

Enhancing **STEM** Research and **Grant Infrastructure** in West Virginia



Funded by the National Science Foundation

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WHO WE ARE



Dr. Suzanne Strait
Associate Vice President for
Research Development;
Marshall University



Dr. Micheal Fultz
Associate Provost and
Associate Vice President
of Academic Affairs;
*West Virginia State
University*



Dr. Janet Rorrer
Associate Director;
*STaR Division, West
Virginia Higher
Education Policy
Commission*



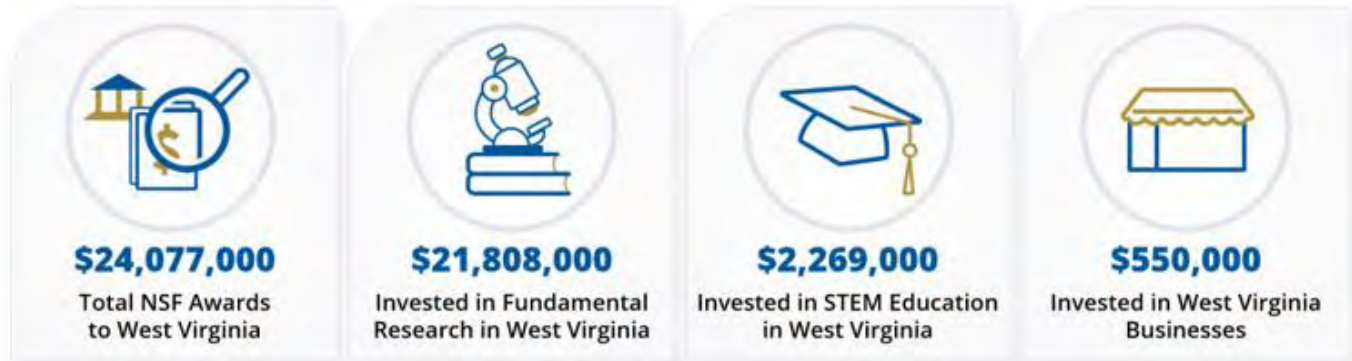
Dr. Melanie Page, Director
WV NASA Space Grant and EPSCoR
Programs;
Professor; Associate Vice President
for Research of Scholarly and Creative
Activity; *West Virginia University*

NSF 2023 West Virginia NSF Award Data

- 142 proposal submitted
- 40 new awards funded
- 28% funding rate
- 5 NSF funded universities
(CU, MU, SU, WVSU, WVU)
- \$24 million



● FY 2023 Fast Facts



NSF WV Ranking Data

- 142 proposal submitted (46th)
- 40 new awards funded (47th)
- 28% funding rate (29% national average)

2024 data: now 7 institutions funded

The first step in West Virginia’s STEM and external funding transformation is to **study and understand the regional barriers to grant submission, management, and project success.**

Institution	Designation	Public/Private	Number of Students	# of Times on a EPSCoR Track 1	# of NSF Grants
Bethany College (BC)	PUI	Private	569		
Bluefield State University (BSU)	PUI, HBCU	Public	2,063		
Concord University (CU)	PUI	Public	1,556		8
Davis & Elkins College (DEC)	PUI	Private	805		
Fairmont State University (FSU)	PUI	Public	3,961		3
Glenville State University (GSU)	PUI	Public	1,599		
Marshall University (MU)	PUI, R2	Public	13,321	3	31
WVU Potomac State College (PSU)	PUI	Public	1,815		
Shepherd University (SU)	PUI	Public	3,159	2	5
University of Charleston (UC)	PUI	Private	2,162		3
Wheeling University (WU)	PUI	Private	1,171		
West Liberty University (WLU)	PUI	Public	2,789		
WVU Institute of Technology (WVU Tech)	PUI	Public	1,645		
West Virginia State University (WVSU)	PUI, HBCU	Public	4,337	3	5
West Virginia Wesleyan College (WVWC)	PUI	Private	1,066	1	
West Virginia University (WVU)	R1	Public	28,776	3	279

