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**Gentle Jumps: engineering students craft a life-changing toddler’s chair**

Written by Christine Bellport

Emma Gunderson is a lively, happy one-and-a-half-year-old who, despite her blindness and limited hearing, finds comfort in one place: her bouncy chair.

“It’s hard to put into words just how important this chair is for Emma,” said her mother, Rachel Gunderson. “She spends about a third of her day in it—it’s her safe space. She laughed for the first time in this chair. We take it everywhere with us because it’s the one place where she feels secure and comfortable.”

Emma has moderate hearing loss and wears hearing aids, though she is technically deaf and blind. She has retinal dystrophy—a condition that causes structural differences in her retinas, and limited testing can be performed on young children. Additionally, Emma has mild neurological abnormalities that have puzzled her neurologist. With no formal diagnosis, her mother calls Emma, “My little medical mystery.” However, her physical hurdles are offset when she’s in her bouncy chair.

“Emma just wants to move her body independently; she doesn't want to be held or restricted for long periods of time. She absolutely loves it,” said Gunderson. “The thought of her outgrowing the chair is heartbreaking, because this chair is more than just a piece of equipment. It’s been a lifesaver for Emma.”

As the child quickly outgrows the chair, her parents face a dilemma: no one makes a larger version, and finding a solution became urgent. Enter three mechanical engineering seniors from the University of Wisconsin-Platteville, ready to tackle the problem.

"I got into engineering because I want to create devices that promote more equality," said Taylor Nisius, who graduated this month and is returning to her hometown of Stoughton, Wisconsin, where she is fielding offers within the industry. "I have a cousin with scoliosis who’s also on the autism spectrum. She’s always worn braces, which really restricted her. I think about all the things she couldn’t do with us that we take for granted, like swimming. She couldn’t even get her brace wet."

Nisius, along with JJ Hilliard and Bryanne Pinkowski, decided to take up Emma’s plight in the form of their [Senior Design Project](https://www.uwplatt.edu/college/engineering-mathematics-science/senior-design-projects). UW-Platteville’s College of Engineering, Mathematics and Science receives a diverse range of project proposals, which are reviewed and compiled into a list of potential senior projects. Students select the one that best aligns with their goals.

"My mother always had mobility issues, so I watched her struggle with her walker, which wasn’t ideal,” recalled Hilliard, from Madison, Wisconsin, who’s heading to La Crosse as a product design engineer for Trane Technologies. “That’s when I started getting into designing mechanical solutions, driven by the idea of creating more equality for people with disabilities.”

The trio created their team’s name and logo, Gentle Jumps, and began working on a chair that Emma could grow into, ensuring it would provide the same sense of safety and independence for the next three to four years. Designing the chair came with many challenges that the students had to work through.

"We needed a manufacturing plan, budget, fabrication plan and materials,” recounted Nisius. “One challenge we faced along the way was conducting a force analysis, especially since Emma tends to rock pretty hard in her chair. It needs to be adjustable as she grows. Her seating position will change, and while we can’t predict her growth exactly, we’re making assumptions to ensure it serves her safely for the next three to four years."

Balancing all these factors required a lot of careful planning and problem-solving, something that inspires the faculty who are advising the group.

"These students are driven to make a difference, whether from personal experience or their core values,” said Dr. Jodi Prosise, engineering professor and faculty adviser to the team. “At its heart, engineering is about shaping the world, and they are committed to doing just that."

Creating this chair has brought many people together. Darlington High School science teacher Cristina Wolfe saw a Facebook post by Rachel Gunderson and forwarded it to UW-Platteville, knowing that the engineering students create projects to help the community. Her class also followed along in the journey.

"The Platteville team has been fantastic about including my class in their communications, allowing us to follow along as the engineers progress through the design process," said Wolfe. "It's been invaluable for my students to watch the entire process unfold—from the presentation posters to the final product. This experience has really helped us understand engineering in action and its potential to make a real difference in people's lives."

At the conclusion of the presentation in Busby Hall of Engineering attended by Gunderson and her husband, Matt, she said they were overwhelmed by the community support.

“This is the greatest Christmas present we could ever receive, and we are deeply moved. To hear how much effort they’ve put into this and to see the other students in the class giving feedback to support them—it was just so inspiring. It’s more than just a chair; it’s a reflection of the incredible community that’s rallied around Emma."

For Nisius, Hilliard and Pinkowski, this project was more than just an academic challenge; it marked the final milestone in their journey as undergraduates at UW-Platteville.

"What an incredible way to wrap up my education in Platteville," said Pinkowski, who has accepted a design job near her hometown of Prior Lake, Minnesota. "It was especially exciting to share the working prototype with everyone. I was a little nervous knowing Emma and her parents were there, but they made me feel so comfortable."

Pinkowski said she plans to apply everything she learned from this final exam project to her new job.

"I'll be doing online modeling using Autodesk Inventor, which is similar to SolidWorks that I used here at school. I feel so ready!"

The students helped pack up the Gentle Jumps chair and watched the Gunderson family leave Busby Hall, realizing that this project was their chance to make a tangible difference in someone’s life. With Emma’s future in mind, they persevered through the long process of designing a chair that would not only grow with her but also provide the freedom she needs to thrive.