output goals? 3) Are there obstacles limiting successful implementation of the project? How can they be overcome? 4) Are participants satisfied with project activities? 5) Are

the right strategies being used to ensure sustainability of project components? 6) Are there any unexpected outcomes developing because of the project?

Program implementation and activities will be assessed through surveys, which will include both scale and open-ended questions for comprehensive feedback. Evaluators will use an annual survey to assess participant satisfaction, perception of usefulness, and achievement of objectives for project components. Interviews will be used to obtain feedback regarding facilitators and barriers to program implementation. The evaluators will also request tracking data collected by program leaders regarding the number of participants recruited and participation in program activities. Evaluators will share formative evaluation findings with leaders and discuss recommendations for improving the program.

Summative Evaluation and Analyses

Multiple data sources, including surveys, focus groups, and interviews, will be used to monitor outputs and determine the extent to which project outcomes are being met. The summative evaluation will include a mixed-methods approach to analyze data sources, including descriptive and inferential statistics (e.g., ANOVA, t-test, or nonparametric tests for small sample sizes) for comparisons of baseline to post data and between-group comparisons (e.g., students vs. faculty) as well as thematic analysis of qualitative data, where appropriate. Evaluators will also monitor feedback provided by NSF.

Logic Model

Evaluators and project leads worked together extensively to generate a comprehensive logic model that captures and categorizes all of the project's components. The logic model is displayed in two panels below. All items in the activities and outputs that are surrounded by [brackets] represent collaborating parties that will contribute to the accomplishment of the relevant activity and/or output. See Table 1 for a legend of collaborator acronyms and definitions. Figure 1 shows all the relevant components of the logic model for project Goals 1, 2, and 3. Due to the similarity of the activities and outputs for Goals 1 and 2, these goals share the same activities/outputs, and short-, medium-, and long-term outcomes. Figure 2 displays all the relevant components for Goal 4, 5, and 6. All inputs are the same across both panels, and the double-sided arrows indicate the mutual influence between the activities related to each of the project's goals and should be interpreted as existing between and across all the project's goals.

Legend	
Acronym/Collaborator's Name	**Definition**
Brain Camp	Annual camp where high school (HS) teachers use their PBI training for neuroscience/data science instruction of K-12 students, hosted by WVU (Y1), MU and WVSU (Y2-5), and SU (Y2-4)
CodeWV/Code.org	Partnership between Code.org and WVU; they develop computer science curriculum for K-12 computer science education
EAB	External Advisory Board
EPSCoR	Established Program to Stimulate Competitive Research
EWD Team	Education and Workforce Development Team
Faculty Mentors	Early-career faculty mentors and/or faculty who mentor undergraduates
First2	Alliance First2 Student Success Network
HEPC	Higher Education Policy Commission, Dr. Strait
HBCUs	Historically Black Colleges and Universities
HS Teachers	High school teachers
HSTA	Health Sciences and Technology Academy
IAB	Industry Advisory Board
KY-WV LSAMP	Includes but not limited to 18 colleges and universities and 9 community colleges in WV working to broaden participation in STEM disciplines
MU	Marshall University
MU, SU, WVSU and WVU Faculty	Faculty not already funded by the proposal to pursue high-risk, high-impact, or potentially transformative research in functional neural mechanisms
NYSA	National Youth Science Academy
Project Leads (ELT)	Project Leads (Executive Leadership Team)
PUIs	Primarily Undergraduate Institutions
Researchers	Faculty researchers contributing to Goal 1 and/or Goal 2
STEM Education Faculty	Faculty in Education departments who specialize in training others how to teach STEM subjects
STEM Faculty	Faculty who teach STEM
SU	Shepherd University
UPR	University of Puerto Rico
WV GEAR UP	West Virginia's Gaining Early Awareness and Readiness for Undergraduate Programs
WV Science Adventures	West Virginia Science Adventures
WVDE	West Virginia Department of Education
WVSU	West Virginia State University
WVU	West Virginia University

Table 1. Legend of acronyms and definitions of the logic model's collaborating parties, as indicated in the logic model by [brackets]; does not include all collaborating parties in the logic model.

Logic Model (Goals 1-3)