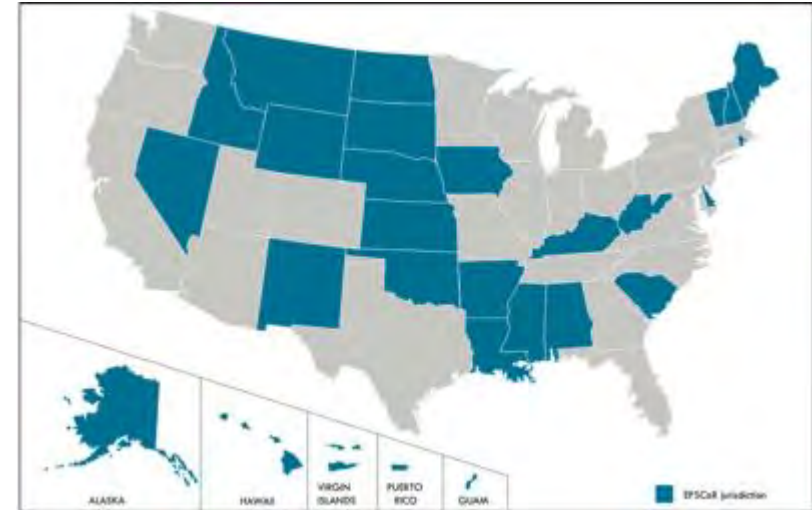
Why Now?

EPSCoR (Established Program to Stimulate Competitive Research)

- NSF, NASA, DOD, DOE, USDA
- Geographic diversity: “Missing millions”

\$250 billion CHIPS and Science Act of 2022

- Not just about semiconductor industry
- Doubles NSF’s budget over 5 years, strengthens fundamental research, establishes technology, innovation & partnerships, invests in STEM education, advances diversity in STEM, & addresses research security
- Addresses geographic inequity



NSF EPSCoR Provisions in CHIPS and Science Act - Sec, 1035 a.3.B

Agency-level Spending Target for Scholarships, Fellowships, Traineeships (Dollars in Millions)							
	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029
% Target	16%	18%	20%	20%	20%	20%	20%
Dollar Target	\$51.87M	\$45.55M	TBD	TBD	TBD	TBD	TBD
Resulting NSF Investment	\$60M (18%)	ACHIEVED*	TBD	TBD	TBD	TBD	TBD

2023-2024 NSF GRANTED

Growing Research Access for Nationally Transformative Equity and Diversity (GRANTED)

GOAL: Study the barriers to grant submission and success (focusing on NSF but broadly applicable) at West Virginia's 16 four-year colleges and universities.

WHAT WE DID

Survey of personnel and resources in sponsored program office across the state, n=11 responses

QUESTIONS				
Do you have a designated SPO office?	Yes (8)	No (3)		
How many personnel in office?	3 or less (9)	22 (1)	28 (1)	
Are your personnel remote, hybrid or in office?	All remote (1)	50% remote, 50% hybrid (2)	All in office (3)	90% hybrid, 10% remote (1)
Problems filling positions?	Yes (5)	No (3)		
Rate the opportunities for professional development (rating 1-10, 10 highest)	4 (1)	5 (1)	7 (1)	8 (4)
Would more professional development help your office?	Yes (8)	No (0)		
Do you have at least one person for pre-award?	Yes (8)			
Do you have at least one person for post-award?	Yes (8)			
Do you have at least one person for security and compliance?	Yes (7)	No (1)		
Do you have at least one person for technology transfer?	Yes (4)	No (4)		
Do you use contract help?	Yes (2)	No (4)		

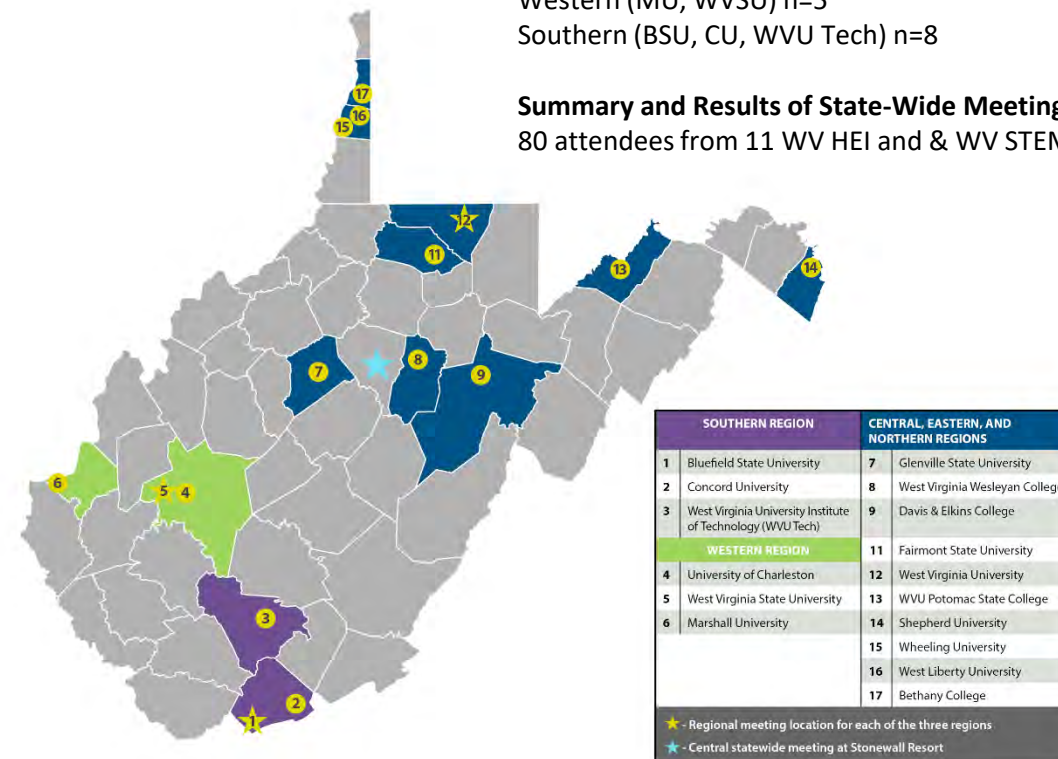
Organized regional and statewide meetings

