

News from the field of the premiere DoD Youth STEM education program.

## Visiting with Alumni: Ruhi Doshi, STARBASE Minnesota



“STARBASE gave me the confidence to keep pursuing my passion and helped me realize my dream job as an astro-informatics scientist.” Ruhi Doshi recollects a pivotal moment in her STEM journey, attending STARBASE Minnesota’s Next Generation summer program in 2011. Today, Ruhi is even closer to achieving her dream job. She studies data science at the University of California, Berkeley where she contributes to dark energy research, participates in the statistics association, and even helps teach a data science course.

Growing up, Ruhi had a passion for science and math, but often felt frustrated being the only girl in the room at most STEM camps. On the first day of a robotics camp, Ruhi walked into a room full of boys who made decisions without her and told her to sit and watch. “I almost ran out crying,” Ruhi recalls. “I remember feeling so frustrated. Just because I may not have had the exposure beforehand didn’t mean I wasn’t capable. It just sucked the fun out of all these supposedly fun summer camps.” Ruhi was ready to give up on math and science, but then, she explains, “When STARBASE happened, the first thing I could do was make friends with other girls. It was so refreshing to be able to do that. And, that I wasn’t the only person who had these experiences was really empowering to me.”

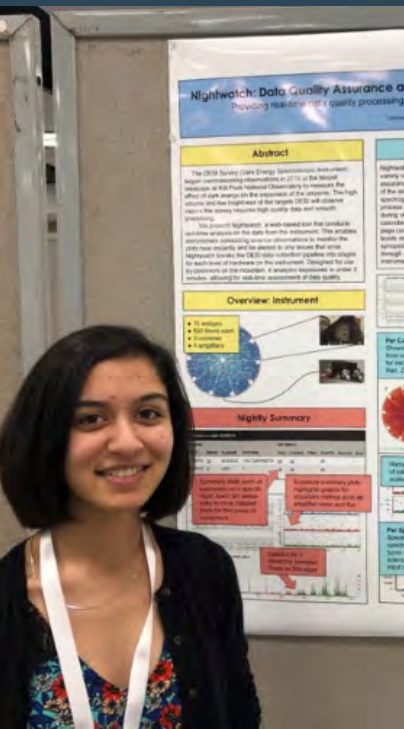
At STARBASE, Ruhi used a 3D printer for the first time and solved problems like an engineer. Working with her teammates, Ruhi tested the strength of shapes to solve a design challenge of building a bridge capable of holding significant weight. After completing the challenge, Ruhi learned that engineers use trusses to build strong structures in real life. “I was just mind blown. That’s



“ I was just mind blown. That’s the kind of problem solving that is really appealing to me about STEM, about creating new solutions...I’m never going to forget that.”



“If you know you are on the right track, if you have this inner knowledge, then nobody can turn you off... no matter what they say.” -- Barbara McClintock



the kind of problem solving that is really appealing to me about STEM, about creating new solutions...I'm never going to forget that." Ruhi learned Pro/Engineer, PTC's computer-aided design modeling software prior to Creo, to design and 3D print rocket fins. "It was just absolutely fascinating," Ruhi remembers, "to see all of the different shapes my friends and I designed."

The positive week at STARBASE not only revived Ruhi's self-efficacy and interest in STEM, but also propelled her into advanced STEM learning experiences. The very next year, Ruhi's Engineering Technology and Design teacher offered her more complex projects because of her experience using Pro/Engineer while at STARBASE. Ruhi pursued STEM outside of the classroom by joining Science Olympiad, where she found a community of like-minded STEM enthusiasts. Over the years, her role has transitioned from avid participant to leader and mentor, "Now, I help write textbooks and test questions and help proctor the tournament. It's definitely one of the communities that I really enjoy being a part of."

While attending high school in the Twin Cities, Ruhi had the chance to conduct research alongside professors at the University of Minnesota, an experience that led her to declare a data science major at the University of California, Berkeley. In addition to taking classes like Data Inference and Decisions Statistics, Ruhi contributes to STEM research as an intern with the Dark Energy Spectroscopic Instrument (DESI) Survey. As a member of the software team at DESI, Ruhi works on creating a data quality monitoring application that astronomers use to make sure incoming data is of good quality. Ruhi and her undergraduate teammates had the opportunity to present at the 235th meeting of the American Astronomical Society in Hawaii earlier this year.