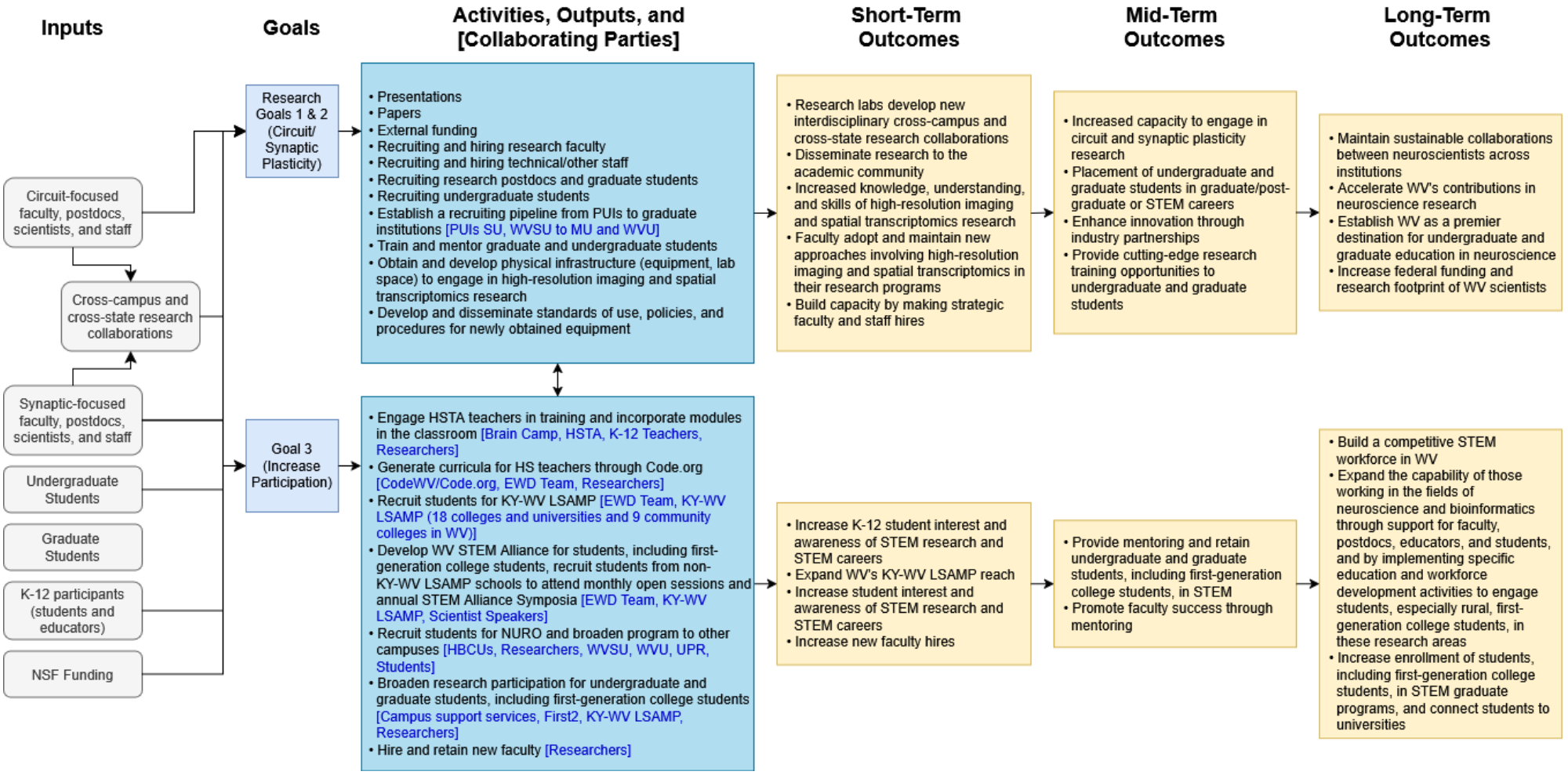

Figure 1. Logic Model of project Goals 1, 2, and 3.

Logic Model (Goals 4-6)

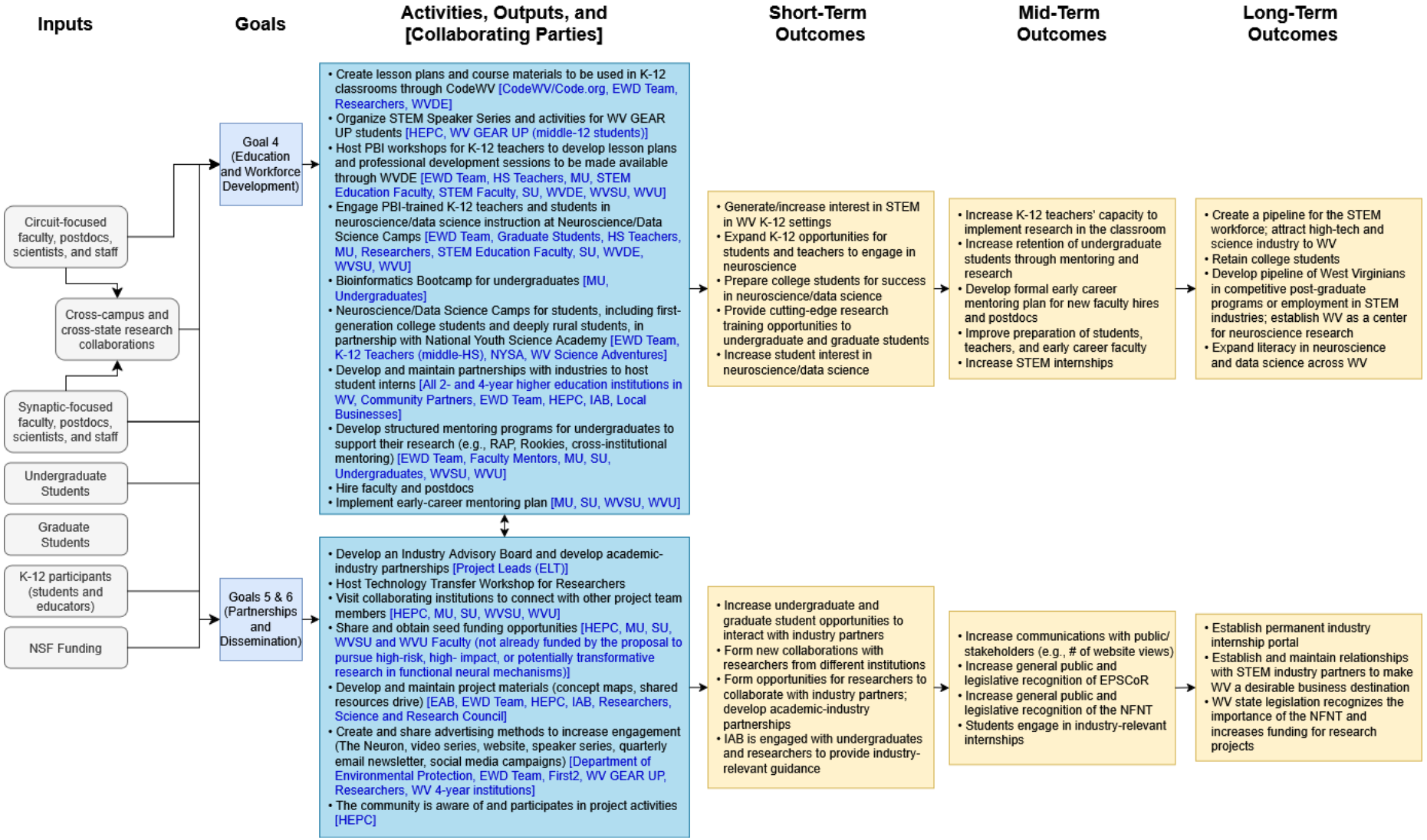

Figure 2. Logic Model of project Goals 4, 5, and 6.

Links Between the Logic Model and Specific Aims

Activities and Outputs

Table 2 below links the activities and outputs from the logic model to each corresponding specific aim. Items included in [brackets] indicate the collaborating parties that will contribute to the relevant activity or output.

Project Goal | Logic Model Activities and Outputs	Specific Aims
Goals 1 & 2	
Presentations	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6
Papers	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6
External funding	1.1, 1.4, 1.5, 2.3, 2.5, 2.6
Recruiting and hiring research faculty	4.6.4, 4.4.3
Recruiting and hiring technical/other staff	1.5, 2.7
Recruiting research postdocs and graduate students	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6
Recruiting undergraduate students	4.6.3
Establish a recruiting pipeline from PUIs to graduate institutions [PUIs SU, WVSU to MU and WVU]	4.6.4, Goal 5 Obj 2
Train and mentor graduate and undergraduate students	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7
Obtain and develop physical infrastructure (equipment, lab space) to engage in high-resolution imaging and spatial transcriptomics research	1.6, 1.7, 2.7
Develop and disseminate standards of use, policies, and procedures for newly obtained equipment	1.6, 1.7, 2.7
Goal 3	
Engage HSTA teachers in training and incorporate modules in the classroom [Brain Camp, HSTA, K-12 Teachers, Researchers]	4.6.2
Generate curricula for HS teachers through Code.org [CodeWV/Code.org, EWD Team, Researchers]	4.6.5
Recruit students for KY-WV LSAMP [EWD Team, KY-WV LSAMP (18 colleges and universities and 9 community colleges in WV)]	4.6.1
Develop WV STEM Alliance for students, including first-generation college students, recruit students from non-KY-WV LSAMP schools to attend monthly open sessions and annual STEM Alliance Symposia [EWD Team, KY-WV LSAMP, Scientist Speakers]	4.6.1
Recruit students for NURO and broaden program to other campuses [HBCUs, Researchers, WVSU, WVU, UPR, Students]	4.6.4
Broaden research participation for undergraduate and graduate students, including first-generation college students [Campus support services, First2, KY-WV LSAMP, Researchers]	4.6.4, 4.4.3
Hire and retain new faculty [Researchers]	4.6.7, 4.4.3
Goal 4	
Create lesson plans and course materials to be used in K-12 classrooms through CodeWV [CodeWV/Code.org, EWD Team, Researchers, WVDE]	4.4.1.1

