

Custom made by Tulane students, mobility chairs help special needs toddlers get moving

December 21 2023, by CHEVEL JOHNSON RODRIGUE and STEPHEN SMITH



Dr. Jennifer Gaubert, a physical therapist, helps introduce Freya Baudoin, 18 months, to her new mobility chair, at the Children's Hospital New Orleans Rehabilitation Center in Metairie, La., Monday, Oct. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP

Photo/Gerald Herbert

At 19 months old, Elijah Jack, born with no femur bone in one leg and a short femur in the other, is unable to walk on his own like most toddlers his age. Another 19-month-old, Freya Baudoin, born prematurely at 28 weeks and delayed in her mobility, has finally taken her first step.

Special needs children like these often take longer than most to become independently mobile, which can be a hardship for parents and others who care for them. Elijah is often carried because of his limb difference and clubfeet, meaning that instead of being straight, his feet are twisted inward and his toes point downward.

As a result, getting around on his own is a challenge.

That was until this past Spring. Elijah was one of the first recipients of a specially designed rolling chair built by a team of biomedical engineering students at Tulane University. Today, Elijah has mastered getting around on wheels—turning, stopping and steering all on his own.

"He loves his chair," said Crystal Jack, Elijah's mom. "So, I get a lot of things done because I know in his chair, he's safe. He know how to go around the house with it and everything, so I get a lot of things done now."

Before the chair, Jack said her son was able to scoot on the floor to get where he needed to go but the chair offers a whole new level of independence.



This photo released by Tulane University shows Tulane biomedical engineering students building specially designed mobility chairs for children at the MakerSpace workshop at the university Sunday, Sept. 24, 2023. The students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: Sabree Hill/Tulane University via AP

"Like I said we come a long way, but I'm blessed to have him," Jack said, smiling warmly as he moved back and forth around the living room of her mother's home in Ventress, Louisiana.

The Tulane students partnered with the nonprofit [MakeGood](#) in 2022 to design and produce the chairs to help toddlers (roughly ages 1-4) build

independence and strength, and for some, prepare for a real wheelchair. While it remains difficult to access precise numbers for total wheelchair use among children, there were about 2.8 million wheelchair users in the U.S. in 2002, of whom 121,000 were under 15 years of age, according to the US Census.

MakeGood is the New Orleans area coordinator for [TOM Global](#), an Israeli nonprofit that combines modern design and digital manufacturing to fulfill neglected needs of people with disabilities and limitations. TOM stands for Tikkun Olam, which is Hebrew for "repairing the world."



Elijah Jack, 1, wheels himself through his home in his mobility chair, which was built as a donation by Tulane University students, at his home in New Roads, La., Thursday, Nov. 30, 2023. Tulane science and engineering students are making

the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert

The students partnered with the nonprofits as part of a service-learning project—a graduation requirement at Tulane. But many say they had no idea when the project started the depth of impact their chairs would make in the lives of children in the community.

Dylan Lucia, a graduate student at Tulane from the San Diego, California area, said he chose the field of biomedical engineering to help people and this project has manifested that.

"Seeing that direct kind of patient feedback and seeing how much these (chairs) were improving their lives and helping them become a more independent person, even as a small toddler ... like, it was really, really endearing to see something like that and to see the positive change," Lucia said.

The chairs are particularly helpful for families whose children will eventually need wheelchairs. Noam Platt, director of MakeGood, said insurance companies typically don't cover the cost of a wheelchair for a child unless there is sufficient evidence that the child can use it effectively.



This photo released by Tulane University shows biomedical engineering students Leah Abraham, left, and Shayne Shelton use a drill to secure a side panel of a mobility chair, as they build the specially designed chairs for children at the MakerSpace workshop at the university Sunday, Sept. 24, 2023. The students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: Sabree Hill/Tulane University via AP

"These devices are used to create that evidence that their quality of life will be improved so they can get maybe a more durable assistive technology," Platt said.

Freya's chair was one of five made throughout several weekends early

this fall at Tulane's [Scot Ackerman MakerSpace](#), an enormous workshop with laser cutters, 3D printers and drilling and sewing equipment.

Students applied padding and safety straps to the chairs, and some required modifications to accommodate the needs of the children receiving them. For instance, Freya's chair needed a wider strap to help secure her torso, and another patient needed a space behind the chair big enough to hold his breathing vent. Freya's chair also had a bar added to the back, so that she could push it like a stroller. She took her first steps in early December after working with her physical therapist and her chair.



Elijah Jack, 1, looks up from his mobility chair, which was built as a donation by Tulane University students, at his home in New Roads, La., Thursday, Nov. 30, 2023. Tulane science and engineering students are making the second batch of

mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently.

Credit: AP Photo/Gerald Herbert

There's no word on how long Freya will have to use the chair but her mother said it has been more than a blessing.

"At first, we thought the [muscle tone](#) in her ankles wasn't strong enough for her to walk at all, but the neurologists recently told us everything is looking good and she should be walking on her own or with limited assistance soon," said her mom, Heather Hampton, of Metairie, Louisiana.