Summary and Results of Regional meetings:

Three meetings (14 out of the 16 institutions participated)
 Northern (WVU, BC, FSU, GSU, UC, WVU Tech, WVWC, WVSU, PSU) n=32
 Western (MU, WVSU) n=5
 Southern (BSU, CU, WVU Tech) n=8

Summary and Results of State-Wide Meetings:

80 attendees from 11 WV HEI and & WV STEM non-profits



REGIONAL MEETING TAKEAWAYS

Two exercises included:

- Listing and grouping barriers to grant submission and administration
- Importance-difficulty matrix– identified barriers were ranked according to importance (Low/High) and difficulty (Easy/Difficult) to facilitate their prioritization

1) Faculty time (H/D)

- high teaching/service loads
- no release time (or problems getting covered, rural locations)
- lack of summer support

2) Institutional culture/no incentives (H/D)

- Aligned primarily with teaching and devalue research
- Lack of understanding of benefits of research/grants
- No P/T credit or incentive pay
- No credit for mentoring student research
- Need for longer return on investment thinking
- Administration unaware of grant opportunities

3) Limited knowledge of grant cycle & SPO vocabulary (H/E)

- Identifying grant opportunities
- Grant development/writing
- Budgeting
- Compliance (increasingly complex)
- Submission processes (portals increasingly complex)
- Project management and reporting
- Subawards seems risky and unfamiliar

4) Lack of support (H/E)

- During both application and execution
- Mentorship

- Difficulty finding collaborators (PUI to R1, R2)
- Administrative values
- Internal/external evaluation of grant progress

5) Lack of research infrastructure (mixed)

- Lab space, equipment, and resources
- Students, staff, research assistants, post-docs
- Lack of data tracking

6) Lack of funding to support grantsmanship (H/D)

- seed money
- cost-sharing/matching funds

7) Internal challenges (L/L)

- Cumbersome policies/process issues
- Interpersonal interactions
- Fear/frustration of rejection

8) SPO challenges (mixed)

- No designated SPO office or not enough administrative capacity
- PIs not responsive to communications
- Not spending funds in a timely fashion
- Not finishing/sharing reports
- Skipping SPO entirely in submission
- Turnover in staff
- Hard to find qualified staff in rural locations
- Lack of academic in office

STATEWIDE MEETING TAKEAWAYS

- Talks by leaders in WV and grantsmanship
- Goal to generate solutions to the barriers identified

Organized 5 statewide committees:

1) Full GRANTED grant action/submission planning

2) Convening with decision makers

- Presenting at statewide Provost meeting, Oct 21
- Presenting to NSF First2 administrative team, Nov 1

3) State-wide member roster development; community of practice

4) Centralized budget/pre/post support

5) Building state-wide infrastructure

- Grant list resource summary for research at PUIs and ERIs developed and distributed
- Living document to be updated as opportunities develop