Organize STEM Speaker Series and activities for WV GEAR UP students [HEPC, WV GEAR UP (middle-12 students)]	4.4.1.5
Host PBI workshops for K-12 teachers to develop lesson plans and professional development sessions to be made available through WVDE [EWD Team, HS Teachers, MU, STEM Education Faculty, STEM Faculty, SU, WVDE, WVSU, WVU]	4.4.1.2
Engage PBI-trained K-12 teachers and students in neuroscience/data science instruction at Neuroscience/Data Science Camps [EWD Team, Graduate Students, HS Teachers, MU, Researchers, STEM Education Faculty, SU, WVDE, WVSU, WVU]	4.4.1.3
Bioinformatics Bootcamp for undergraduates [MU, Undergraduates]	4.4.2.3
Neuroscience/Data Science Camps for students, including first-generation college students and deeply rural students, in partnership with National Youth Science Academy [EWD Team, K-12 Teachers (middle-HS), NYSA, WV Science Adventures]	4.4.1.4
Develop and maintain partnerships with industries to host student interns [All 2- and 4-year higher education institutions in WV, Community Partners, EWD Team, HEPC, IAB, Local Businesses]	4.4.2.2
Develop structured mentoring programs for undergraduates to support their research (e.g., RAP, Rookies, cross-institutional mentoring) [EWD Team, Faculty Mentors, MU, SU, Undergraduates, WVSU, WVU]	4.4.2.1
Hire faculty and postdocs	4.6.4, 4.4.3
Implement early-career mentoring plan [MU, SU, WVSU, WVU]	4.4.3
Goals 5 & 6	
Develop an Industry Advisory Board and develop academic-industry partnerships [Project Leads (ELT)]	G5, Obj 1
Host Technology Transfer Workshop for Researchers	G5, Obj 1
Visit collaborating institutions to connect with other project team members [HEPC, MU, SU, WVSU, WVU]	G5, Obj 2
Share and obtain seed funding opportunities [HEPC, MU, SU, WVSU and WVU Faculty (not already funded by the proposal to pursue high-risk, high- impact, or potentially transformative research in functional neural mechanisms)]	G5, Obj 2
Develop and maintain project materials (concept maps, shared resources drive) [EAB, EWD Team, HEPC, IAB, Researchers, Science and Research Council]	G5, Obj 3
Create and share advertising methods to increase engagement (The Neuron, video series, website, speaker series, quarterly email newsletter, social media campaigns) [Department of Environmental Protection, EWD Team, First2, WV GEAR UP, Researchers, WV 4-year institutions]	G5, Obj 4
The community is aware of and participates in project activities [HEPC]	G5, Obj 4

Table 2. Logic model activities and outputs and their corresponding specific aims.

Theory of Change

The Theory of Change model aims to build a robust STEM ecosystem in West Virginia by fostering industry partnerships, enhancing K-12 and undergraduate STEM education, supporting students and faculty, and increasing public engagement and research capacity. This comprehensive approach seeks to achieve sustained growth in STEM talent and industry engagement, thereby positioning West Virginia as a competitive hub for STEM research and business. Evaluators and project leads worked together to develop an activity focused Theory of Change model that maps activities and outputs onto their desired short-, medium-, and long-term outcomes. The Theory of Change model is displayed in multiple panels below due to its size. Figures 3-6 display the relevant components of the Theory of Change model across all project Goals.

Activity Focused Theory of Change (Goals 1 & 2)

