

## MEMORANDUM

**TO:** Legislative Oversight Commission on Education Accountability (LOCEA)

**FROM:** Dr. Juliana Serafin, Senior Director, Division of Science, Technology and Research, HEPC

**DATE:** September 1, 2023

**RE:** Research Challenge Fund Annual Report

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West Virginia Code §18B-1B-12 requires the West Virginia Higher Education Policy Commission to report to LOCEA annually on the results of the projects and activities funded by the Research Challenge Fund (RCF) appropriation.

Since it was created in 2004, the Research Challenge Fund supports undergraduate and graduate students in the STEM fields (Science, Technology, Engineering and Math) and creates a highly skilled diverse workforce, leading to new economic possibilities for West Virginia. The RCF is instrumental in helping West Virginia build its scientific research infrastructure and reputation by attracting and developing top university scientists who can obtain independent federal funding for important research. The Research Challenge Fund is evidence of the state's ongoing commitment to support science and technology research, education, and outreach.

In Fiscal Year 2023, the Research Challenge Fund supported the following grants:

- **Research Challenge Grants** support the creation of research centers and foster economic development and workforce advancement (\$1.3 million for each of 3 awards distributed over 5 years).

FY 2023 marked the end of state funding for three Research Challenge Grants that began in 2018:

- 1) Advancement of Science and Engineering for Localized Gas Utilization (WVU and Marshall University),
- 2) Foundation of the Vaccine Development Center at WVU (WVU),
- 3) Center for Cognitive Computing (C3): A Multidisciplinary Research Center for Excellence (WVU).

The measurable return on investment for the state's appropriation to this fund is significant. The state investment of \$1.3 million in each of these three programs has led to follow-on funding in the amount of \$89 million: \$17.3 million, \$38.6 million, and \$33.1 million, respectively for the projects list above. This follow-on funding is the result of submitting new proposals to federal agencies that awarded the grants based on the work funded by the RCG award.

These three projects are preparing final reports for the STaR Division and were featured in a 2022 edition of the *Neuron* magazine, which can be accessed here: [https://wvresearch.org/wp-content/uploads/2022/06/Neuron\\_Vol18Issue1\\_Digital.pdf](https://wvresearch.org/wp-content/uploads/2022/06/Neuron_Vol18Issue1_Digital.pdf)

For the new grant period of 2023-2027, a competition for funding attracted 18 proposals. Three new projects were selected for RCG funding:

- 1) Data Driven Autonomous Experiments for Energy Sciences Principles of Machine Learning (WVU and Marshall University),
- 2) Metal-embedded Carbon-based Catalytic Membranes for Co-production of Ammonia and Ethylene (WVU, Marshall University, Bluefield State University, and Concord University),
- 3) Synergistic Conversion of Captured CO<sub>2</sub> and Green H<sub>2</sub> to Value-added Products for a Decarbonized Economy (WVU, Concord University, and West Virginia State University).

A factor in the funding decision was the level of research and education collaboration between our universities, which is important when applying for National Science Foundation EPSCoR funding. All three projects involve expanding knowledge in energy-related sciences.

- **Summer/Semester Undergraduate Research Experience (SURE)** awards are used for undergraduate research stipends to fully or partially support approximately 100 students annually at Marshall University, Shepherd University, West Liberty University, West Virginia State University, WVU, and WV Wesleyan College. (The sum of six awards is \$300,000 per year, for three years from 2020-2022. Note that due to 2020 summer COVID-19 shutdowns, these grants were extended to 2023.) These awards help undergraduates develop much-needed research/laboratory skills and support their undergraduate work in STEM fields. These awards have now ended, and STaR Division is taking applications for the 2024-2026 SURE grants, which will be announced later this year.
- **Science, Technology, Engineering and Mathematics (STEM) Fellows** grants are for STEM doctoral (Ph.D.) students at WVU and Marshall. This grant provides significant support to WVU and Marshall for their STEM research programs and helps maintain their respective national R1 and R2 research rankings. New awards to Marshall University (\$952,000) and WVU (\$1,390,000) for 2022-2026 started in FY23.
- **Technical Assistance** provides external expert review services to help STEM faculty develop competitive proposals for funding from federal agencies. In FY23, ~50 proposals from individual faculty, or from collaborations between faculty at multiple higher education institutions were reviewed by the service. Feedback for researchers on the proposals is crucial for making them nationally competitive. Year to date, \$10.3 million has been funded for the proposals reviewed in FY23. Special review services were also provided for the RII Track-1 EPSCoR proposal for \$20 million from the National Science Foundation, which was successfully funded. (\$150,000)
- **Opportunity Fund** provides small, one-time awards (Approximately \$5000 each except for VEX Robotics proposals, which are for smaller amounts) to assist research faculty/students and for STEM programing. Total funding per year is about \$40,000. In FY23, 17 proposals were funded. The 2023 Undergraduate Research Day at the Capitol, and the Marshall University Research and Creativity Symposium events were supported by Opportunity awards. Awards also went to Glenville State University, Marshall

University, Fairmont State University and West Virginia State University. Community awards went to 11 middle and high school teams from West Virginia that participated in the International VEX Robotics competition in Dallas TX in March 2023.

- **Innovation Grants** provide one-time awards for equipment, supplies and minor renovations of laboratory spaces for undergraduate education and research. The two FY23 awards went to West Liberty University (\$26,000) and WVU Institute of Technology (\$20,000).

Summary:

In 2021, *Vision 2025: West Virginia Science & Technology Plan* identified growth of the research enterprise and development of the STEM Talent Pipeline at our universities as key areas of focus for the state. Clearly, the grants and programs funded by the Research Challenge Fund are a primary way to achieve this goal. It is especially impressive that the state's \$3.9 million seed funding for the three previous Research Challenge Grants resulted in a return on investment of \$89 million in independent funding from federal and private corporations. STEM Fellows, SURE, Innovation and Opportunity grants are crucial to filling the STEM Talent Pipeline in West Virginia. External Review Services and the collaborations created between researchers at our universities by these grants were critical to obtaining the \$20 million EPSCoR RII Track-1 grant from the National Science Foundation in Neuroscience.

Attachments: Press releases for the new Research Challenge Grants and the RII Track-1 Grant.