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DAY 1 SCHEDULE		DAY 2 SCHEDULE	
8 - 9 A.M.	Registration Opens	9 - 10 a.m.	Keynote: Research at Primarily Undergraduate Institutions (President Ericke Cage, West Virginia State University)
9 - 9:15 A.M.	Welcome and Introduction (Dr. Juliana Serafin, West Virginia Higher Education Policy Commission)	10 - 11 a.m.	Breakout Session: Solutions to the Barriers - Part 2 (Dr. Amena Anderson, Shifting Power, LLC)
9:15 - 9:30 A.M.	West Virginia Land Acknowledgment (Kim Dingess, Marshall University)	11 - 11:15 a.m.	Refreshment Break
9:30 - 10:30 A.M.	Dr. Dina Stroud, NSF GRANTED Office	11:15 a.m. - 12 p.m.	Report Out of Breakout Groups & Next Steps (Dr. Amena Anderson, Shifting Power, LLC)
10:30 - 10:45 A.M.	Refreshment Break	12 - 12:50 p.m.	NSF DUE Virtual Program with Lunch (Drs. Eleanor Sayre, Thomas Kim, Olivia Long, Patrice Waller, Jennifer Ellis and Paul Tymann)
10:45 - 11:45 A.M.	Keynote Address: Grant Development Case Study (Dr. Amy Cuchel-Schuckers, The College of New Jersey)		
11:45 A.M. - 1 P.M.	Lunch		
1 - 2 P.M.	Pre-Award Panel Discussion: From Award to Proposal Submission (Dr. Kelvin Chu, TIG; Nicki Bentley-Colthart, The Grant Advantage; Morgan Saunders, The WV Grant Center; Erica Bentley, Mayo Clinic; moderated by Dr. Melanie Page, NASA EPSCoR)		
2 - 3 P.M.	Post-Award Panel Discussion: From Award to Final Report (Dr. Wesley Stites, Marshall University; Dr. Michael Fultz, West Virginia State University; Dr. Anna Edlund, Bethany College; Ashlae Stover, WVU Office of Program Management, and moderated by Dr. Melanie Page, NASA EPSCoR)		
3 - 3:15 P.M.	Refreshment Break		
3:15 - 5 P.M.	Breakout Rooms: Solutions to the Barriers - Part 1 (Dr. Amena Anderson, Shifting Power, LLC)		

Engaging Students: A Case Study in Non-Research Based Grants Enhancing Academics

Dr. Micheal Fultz

Associate Provost and Associate Vice President of Academic Affairs; *West Virginia State University*



THE IMPORTANCE OF GRANTS

Grants can be used for many activities to build an academic program:

- Instrumentation
- Summer Faculty Support
- Instruction
- Student engagement
 - Undergraduates
 - High school students
- Scholarships
- Community Engagement
- Research (not covered here)