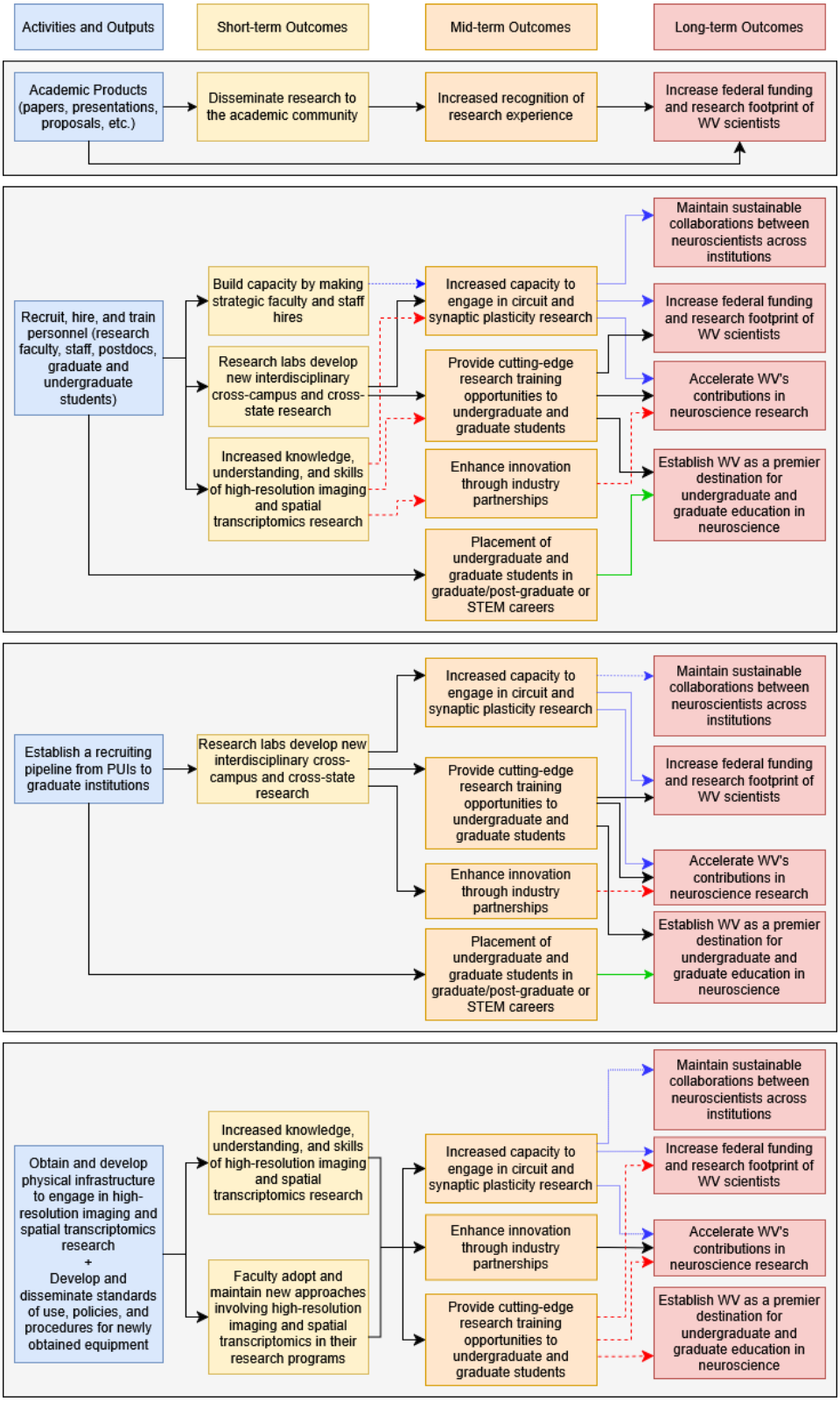

Figure 3. Activity focused Theory of Change model for project Goals 1 and 2.

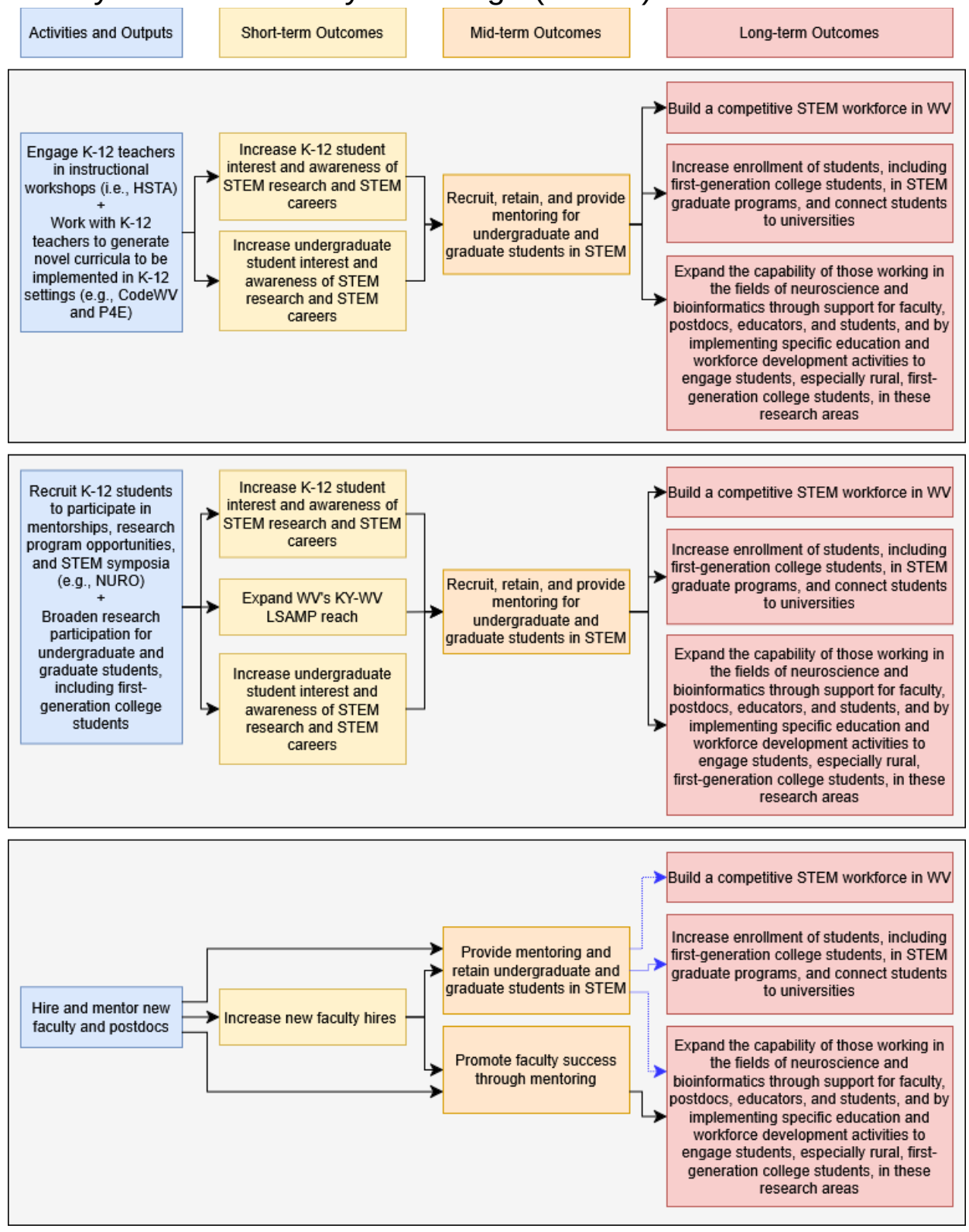

Figure 4. Activity focused Theory of Change model for project Goal 3.

Activity Focused Theory of Change (Goal 4)