When asked what skills she uses most often, Ruhi responds with conviction, "Perseverance is so key. When you see a problem you don't know how to do, you just try from a different angle or come back after a little while. That's the whole point, you don't stop working on a problem if you get stuck." She goes on to say that teamwork is another key skill, "Science, engineering, and any kind of STEM work, is not done individually. It's all collaborative. You don't solve problems on your own, and if you get stuck you go and talk to your teammates and you find out what they would do instead. Find out how to grow and learn those methods yourself so you can help other people too."

We asked Ruhi to share words of advice with current STARBASE students. She recommends, "Stay involved and keep trying new experiences." She advocates for students to communicate and support fellow classmates. "STARBASE is a great launching point, being



able to talk to other students and not feel shy about asking them what their rocket design looks like, how it's different from yours, and what shape they think is best to support a bridge. Those are the ways you grow, learn, and keep staying interested in STEM."

Many thanks to Ruhi for taking the time to reconnect with STARBASE! We enjoyed catching up and hearing about her fantastic STEM experiences. We wish her the best as she continues STEM research, STEM mentoring and teaching, and pursues a career in data analytics!

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# STARBASE Curriculum Changes on the Horizon - Part 2

At the time of this publication, the new Standards, Objectives, and Activities: The DoD STARBASE Approved Curriculum Guidebook (SOA) has been published to STARBASE-U in the *STARBASE New Curriculum – 2020* course. The STARBASE Curriculum Advisory Group (SCAG), formerly the Curriculum Committee, is very excited to present this updated foundational guide for our program.



As it always has, the SOA serves as a consolidated source for information about our current approved lesson plans and their correlation to the internal STARBASE objectives. These STARBASE objectives provide our staff a way to build curriculum schedules

that ensure the breadth of our curriculum is delivered at the same high-standard at each of our 70 locations. This revision of the SOA offers sites additional tools necessary to connect with the needs of our stakeholders. Inside the updated SOA, you will find:

## STARBASE Key Concepts

Each lesson and accompanying activity were reviewed, and 37 Key Concepts were identified and gathered into one concise list. Within the SOA, you will find a list of these concepts with their working definitions as they relate to STARBASE.

The hope is that once a site chooses their specific curriculum and compiles their list of key concepts this list can be used as a marketing tool for teachers and school leadership to quickly determine what over-arching academic principles will be taught during the 25 hours of instruction at STARBASE.

## STARBASE Emphasis

Similar to the Key Concepts, the addition of an explanation of the STARBASE Emphasis for each core curriculum area can be used to convey to teachers and school administration what skills are addressed by the instruction within each of the core curriculum areas (STEM). You will find that these STARBASE Emphasis areas focus more on the cooperative learning, problem-solving, exploration, and inquiry-based learning skills that are enhanced through STARBASE instruction and activities.

## Alignment to National STEM Standards

Classroom teachers align instruction with State and National standards in order to ensure their students meet the targeted demand and requirements for their specific grade level. Instruction in the classroom is driven by standards. Despite the fact that the STARBASE curriculum does not intend to align with one set of standards, we cannot ignore this National and State focus on standards and objectives. Therefore, the SOA outlines how the STARBASE curriculum addresses and satisfies many different sets of STEM standards and learning targets.

## NEW TERMINOLOGY

**SCAG:** STARBASE Curriculum Advisory Group (formerly the Curriculum Committee)

The STARBASE objectives act as an internal planning tool for curriculum development and implementation, and the alignment with the national standards (NSES, NGSS, NCTM, ISTE and CCMS) creates a logical buy-in from school administration and participating classroom teachers.

## Curriculum-at-a-Glance

This area of the SOA should look familiar! The Curriculum-at-a-Glance was formerly known as Meeting Objectives. This tool continues to provide a planning document as sites work to develop their own individual curriculum schedules. Here, you will find not only the internal STARBASE objectives necessary for curriculum compliance but also those key concepts that have been identified for each lesson plan.

## Timeline for New SOA Implementation

These are three important dates you will need as we move forward with the adoption of this new curriculum distribution:

1. **October 2020:** New SOA is published to STARBASE-U.
2. **January 2021:** Existing curriculum will be updated to the new objective alignment and numbering protocols.
3. **School Year 2021-22:** Plan to adopt the new curriculum configuration as you decide on your curriculum schedule for the year.

As we hope you can see, this refresh to the STARBASE curriculum is just that, a simple reorganization. The SCAG believes this will allow for even more expansion as we look forward to the evolution of the STARBASE curriculum over the next 10 years!