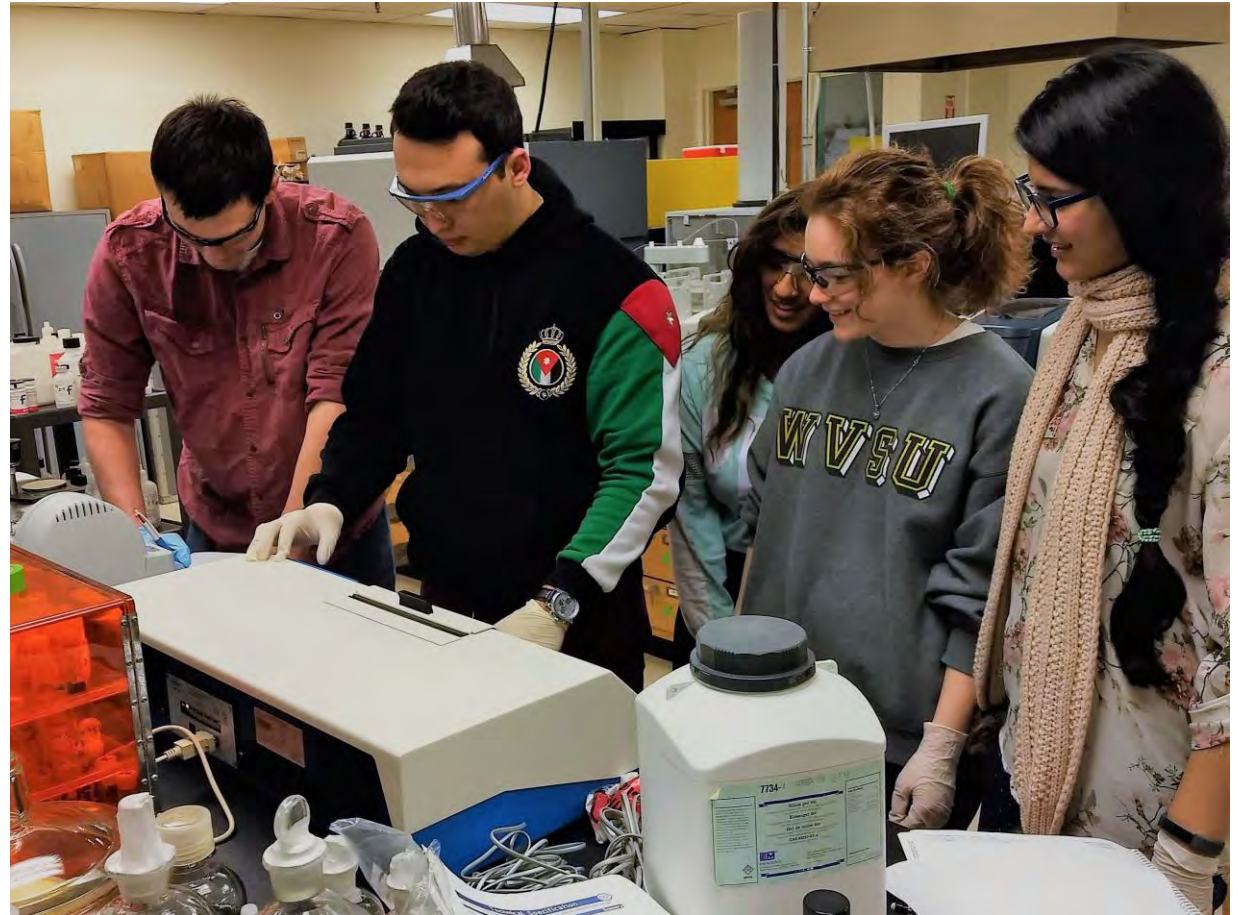
TYPES OF GRANTS

Instrumentation

- NMR (state, private, and federal)
- GC, IR, Polarimeter (State instrumentation)
- LC-MS (federal mostly NSF but DoD)

Instruction

- NSF STEP to Success
- NSF Planning Grant
- WV Diversity Grant



TYPES OF GRANTS

Student Engagement

- SURE Grant
- Project SEED
- Army Educational Outreach Grants
- Noyce and S-STEM

Community Engagement

- Opportunity Grant
 - National Landmark
 - Undergraduate Research Day at the Capital
- Professional Societies – equipment and events



RESULTS OF GRANTS

- 42 students presenting at National Meetings (over 70 overall)
- 10 moved onto grad students (5 in West Virginia)
- 3 moved became West Virginia Teachers (all in WV)
- 7 directly employed in industry (6 in WV)
- 9 accepted into medical school (all in WV)
- 4 accepted to pharmacy school (all in WV)
- Others moved onto law school, extension, and nursing

GRANT OPPORTUNITIES

Dr. Janet Rorrer

Associate Director, STaR

West Virginia Higher Education Policy Commission



STaR WHAT WE DO - STATE PROGRAMS

Funding from the State of West Virginia is provided through the Research Challenge Fund totaling \$1.7 million per year.

Opportunity Grants & Sponsorships

Support STEM education, demonstrate the value of STEM in West Virginia, build STEM research capacity, or support those in STEM careers. Up to \$5000.

Instrumentation & Innovation Grants

Funds improvements in scientific equipment, curriculum, minor renovations, and classroom instruction

SURE Grant

Helps colleges and universities provide summer/semester undergraduate research experiences (SURE) in STEM fields

STEM Fellows Grant

Helps recruit and support outstanding PhD students in STEM fields at WVU and Marshall

Proposal Review Service

STEM faculty can receive feedback on proposals at no cost before they submit the proposals to the NSF

Research Challenge Grant

Supports large, focused STEM research projects that may lead to research centers and economic development

WHAT WE DO: Opportunity Grants & Sponsorships

8 awards annually for up to \$5000 each

- Supports STEM education, activities to demonstrate the value of STEM in West Virginia, and/or support those in STEM careers
- Sponsorship of conferences (URDC)
- Travel for STEM events or research by faculty/students
- Higher ed institutions, non-profits, K-12 schools, and state and local governments can apply, but only for one grant per year
 - Opens July 1
 - Closes June (or until funding exhausted)