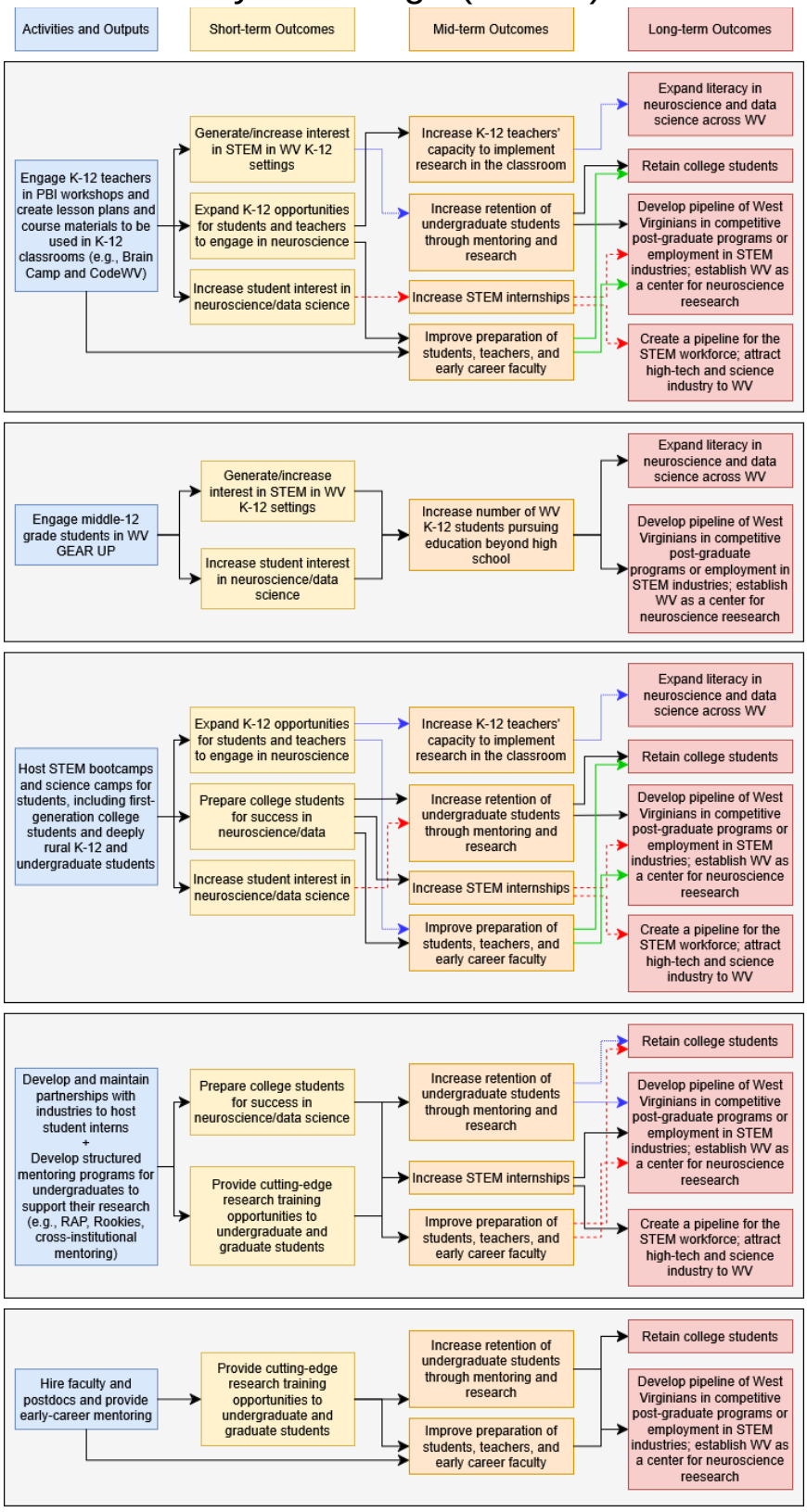

Figure 5. Activity focused Theory of Change model for project Goal 4.

Activity Focused Theory of Change (Goals 5 & 6)

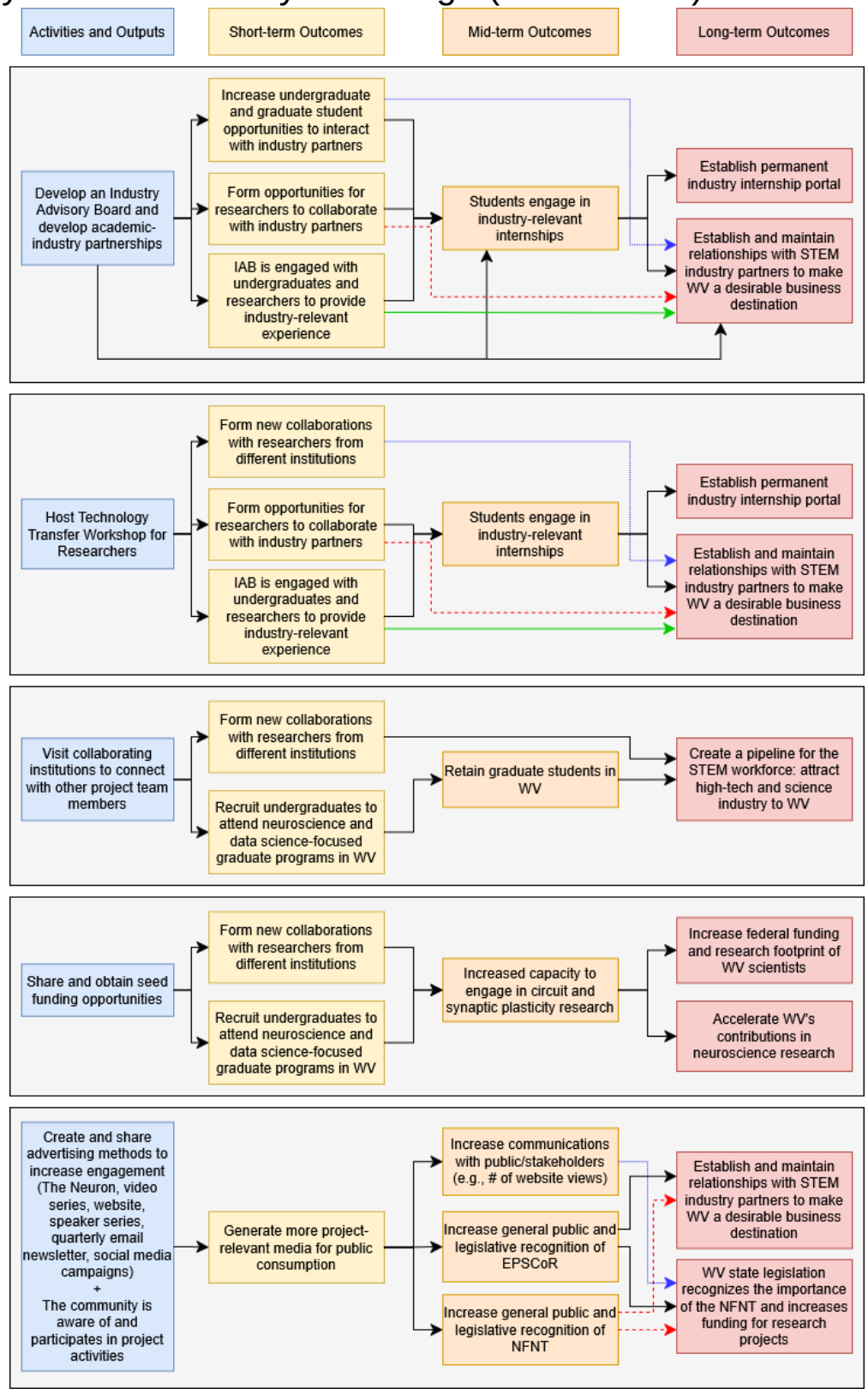

Figure 6. Activity focused Theory of Change model for project Goals 5 and 6.

