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**PRESS RELEASE**

## **Former Liberty High School Students Earn Patent for Breakthrough Baseball Helmet Safety Technology**

Bethlehem, PA, December 2, 2025—Two Liberty High School alumni, **Sid Tekumalla** and **Joseph Barlow**, have been awarded a U.S. patent for a groundbreaking helmet safety innovation originally conceived during their senior-year engineering capstone course.

Their patent, titled “DIVERGED ENERGY OF COMPRESSED NEGATIVE STIFFNESS HONEYCOMB SHELLS VIA SYNTHETIC NYLON 6 AND 12 MATERIALS,” introduces a novel honeycomb structure designed to be secured inside baseball helmets. Built from uniquely engineered Nylon 6 and Nylon 12 materials, the structure delivers at least 90% recovery of shape after baseball impact, enabling helmets to be safely reused, something current helmet padding systems cannot reliably achieve.

Today, baseball helmets are typically discarded after a significant impact because the internal padding does not return to its original form or maintain the necessary protective strength. Sid and Joe’s innovation solves that problem, potentially transforming equipment standards across youth, collegiate, and professional baseball.

“I am incredibly proud of Sid and Joseph’s accomplishments and grateful to the talented teachers and mentors who supported them,” commented Dr. Maureen Leeson, Assistant Superintendent of the Bethlehem Area School District. “It’s remarkable that their high school engineering coursework resulted in a U.S. patent, showcasing the real-world opportunities BASD provides. Their achievement highlights the strength of our engineering programs and the innovation happening in our classrooms. This milestone shows what is possible when education, mentorship, and student passion intersect.”

### **From High School Idea to U.S. Patent**

The project originated in the Project Lead The Way (PLTW) capstone engineering course, the conclusion of a 4-course engineering pathway at Liberty High School, led by engineering educator Kristin Stuby. “Sid and Joseph are highly motivated young men who persevered through the patent process to obtain a patent on their PLTW capstone engineering project,” said Stuby. “I facilitated and led them through the engineering design process, which gave them the foundation to pursue their idea after graduation. What excites me most is that the small-scale testing they conducted in a high school setting was later confirmed through large-scale, industry-standard testing.”

Stuby credits two mentors with helping the students navigate the highly complex patent journey:



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- Dr. Frank Schweighardt, who guided material selection, arranged formal testing, and advised the team through the technical patent requirements.
- Jim McDaniel, a patent attorney and colleague of Schweighardt, who donated his legal services to help file and secure the patent.

### **The Students Behind the Innovation**

#### **Sid Tekumalla, Co-Inventor**

Now a junior at Penn State University, double majoring in Computer Science and Data Science, Sid recalls how a YouTube video on honeycomb paneling sparked the initial direction for his portion of the project. “The idea was a back-and-forth process,” Sid explained. “Joe suggested improving baseball helmet safety, and while researching, I came across honeycomb and hexagonal structures. That led me to a negative stiffness honeycomb design from UTexas, which I modified for our project.”

He credits Joseph for seeing potential beyond the classroom assignment. “Joe was the one who pushed to turn this into more than a school project,” he continued. “When our test results came back, that’s when I realized what we had was truly worthy of being patented.”

#### **Joseph Barlow, Co-Inventor**

Joseph recently earned a B.S. in Aeronautical Science–Flight, a Minor in Aviation Safety, and an A.A. in Air Traffic Control from the Florida Institute of Technology. “I realized when talking with my boss that our project had real potential,” said Joseph. “We watched a lot of videos and saw that head safety in baseball just wasn’t as developed as it should be. We believed our idea would work, but none of us expected it to perform as well as it did.”

Both inventors plan to pursue the sale or licensing of the patent as they continue their academic and professional careers.

### **A New Standard for Player Safety**

The newly patented honeycomb design not only enhances impact absorption but ensures durability and reusability, offering organizations a safer and more cost-effective alternative to current single-impact helmet padding.

With its combination of material science, structural engineering, and student-led innovation, Sid and Joe’s invention may represent a major advancement in protective sports equipment.

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**For interview opportunities, please contact:**

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***About the Bethlehem Area School District***

The Bethlehem Area School District is the 6<sup>th</sup> largest school district in Pennsylvania serving nearly 13,000 culturally and economically diverse students in 22 community-based schools. The district serves five municipalities: City of Bethlehem, Bethlehem Township, Hanover Township, Freemansburg, and Fountain Hill. The district enjoys numerous community partnerships with universities, businesses, and arts providers that extend the schools' rich curricular and co-curricular offerings.