WHAT WE DO: Opportunity Grants & Sponsorships

2023 – 2024

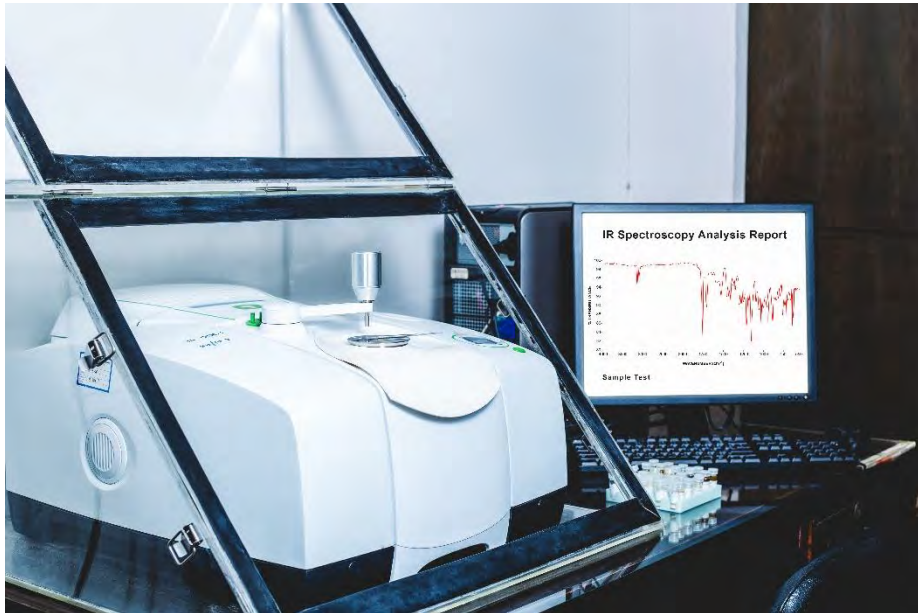
- Fairmont State University
- West Virginia University
- Undergraduate Research Day at the Capital
- Marshall University Research Corporation
- Huntington Children's Museum INC
- Bridge Valley Community and Technical College
- Fairmont State University

2024 – 2025

- Marshall University Research Corporation
- Fairmont State University
- WV Alliance for STEM & the Arts



WHAT WE DO: Instrumentation & Innovation Grants



Instrumentation: 4-5 awards of \$20K each.

- One proposal per institution
- October proposal submission yearly
- Instrument must be used for undergraduate labs and research

Innovation: Up to two awards of \$40K each that must be matched (cost share).

- One proposal per institution
- October proposal submission yearly
- Must be used for minor renovation of teaching labs
- Computer purchases not generally allowed

WHAT WE DO: 2023 Instrumentation Grant Awards

1. Fairmont State University, \$20,000

- Chemistry, Infrared Spectrometer to support laboratory courses across the core Chemistry Curriculum as well as undergraduate research projects.

2. Shepherd University, \$20,000

- Geosciences, ground penetrating radar (GPR) equipment for environmental monitoring and hazard and resource evaluation.

3. West Virginia State University, \$19,394

- Civil Engineering, six high-performance laptops, enabling the integration of cutting-edge computational fluid dynamics modeling software into curriculum and research activities.

4. West Virginia University Institute of Technology (WVU Tech), \$16,008

- Psychology, will use the funds to establish an animal model of drug self-administration to compliment current curriculum and extend laboratory experiences.

WHAT WE DO: 2023 Innovation Grant Awards

1. Concord University, \$40,000

1. Geology, “Upgrade of Electron Probe Microanalyzer (EPMA) to Enhance Teaching, Research, and Educational Outreach.”
 - one part of a set of major upgrades to Concord University’s electron microprobe laboratory, the only facility of its kind in West Virginia.

2. West Virginia University Institute of Technology (WVU Tech), \$39,600

- Mechanical Engineering, “COBOT: Undergraduate Collaborative Robotics Curriculum Development at WVU Tech.”
 - enhance manufacturing automation curriculum through the purchase of a FANUC CRX-i5A industrial collaborative robot (cobot), that will better prepare engineering students for manufacturing positions at companies in West Virginia.

WHAT WE DO: SURE Program

Five to eight awards for a total of \$300K per year for 3 years to fund undergraduate research experiences

- Summer or year-round programs
- Current Cycle: 2024-2026
- Next Cycle: 2027-2030
 - Proposal due date: mid Oct 2026
- One proposal per institution allowed
- WVUIT (30) and Fairmont State (46), WLU (30), WVU (123), MU (36), WVWC (24), Shepherd (30), WVSU (36)
 - 335 students over 3 years