Proposed Measurement Sources for Logic Model Activities and Outputs

Evaluators and project leads worked together to identify relevant data collection events for each of the specific aims, milestones, and metrics of project activities. Project leads will collect updates on progress towards metrics for all milestones for all specific aims as outlined in the Strategic Plan and share these updates with evaluators annually. Table 3 below shows the expected source of data for evaluating each of the activities and outputs of the logic model. Not included in this table are focus groups with undergraduate mentees (which will be developed and implemented in project year two), and the utilization of three activity surveys which will be used to evaluate three different project-supported activities. Project leads have identified two project-supported activities for these activity surveys: 1) undergraduate students' research experiences with Marshall University, West Virginia State University, and Shepherd University (Objective 4.4.2.1), and 2) the project-based instruction training and implementation camps to be held across multiple institutions each summer (Objectives 4.4.1.2 and 4.4.1.3). Project leads are working with evaluators to determine the feasibility of re-scoping the third proposed activity survey to become a follow-up survey used to track the long-term impact of project participation on undergraduate students' intentions and successes in pursuing STEM- and neuroscience-related graduate training and careers, to be implemented in project years two through five. See Appendix B for a similar table that links the logic model's short-, medium-, and long-term outcomes to data collection events.

Project Goal	Activity/Output	Project Tracking	Annual Survey	Interviews
Goals 1 & 2				
Presentations		X	X	X
Papers		X	X	X
External funding		X		
Recruiting and hiring research faculty		X	X	X
Recruiting and hiring technical/other staff		X	X	X
Recruiting research postdocs and graduate students		X	X	X
Recruiting undergraduate students		X	X	X
Establish a recruiting pipeline from PUIs to graduate institutions [PUIs SU, WVSU to MU and WVU]			X	X
Train and mentor graduate and undergraduate students		X	X	X
Obtain and develop physical infrastructure (equipment, lab space) to engage in high-resolution imaging and spatial transcriptomics research		X	X	X
Develop and disseminate standards of use, policies, and procedures for newly obtained equipment		X	X	X
Goal 3				
Engage HSTA teachers in training and incorporate modules in the classroom [Brain Camp, HSTA, K-12 Teachers, Researchers]		X		
Generate curricula for HS teachers through Code.org [CodeWV/Code.org, EWD Team, Researchers]		X		X
Recruit students for KY-WV LSAMP [EWD Team, KY-WV LSAMP (18 colleges and universities and 9 community colleges in WV)]		X	X	X
Develop WV STEM Alliance for students, including first-generation college students, recruit students from non-KY-WV LSAMP schools to attend monthly open sessions and annual		X	X	X

STEM Alliance Symposia [EWD Team, KY-WV LSAMP, Scientist Speakers]			
Recruit students for NURO and broaden program to other campuses [HBCUs, Researchers, WVSU, WVU, UPR, Students]	X	X	X
Broaden research participation for undergraduate and graduate students, including first-generation college students [Campus support services, First2, KY-WV LSAMP, Researchers]	X	X	X
Hire and retain new faculty [Researchers]	X		
Goal 4			
Create lesson plans and course materials to be used in K-12 classrooms through CodeWV [CodeWV/Code.org, EWD Team, Researchers, WVDE]	X	X	X
Organize STEM Speaker Series and activities for WV GEAR UP students [HEPC, WV GEAR UP (middle-12 students)]	X	X	X
Host PBI workshops for K-12 teachers to develop lesson plans and professional development sessions to be made available through WVDE [EWD Team, HS Teachers, MU, STEM Education Faculty, STEM Faculty, SU, WVDE, WVSU, WVU]	X	X	X
Engage PBI-trained K-12 teachers and students in neuroscience/data science instruction at Neuroscience/Data Science Camps [EWD Team, Graduate Students, HS Teachers, MU, Researchers, STEM Education Faculty, SU, WVDE, WVSU, WVU]	X	X	X
Bioinformatics Bootcamp for undergraduates [MU, Undergraduates]	X	X	X
Neuroscience/Data Science Camps for students, including first-generation college students and deeply rural students, in partnership with National Youth Science Academy [EWD Team, K-12 Teachers (middle-HS), NYSA, WV Science Adventures]	X	X	X
Develop and maintain partnerships with industries to host student interns [All 2- and 4-year higher education institutions in WV, Community Partners, EWD Team, HEPC, IAB, Local Businesses]	X	X	X
Develop structured mentoring programs for undergraduates to support their research (e.g., RAP, Rookies, cross-institutional mentoring) [EWD Team, Faculty Mentors, MU, SU, Undergraduates, WVSU, WVU]	X	X	X
Hire faculty and postdocs	X		
Implement early-career mentoring plan [MU, SU, WVSU, WVU]	X	X	X
Goals 5 & 6			
Develop an Industry Advisory Board and develop academic-industry partnerships [Project Leads (ELT)]	X	X	X
Host Technology Transfer Workshop for Researchers	X	X	X
Visit collaborating institutions to connect with other project team members [HEPC, MU, SU, WVSU, WVU]	X	X	X
Share and obtain seed funding opportunities [HEPC, MU, SU, WVSU and WVU Faculty (not already funded by the proposal to pursue high-risk, high- impact, or potentially transformative research in functional neural mechanisms)]	X		X
Develop and maintain project materials (concept maps, shared resources drive) [EAB, EWD Team, HEPC, IAB, Researchers, Science and Research Council]	X	X	X
Create and share advertising methods to increase engagement (The Neuron, video series, website, speaker series, quarterly email newsletter, social media campaigns) [Department of	X	X	X

Environmental Protection, EWD Team, First2, WV GEAR UP, Researchers, WV 4-year institutions]			
The community is aware of and participates in project activities [HEPC]	X		X

Table 3. Proposed data collection events to evaluate project's activities and outputs as identified in the logic model.

As outlined above, the guiding evaluation questions are aligned with the goals of the NFNT program and aimed at evaluating the impact of the program on participants, faculty, and the universities. Table 4 below summarizes the concepts measured, evaluation methods, and proposed data collection timeline.