### Curriculum in 2020-21

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If nothing else, the COVID-19 pandemic has taught us the importance of staying in touch with our stakeholders in a virtual environment. So much of STARBASE depends on face-to-face interaction, and this past year has shown that we need to look for additional ways to stay connected when we can't physically be together. The good news is that we already have one such amazing tool out in the STARBASE community, extension activities.

For the first data call this year, the STARBASE Curriculum Advisory Group (SCAG) will be requesting the submission of extension activities you may already be providing to your classroom teachers. The extension activities will be reviewed, formatted, and shared on [dodstarbase.org](http://dodstarbase.org).

Please look for this call in mid-November! With your help, we can create an amazing resource both for our sites and our stakeholders!

# Planning for School Year 2020-21 with Winchester STARBASE

The Winchester STARBASE Academy in Winchester, Virginia has started SY20-21 off with resounding success! Private schools and homeschool groups are visiting the STARBASE program at the Army National Guard Winchester Readiness Center for the first two months of school. The Winchester STARBASE instructors will then be traveling in order to provide a STARBASE “on wheels” program to Clarke County Public Schools for the last part of this fall semester.

An exciting, new partnership has developed between the Winchester STARBASE Academy and Shenandoah University (SU). Professor Dr. LaBombard-Daniels and Program Director Dr. Susan Corrigan worked together to determine how professional training could be provided for their elementary education students. These preservice teachers take a “Reasoning Skills I: Science” course, which is about teaching Science to elementary students, as part of their core curriculum requirements. For the fall 2020 semester, these SU students are spending four days at the Winchester STARBASE Academy to participate in a variety of science, technology, engineering, and mathematics (STEM) activities. Along with leading the activity, the fabulous STARBASE instructors share a variety of helpful hints, ideas, and suggestions for working with elementary students. For their first science lessons at the Winchester STARBASE Academy, the preservice teachers learned about teaching matter by working with the molecule building kits, Happy Atoms, and by participating in a physical and chemical change chemistry activity. To further their STEM experience, the SU students may choose to do 20 practicum hours at the STARBASE facility.

The goal is to continue being inspirational role models to SU students to positively impact the instructional skills of preservice teachers in order for them to pass on an excitement for STEM to their future students.



## A Call for Participation

Throughout the year, this newsletter will continue to spotlight the achievements, partnerships, and tips of the participants of the DoD STARBASE program. Please share your achievements, success stories, and helpful tips with us at [email@dodstarbase.org](mailto:email@dodstarbase.org).

# Visiting with Alumni: Nathaniel Fisher, STARBASE Topeka

Nathaniel Fisher, a DoD STARBASE Topeka graduate, works for NASA as a flight controller for the International Space Station (ISS). His work in mission control involves monitoring the health and status of a specific system of the ISS: Guidance, Navigation, and Control system. Simplified, Nathaniel is the pilot of the ISS. Nate credits the STARBASE Topeka program with having an impact on his decision to become an engineer.



Nathaniel shared some personal highlights attending STARBASE at the 190th Air Refueling Wing on Forbes Field. "I remember having a lot of fun at STARBASE when I was in 6th grade back in the 90's. We were able to tour one of the KC-135 refueling airplanes, and that was just so awesome. My Dad is a pilot, and I grew up loving everything aircraft related. Another opportunity that I had while at STARBASE was building and launching a small rocket. That was so cool! And looking back, the experiences that I had while attending STARBASE were among several things in my life that made studying math and science real."

A high school assignment to research future careers helped solidified Nate's decision to become an engineer. He selected to research becoming an astronaut and found there were several pathways to achieve this goal. Further researched showed him that a lot of astronauts had degrees in various engineering fields.

While working towards his engineering degree at Kansas State University, Nathaniel earned an internship with NASA. After graduation, NASA hired him as a full time engineer. One of the most interesting aspects of Nate's job is "the jaw-dropping views of the Earth from the ISS external cameras that I get to see when I am working in mission control." Nate enjoys the fact that he continually learns while on the job at NASA.

He reminds us that NASA needs more than just engineers and astronauts. Accountants, geologists, chemists, business leaders, managers, and lawyers are a few of the many job opportunities available. "It takes an entire team to run the space program and everyone's job is important."



Nate's advice to students "Work hard in all of your subjects, don't be afraid of failure while growing up and throughout your life. Learning from failure (or poor performance in general) is an important way for us to change how we think and act in the future."

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