WHAT WE DO: STEM Fellows

Two awards for \$500K total for 4 years to fund STEM doctoral students

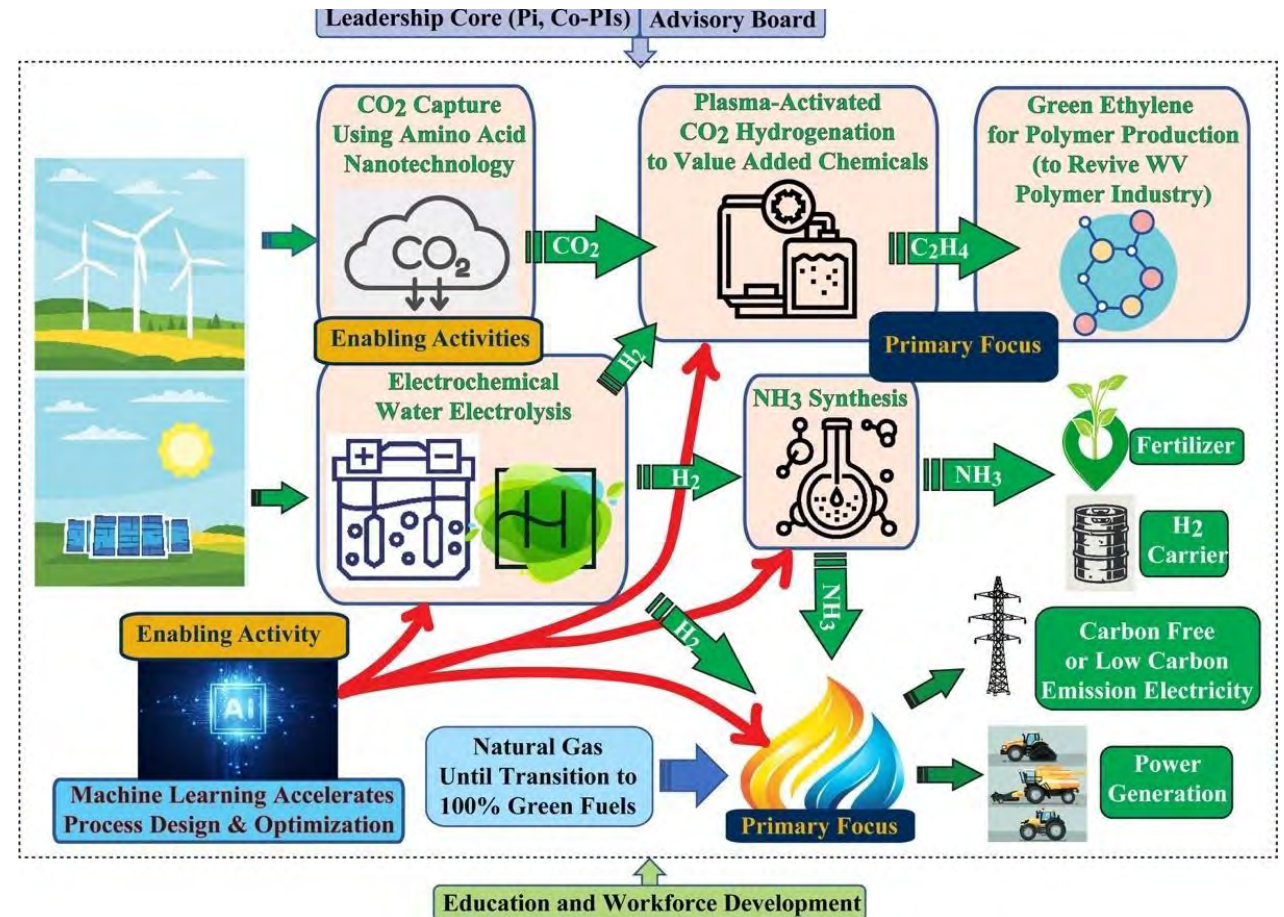
- Current awards started in 2022
- Next Cycle: 2026
 - Proposal due: November 2025
- Must have STEM PhD programs
 - only Marshall and WVU
- Emphasis on creating a pipeline of undergraduate first-generation college and/or URM students to graduate school



WHAT WE DO: Research Challenge Grants

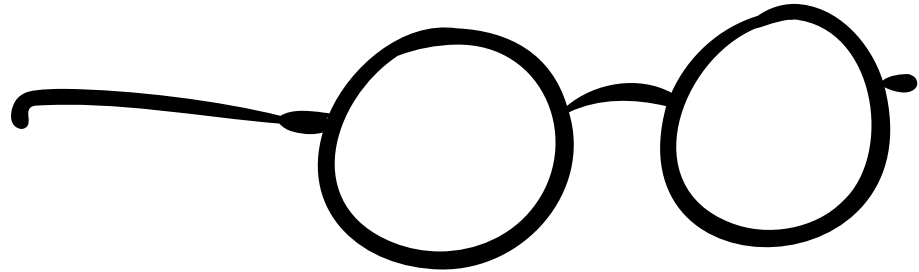
Three five-year awards for \$1.3 million each

- Current group started in 2023
- Next Cycle: 2028
 - Proposal due: August 2027
- **Must be multi-institutional**
- Goal is to position the project for federal-funding (NSF, DOE, NIH)
- Institutions may submit multiple proposals; they may have an internal screening process
- Sent for external review