Outcome success indicator	**Sample**	**Data source (type)**	**Data timing**
Advance research infrastructure and productivity - Evaluation question (EQ) 1: To what extent has the project been successful in building institutional capabilities in functional neuroscience, including technologies and expertise needed for high resolution structure-function studies of synaptic and circuit plasticity?			
Advanced research (e.g., met all research output goals and objectives); Dissemination of research to academic community (e.g., # of publications, presentations); Enhanced interdisciplinary collaboration externally and internally (e.g., # of co-authored publications); Enhanced innovation through partners (e.g., # of products)	Program-funded participants; research leader team; leadership team, industry and outside collaborators	Tracking data; annual survey; EAB & seed grant reports; institutional data; interviews	Tracking data yearly; reports as available; interviews in yrs. 1, 3, & 5
Increase Participation - EQ 2: To what extent has the project used effective strategies to broaden participation in STEM among all citizens, including first-generation college students?			
Increased percentage students, including first-generation college students, retained in STEM and with an interest in STEM careers, enrolled in STEM graduate programs, and connected to universities; New faculty hires	K-12, undergraduate, and graduate students	Annual survey; institutional data; tracking data; trainee follow-up survey	Survey, institutional and tracking data yearly; trainee follow-up survey in yrs. 2-5
Education and Workforce Development - EQ 3: In what ways has the project improved preparation of students, teachers, and early career faculty to create a pipeline for the STEM workforce, specifically in data science and neuroscience?			
Improved effectiveness of STEM education; Increased technical (e.g., genetic, imaging, spatial transcriptomics) & professional (e.g., time management, science communication) skills; Increased interest in/intention to pursue STEM, retention in STEM, confidence & self-efficacy, and job readiness; Increased teacher preparedness to teach STEM	K-12 teachers and EWD leads; undergraduate and graduate student activity participants; undergraduate mentees	Annual survey; tracking data; activity surveys; focus groups; trainee follow-up survey	Activity surveys as activities are scheduled; interviews in yrs. 1, 3, & 5; focus groups in yrs. 2 & 4; trainee follow-up survey in yrs. 2-5
Partnerships and Stakeholders - EQ 4: To what extent has a cooperative, mutually beneficial relationship developed between researchers, stakeholder groups, and the community?			
Enhanced internal/external collaborations (e.g., # research projects, # of partners, use of intellectual resources)	Project participants; faculty and external partners	Annual survey; tracking data; interviews	Annual survey and tracking data each year; interviews in yrs. 1, 3, & 5

Project management and dissemination – EQ 5: To what extent has the project used effective strategies to achieve project goals and communicate with stakeholders?			
Satisfaction with and frequency of communication and collaboration; Increased communications with public/stakeholders (e.g., website views)	Project participants; faculty and external partners	Annual survey; tracking data; interviews	Annual survey and tracking data each year; interviews in yrs. 1, 3, & 5

Table 4. Evaluation questions with outcomes, samples, data sources, and data timing.

Data Collection

The evaluation uses a variety of data collection methods including annual surveys, activity surveys, tracking data, institutional data, interviews, focus groups, EAB and seed grant reports, and a trainee follow-up survey. Data are collected from different groups such as program participants, undergraduate mentees, K-12 teachers, EWD leads, faculty, and external partners. Surveys and tracking data are gathered yearly, while interviews and focus groups occur periodically throughout the duration of the project. Year 1 data collection procedures consist of project tracking data, activity surveys, and interviews, which are further described below.

Project Tracking Data

Project tracking data are used to provide systematic documentation of the project's activities, outputs, and outcomes. Evaluators will work with project leads to gather and summarize project tracking data to describe program participants. These data include various metrics such as participation rates, progress toward milestones, completion of key tasks, and the achievement of specific objectives. Specifically, project tracking data will include key demographics such as project role, institution, and whether participants are first-generation college students.

Activity Surveys

Activity surveys will be developed and administered in Years 1-5 as activities are scheduled to assess education and workforce development, improved effectiveness of STEM education, increased technical (e.g., genetic, imaging, spatial transcriptomics) and professional skills (e.g., time management, science communication), increased interest in/intention to pursue STEM, retention in STEM, confidence and self-efficacy, and job readiness, and increased teacher preparedness to teach STEM.

Interviews

Interviews will be conducted with faculty, students, and external partners in Years 1, 3, and 5 to gain further understanding of individual perspectives on advanced research infrastructure and productivity, partnerships and stakeholders, and project management and dissemination. In addition, interviews will be used to assess enhanced interdisciplinary collaboration both externally and internally, as well as satisfaction with communication and collaboration.

Reporting

In accordance with NSF guidelines, the evaluators provided a detailed evaluation plan in February of 2024. In February of 2025, an annual report will be provided that covers progress towards goals and addresses evaluation questions based on data collected during both project Years 1 and 2. In February of Years 3-4, annual reports will cover progress towards goals and answer evaluation questions based on data collected during those years. In 2028, for project Year 5, evaluators will provide a summative evaluation that includes findings across all years of the project's evaluation.

Project Evaluation Timeline

Table 5 outlines the timeline of evaluation activities. Evaluators will share quarterly progress reports detailing the activities performed and share formative evaluation findings with the leadership team on a regular basis. An Annual Report will be provided in Years 2-4 that includes the results of any surveys, interviews, and program tracking data collected that year (Years 1 and 2 data will be included in the Year 2 report), as well as key findings and recommendations. Evaluators will provide a Summative Evaluation Report in Year 5 that will include comprehensive information on interview findings, survey data findings, and program tracking information from the final year of the project, as well as trends from across project years. Evaluators will also provide key findings and recommendations for the overall project. The program leaders will use the evaluation findings and recommendations to refine program activities and track progress made in goal areas. The evaluation team will work with program leaders to disseminate findings from evaluation results to stakeholders, such as through annual meetings, newsletters, and/or the project website.

	Year 1	Year 2	Year 3	Year 4	Year 5
Refine evaluation plan/logic model (detailed eval plan in Y1)	X	X	X	X	X
Develop instruments (Y1); refine evaluation instruments (Y2-5)	X	X	X	X	X
Attend monthly program meetings and annual meeting	X	X	X	X	X
Collect program archival data	X	X	X	X	X
Administer annual progress survey (baseline and annual post)		X	X	X	X
Conduct interviews with faculty, interns, and external partners	X		X		X
Conduct focus groups with undergraduate mentees		X		X	
Administer activity surveys	X	X	X	X	X
Administer trainee follow-up survey		X	X	X	X
Quarterly progress reports	X	X	X	X	X
Annual evaluation report		X	X	X	
Summative evaluation report					X

Table 5. Timeline of evaluation activities.

