

# NC STATE UNIVERSITY **The Science House**

## Annual Report

July 1, 2022 – June 30, 2023

**The Science House (TSH)** had an incredible year providing STEM outreach programs to K-12 students and teachers throughout North Carolina. TSH student programs directly served **14,474 students**. Teacher professional development programs served **1,956 teachers**. The Rural Equipment Loan program supplied resources, labs, kits, and technologies to perform hands-on STEM investigations to 123 teachers serving **7,380 students**. TSH's student and teacher programs were implemented in **75 North Carolina counties** during the 2022 - 2023 fiscal year.

- **The Science House** moved! After 26 years in the Research IV Building, The Science House moved to the Cherry Building on Dorthea Dix in January 2023. The Cherry Building creates an opportunity for TSH to expand its outreach programs, provide more accessible space and parking for the K-12 students and teachers, faculty, undergraduate and graduate students, and



undergraduate and graduate students, and community partners it serves; leverages outside space for non-indoor programming, and establishes a visual identity for TSH consistent with its mission. The Cherry Building's exterior and interior spaces mirror its past use as a K-12 school, while its location on the Dorthea Dix campus underscores the vital land-grant connection between NCSU and our public partners. Please stop by and see us!

- Lisa Giacomelli became the new director of the **NC Science Olympiad** program. Lisa, a longtime Science Olympiad coach, was the head science teacher at Wilmington Academy of Arts and Sciences (WAAS) for nine years. During her tenure at WAAS, she started and developed one of the most competitive Science Olympiad teams in the state and nation. Lisa hit the ground running and led 17 elementary tournaments and 12 middle and high school tournaments across North Carolina. A total of 640 teams participated, which is a 16% increase from last year. Her leadership will keep North Carolina the largest Science Olympiad program in the country.



- The **NC Science Olympiad** officially launched [The STEM Yard Podcast](#) inspired by The Brickyard at NC State. **Our own Alonzo Alexander hosts the STEM Yard** and is a place for anyone who loves STEM and wants to learn about the competitive and academic world surrounding the largest STEM competition in the state. We are looking forward to expanding our content to

discuss the latest research happening here at NC State! The podcast launched in January 2023 with a 20-episode season. The podcast quickly took off with 1.5k downloads. In a recent episode, Conen Morgan said, *“Science Olympiad has produced more doctors, lawyers, teachers, engineers, and world changers than any other organization.”* Conen was sadly killed in a tragic boating accident soon after being on The STEM YARD but spent 30 of his short 42 years participating and giving back to the North Carolina Science Olympiad.



- **Imhotep and Kyran Anderson Academies** deepened partnerships within the University, including two specific programmatic offerings fully funded by the Plant Sciences Initiative at NC State. Each program will provide a full week of funded STEM programming (equalling more than \$18,000 in funding) for more than 60 students. The Academies also received another \$10,000 in financial support from Truist Bank and Red Hat to support the expansion of elementary STEM programming in northeastern NC.



- **Imhotep Academy** held 5 sessions this year, including 4 in-person offerings and 1 virtual session. 172 students participated from 10 counties in NC. Session offerings during the year included: a session focused on STEM game design; an ecology session; a series of agricultural engineering sessions designed to explore both plant biology and engineering; and a marine science session focused on marine life in NC waters.

- **Kyran Anderson Academy** was offered in-person and focused on energy generation and served 50 students primarily from NC, with several from Georgia, Virginia, and Maryland. When participating families were surveyed about the program, parents felt that after participating their students: were more knowledgeable about STEM concepts (91%); and were more excited about STEM (100%). 97% of participating students would recommend the program to their peers.



- **Imhotep and Kyran Anderson Academies** continued their mission to reach underserved students. 80% of participants were African-American, Latino, or Native American students; 52% of the participants were girls; and 70% were provided with need-based financial support to participate in the program.

- The **Mountain Satellite Office** tripled the number of students and teachers it served this year, impacting over 51,000 students and 800 teachers! The staff builds transformative relationships through innovative STEM experiences, engaging professional development, and cutting-edge technology loans. Below are some quotes from participants of Mountain Satellite Office (MSO) programs:

- “MSO changed my thinking on STEM and ways in which to flip some of my lessons to make them more student-driven and will bring a fresh experience to my students.”
- In 20 years of science PD, I have never taken back this much information to share with teachers and students.”
- “I learned about the true meaning of STEM and the importance of integrating all subject matters. Everything I learned can be taken back to the classroom!”
- “MSO really gave us an unmatched experience. Their enthusiasm for what they do is evident and contagious. Anyone that takes one of their sessions should feel honored.”
- “I am leaving this MSO workshop with a drive to keep the learning and innovating going and with a sadness that the time has ended. I could keep learning with Michelle and Jason for many more weeks, and I look forward to a continuing partnership.”



- The **Mountain Satellite Office** designed innovative curricula and led culture-shifting professional development for K-12 teachers that transformed classrooms through:

- Supporting teachers’ transition back to face-to-face learning with student-centered pedagogy,
- Highlighting STEM career readiness with the latest research from NCSU,
- Providing week-long intensive sessions through a partnership with the NC Center for the Advancement of Teaching,
- Training teachers in their own classrooms with their own students through mobile STEM labs, and
- Incorporating the new Science and Engineering Practices integral to the recently released NC state standards for science.