Graphic by Dr. Cosmin Dumitrescu, WVU

WHAT WE DO: Proposal Review Service



Contract with external consulting group

- Service open to all STEM faculty in the state
- Arrange review through our office
- Be sure to include plenty of lead time
- Can request review by specialists
- STaR uses the service for technical grant proposals

NASA EPSCoR

EPSCoR Research Seed Grants (\$15K, 20% cost share): WV competition

- Purpose: Small seed grants to prepare for more significant research efforts and proposals.
- 2022-2024: Marshall University, West Virginia University Institute of Technology, West Virginia University, West Liberty University

Rapid Response Research (R3) (\$100K, 1 year, no cost share): nationwide competition

- Last 4 years: Marshall University, West Virginia University, West Virginia State University
- Previously EPSCoR Director had to be PI, will change this year to each science PI can submit from their University; we are available to serve as PI if needed

Basic Research (\$750K over 3 years, with required 50% cost share)

Last 4 years: West Virginia University
EPSCoR Director is required to be the project PI

EPSCoR Faculty travel Grants to present work relevant to NASA or to visit a NASA Center (\$2K, no cost share)



Dr. Melanie Page, Director, WV NASA Space Grant and EPSCoR Programs
Professor; Associate Vice President for Research of Scholarly and Creative Activity
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NASA West Virginia Space Grant Consortium Programs

- Research Initiation Grants (Spring)
- Affiliate Grants (Fall)
- Graduate Research Fellowship (Spring)
- Undergraduate Research Fellowship (Spring)
- Summer Internship Program at NASA and High-Tech Companies in WV
- Mission Directorate specific programs



Affiliate Grants

Purpose: To conduct research of interest to NASA, enhance workforce development. Who may apply: Each affiliate develops scholarship vs faculty research vs student club, etc. opportunities. Each campus sets priorities and awards funds

Research Initiation Grants

Purpose: To conduct research of interest to NASA ideally in collaboration with a NASA scientist.

Who may apply: All faculty from WV Space Grant affiliate academic institutions.

Amount: Each grant is for a maximum of \$25,000 with a required 2:1 cost share

Awarded over last 2 years:

West Virginia University, West Liberty University, Marshall University, Bluefield State University

Graduate Research Fellowship

Purpose: Provides funding for graduate students working on a thesis or dissertation with faculty.

Who may apply: All graduate students in STEM disciplines enrolled in a WV SGC affiliate academic institution.

Amount: \$15,000 NASA, \$15,000 CS

Awarded over last 2 years (30):

Marshall University, West Liberty University, WV State University, West Virginia University

Undergraduate Research Fellowship

Purpose: Provides support for undergraduate students to become involved in a research project under the supervision of their academic advisor.

Who may apply: All undergraduate students conducting space related research, enrolled in a WV Space Grant affiliate academic institution.

Amount: \$5,000 NASA

Awarded over last 2 years: 50 students

Marshall University, West Liberty University, West Virginia University, Bluefield State University, West Virginia Wesleyan College

Summer Internships at NASA Centers, High-Tech Companies, & STEM Outreach.

Who may apply: All undergraduate students doing relevant work to the internship from a WV Space Grant affiliate academic institutions

21 students over last 2 years



Mission Directorate Specific Programs

- NASA SPACE Day
- Keystone Space Collaborative
- Support for WV Robotics Alliance and Teams
- West Virginia Science Public Outreach Team (WV SPOT)
- Center for the Advancement of STEM (CASTEM) at West Virginia State University
- Seeding Your Future at Shepherd University
- Plant the Moon Challenge: The NASA Space Grant Plant the Moon Challenge (NSGPTMC)
- Mary C. Snow Elementary (MCS) and other projects aimed at increasing access to STEM
- Public Extension and Outreach Programs
- Space Flight Design Challenge (SFDC): statewide project, several universities
- WV Science Teachers and WV Math Teachers Associations
- Various academic days and competitions across affiliates
- Various Student STEM Clubs across affiliates



NSF Directorates

STEM Education (EDU)

FOUR DIVISIONS:

- Division of Research on Learning (DRL)
- Division of Graduate Education (DGE)
- Division of Equity for Excellence in STEM (EES)
- Division of Undergraduate Education (DUE)
 - two- and four-year colleges and universities; improve curricula, instruction, laboratories, infrastructure, assessment, diversity of students and faculty, and collaborations.
 - Advanced Technological Education (ATE)
 - Improving Undergraduate STEM Education: Directorate for STEM Education (IUSE: EDU)
 - NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)

Questions?