Appendix A. Table of Specific Aims for Logic Model Entries

Specific Aim Number	Specific Aim Description
1.1	Build jurisdictional capabilities in understanding circuit plasticity regarding functional connectivity between identified cell types as they emerge or are modified
1.2	The cortical circuits underlying texture discrimination in mice
1.3	Neural plasticity after developmental delay by dietary nutrient restriction
1.4	Development of the excitation/inhibition (E/I) ratio oscillation
1.5	Development and vulnerability of hypothalamic stress circuitry
1.6	Capacity Building: Physical Infrastructure MERSCOPE (installation and setup at WVU, sample prep and validation, MERSCOPE/MERFISH experiments)
1.7	Capacity Building: Physical Infrastructure (install STED microscope at WVU)
2.1	Determine the sex-specific molecular code of functional and structural neuronal connectivity in mouse auditory cortex (AC).
2.2	Evaluating the impact of early exposure to nicotine on long-term addiction-related behaviors
2.3	Resolving capsaicin-induced neuronal effects through comparative spatial transcriptome
2.4	The effects of adolescent binge drinking on tripartite synapse integrity
2.5	Characterize the effects of early life opioid exposure on neuronal and astrocytic structural synaptic development (C. Risher, MU).
2.6	Disruption of tripartite synapse by low-level silver nanoparticles (AgNPs) in the striatum
2.7	Capacity Building: Physical Infrastructure (install STED microscope, cryostat and data server at MU)
4.4.1.1	High quality teacher professional development through CodeWV
4.4.1.2	Immerse in-service educators in training and development of neuroscience/data science summer camps and Project Based Instruction
4.4.1.3	Engage HS teachers and students in neuroscience/data science at Brain Camp
4.4.1.4	Neuroscience/Data Science Camps for students, including first-generation college students and deeply rural students, in partnership with National Youth Science Academy
4.4.1.5	STEM Speakers Series collaboration with WV GEAR UP
4.4.2.1	Incorporate a formal mentoring structure and support early-career undergraduate research in neuroscience and data science
4.4.2.3	Bioinformatics Bootcamp
4.4.3	Capacity Building: Human Infrastructure (faculty hires and develop formal early career mentoring plan for new faculty hires and postdocs)
4.6.1	Establish WV STEM Alliance for students, including first-generation college students
4.6.2	Use existing HSTA infrastructure to excite HS students
4.6.3	Broaden participation in undergraduate research opportunities

4.6.4	Broaden participation in graduate research opportunities
4.6.5	Develop the computer science K-12 pipeline through CodeWV
4.6.7	Hire and retain new faculty
G5, Obj 1	Create Industry Advisory Board and engage them with the project themes for the benefit of students and researchers
G5, Obj 2	Build multiple partnerships and collaborations based upon the contributions and connections between the partner institutions: WVU, MU, SU, and WVSU
G5, Obj 3	Create cross-collaboration between Themes and WGs
G5, Obj 4	The community is aware of and participates in project activities

Appendix B. Table of Short-, Medium-, and Long-Term Outcomes Linked to Logic Model and Proposed Data Collection Events

Project Goal	Short-term Outcomes	Project Tracking	Annual Survey	Interviews
Goals 1 & 2				
Research labs develop new interdisciplinary cross-campus and cross-state research collaborations		X	X	X
Disseminate research to the academic community		X	X	X
Increased knowledge, understanding, and skills of high-resolution imaging and spatial transcriptomics research			X	X
Faculty adopt and maintain new approaches involving high-resolution imaging and spatial transcriptomics in their research programs			X	X
Build capacity by making strategic faculty and staff hires		X	X	X
Goal 3				
Increase K-12 student interest and awareness of STEM research and STEM careers		X		X
Expand WV's KY-WV LSAMP reach		X	X	X
Increase student interest and awareness of STEM research and STEM careers			X	X
Increase new faculty hires		X		
Goal 4				
Generate/increase interest in STEM in WV K-12 settings		X	X	X
Expand K-12 opportunities for students and teachers to engage in neuroscience		X	X	X
Prepare college students for success in neuroscience/data science			X	X
Provide cutting-edge research training opportunities to undergraduate and graduate students			X	X
Increase student interest in neuroscience/data science		X	X	X
Goal 5				
Increase undergraduate and graduate student opportunities to interact with industry partners		X	X	X
Form new collaborations with researchers from different institutions		X	X	X
Form opportunities for researchers to collaborate with industry partners; develop academic-industry partnerships			X	X
IAB is engaged with undergraduates and researchers to provide industry-relevant guidance			X	X
Project Goal	**Medium-term Outcomes**	**Project Tracking**	**Annual Survey**	**Interviews**
Goals 1 & 2				
Increased capacity to engage in circuit and synaptic plasticity research			X	X
Placement of undergraduate and graduate students in graduate/post-graduate or STEM careers				
Enhance innovation through industry partnerships		X	X	X
Provide cutting-edge research training opportunities to undergraduate and graduate students			X	X

Goal 3				
Provide mentoring and retain undergraduate and graduate students, including first-generation college students, in STEM		X	X	X
Promote faculty success through mentoring				X
Goal 4				
Increase K-12 teachers' capacity to implement research in the classroom			X	X
Increase retention of undergraduate students through mentoring and research		X	X	X
Develop formal early career mentoring plan for new faculty hires and postdocs			X	X
Improve preparation of students, teachers, and early career faculty			X	X
Increase STEM internships		X	X	X
Goals 5 & 6				
Increase communications with public/stakeholders (e.g., # of website views)		X	X	X
Increase general public and legislative recognition of EPSCoR		X	X	X
Increase general public and legislative recognition of the NFNT		X	X	X
Students engage in industry-relevant internships		X		
Project Goal	**Long-term Outcomes**	**Project Tracking**	**Annual Survey**	**Interviews**
Goals 1 & 2				
Maintain sustainable collaborations between neuroscientists across institutions		X	X	X
Accelerate WV's contributions in neuroscience research		X	X	X
Establish WV as a premier destination for undergraduate and graduate education in neuroscience			X	X
Increase federal funding and research footprint of WV scientists		X	X	X
Goal 3				
Build a competitive STEM workforce in WV		X		
Expand the capability of those working in the fields of neuroscience and bioinformatics through support for faculty, postdocs, educators, and students, and by implementing specific education and workforce development activities to engage students, especially rural, first-generation college students, in these research areas		X		
Increase enrollment of students, including first-generation college students, in STEM graduate programs, and connect students to universities		X	X	X
Goal 4				
Create a pipeline for the STEM workforce; attract high-tech and science industry to WV				X
Retain college students		X		
Develop pipeline of West Virginians in competitive post-graduate programs or employment in STEM industries; establish WV as a center for neuroscience research			X	X
Expand literacy in neuroscience and data science across WV			X	X
Goal 5				
Establish permanent industry internship portal		X		X

Establish and maintain relationships with STEM industry partners to make WV a desirable business destination	X	X	X
WV state legislation recognizes the importance of the NFNT and increases funding for research projects	X		