- Through a \$60k gift from Consortium for Mathematics and its Applications (COMAP), the Science House and the Data Science Academy created the **Data Explorers Teacher Program** to bring mathematical modeling and data to NC rural schools. This first year’s cohort included five high school teachers of varying content areas (Mathematics, Physical Science, Biology, and English) from JF Webb High School in Granville County and EE Smith High School in Cumberland County. Teachers worked through the Amplifying Statistics and Data Science in Classrooms course developed by the Friday Institute for Educational Innovation and an

interactive online module, **Data Explorers Teacher-Coach Module**, created specifically for the Data Explorers Teacher Program that guided teachers new to mathematical modeling and data through the process and how it can enrich their current curriculum. Periodic virtual check-ins were hosted to answer questions and discuss practical classroom applications. In February, teachers came together for a Data Explorers Collaborative Workshop, where they participated in the modeling with data process and explored ways to bring data science into their classrooms.



- The Science House moved into the second year of the Discovery Research PreK-12 (DRK-12) project, **Supporting the Implementation of Modeling Instruction in Rural Schools (SIMIRS)**, funded by the NSF. This second year involved the first set of Modeling Instruction workshops in high school Biology and Chemistry. These workshops served 16 teachers from 9 school districts in northwestern North Carolina. In addition to being provided 114 hours of professional development, these teachers implemented what they learned in the classroom this academic year while being supported by project mentors and participating in educational research activities examining teacher Pedagogical Content Knowledge (PCK) and virtual mentoring.



- The Science House partnered with Dr. Anna Stepanova in the Department of Plant and Microbial Biology to offer a workshop for high school science teachers called the **Synthetic Biology Teacher Workshop**, funded by Dr. Stepanova's NSF CAREER Award. This workshop provided 30 hours of professional development on basic recombinant DNA technology and synthetic biology and served 16 teachers from 9 different North Carolina districts and four other states. These teachers also had access to an equipment lending library over the past academic year. One teacher had the following to say about the experience:



*“The SynBio workshop has advanced my lab technique and challenged my understanding of synthetic biology and genetics far beyond what I expected and hoped to take away. This has been one of, if not THE only, workshop I have done that has pushed me in my thinking and understanding of biology. I am grateful to have learned from the leading experts.”*

- The Science House is excited to host the **2023 AgDiscovery Camp** on campus this year at NC State in the final two weeks of June. TSH, along with the US Department of Agriculture (USDA), will welcome 16 high school students from CA, GA, IL, MD, MO, NC, NJ, and VA. This two-week residential camp will be packed with various activities, including Pest Detection and Identification, tours of the Vet School, Dairy Farm, and the Plant Sciences Building, and trips to Seymour Johnson Air Force Base, the Conservator's Center, and the NCSU Compost facility. The students will also work in teams to design a hydroponics greenhouse for downtown Raleigh.



- The **FIRST Tech Challenge Robotics Program, Biome Robotics**, competed last year as a single team #7083 Tundrabots, in a rebuilding year after most of our students graduated. Our second-year students focused on robot technology and built an impressive, highly competitive machine. They are working over the summer in the off-season, adding five new students, training new coaches, developing CAD and 3D printing skills, perfecting our robot, practicing for scrimmage competition, and doing some research on control systems, to present to the league in September. They are a mix of rising 8th, 9th, and 10th graders. These students spent over 1900 hours working on and competing with their robot.



- The Science House completed its second year of a three-year **\$1,345,466 NSF ITEST project** entitled **Connecting Students with Autism to Geographic Information Science & Technology (CSA-GIST) Careers**. More than 30 students in two cohorts have participated in the CSA-GIST programming since it began in 2021. The program consists of (1) one-on-one online drone classes (one hour each, totaling 30 hours), (2) monthly in-person Saturday GIST Academy sessions (three hours each, 12 or 16 total sessions, depending on cohort), and (3) face-to-face Summer Sessions, (two summers). CSA-GIST also has an extensive research component led by Jamie Pearson focused on generating knowledge about how the design elements of the workforce development model intersect with self-regulation constructs for high school students with ASD in face-to-face, online, and hybrid learning contexts.
- The Science House's year-long program for high school students with disabilities, **Catalyst**, in partnership with the NC Department of Health and Human Services and Pre-Employment Transition Services, served 36 students in its 7th year of operation. The Catalyst program provides participants with job exploration counseling, workforce readiness training, work-based learning experiences, counseling on post-secondary training options, and instruction in self-advocacy. Students attend a STEM summer camp, Fall and Spring STEM Academies, and STEM internships totaling over 100 hours of instruction, exploration, and training. **NCDHHS has**

increased the funding of this program to \$407,880, allowing us to serve more students!

- From April 6-9, 2023, 36 **Catalyst program** students **visited NASA's facilities** in Houston, Texas. The once-in-a-lifetime trip presented an opportunity for the students to engage with adults with disabilities thriving in STEM careers. Learn more about this amazing trip [here](#).