Hampton said Freya's able to push the chair like a stroller on her own. She wishes they could've gotten it sooner but understands the adjustments that needed to be made.

"We're just happy that she'll ultimately be able to get around and walk independently," Hampton said.

Platt said the mobility chairs' original design and plans came from TOM Global but the parts were purchased in the U.S. or made and then assembled by hand at Tulane. The wood panels used for the chair's frame were laser cut and then sanded by students to buff out any splinters and rough edges. Padded seats were stuffed into fabric cushions sewn by students. Wheels were purchased online and then screwed into place.



This photo released by Tulane University shows students, left to right, Kailee Oswald, Shayne Shelton, Leah Abraham and Solomon Lissauer, showing of a finished product as they build the specially designed chairs for children at the MakerSpace workshop at the university Sunday, Sept. 24, 2023. The students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: Sabree Hill/Tulane University via AP

Elijah has had his chair since the end of March. It was made in the first batch of about 10 chairs delivered to pediatric patients for use in occupational and physical therapy sessions.

"His chair shows him that, like, 'I could be up like other children.' You

know, he don't let his (being) disabled get in the way," said Jack who added Elijah will likely need some type of mobility assistance for the rest of his life.

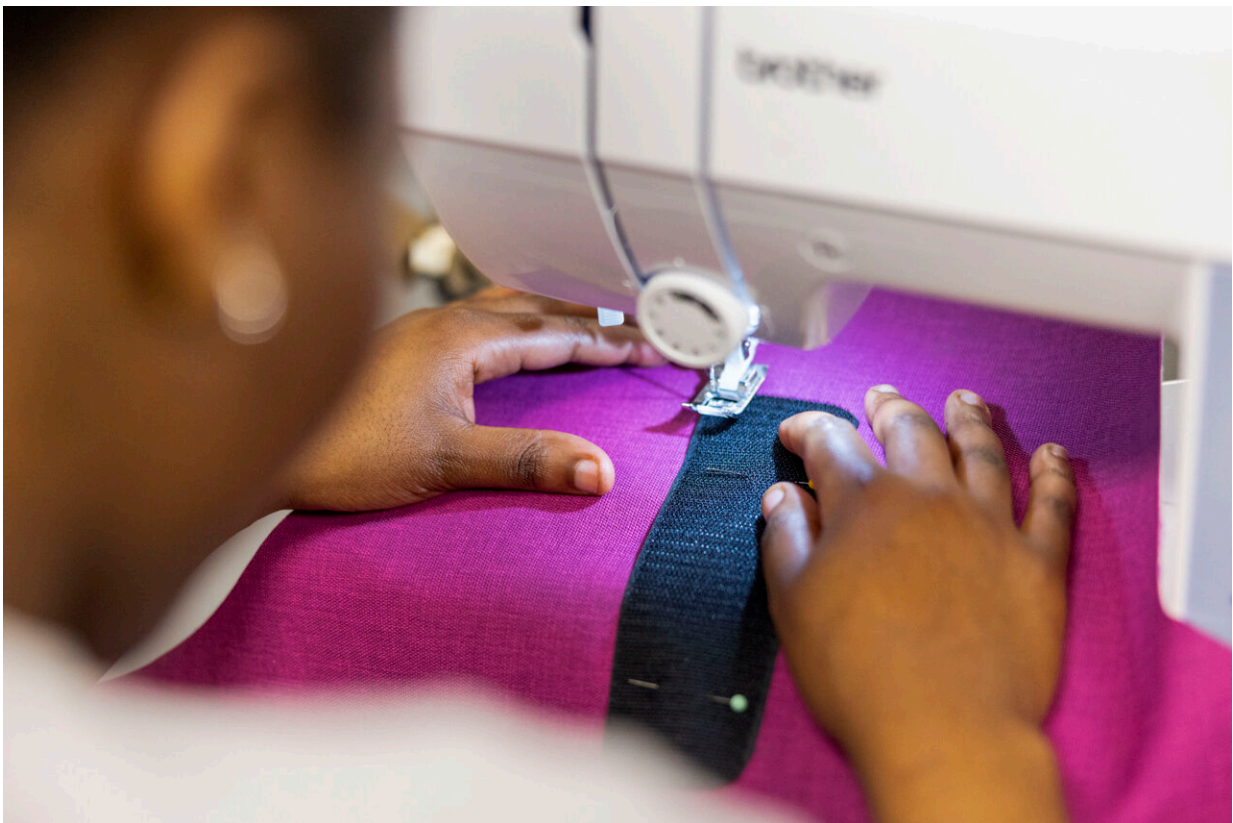
Bumpers were added to the bottom front of the most recent batch of chairs after parents from the first round said their furniture—and feet—were taking hits as their children became better and faster at using their chairs.

Platt said there have been two rounds, so far, of chair building and 15 chairs have been given away. But, he said they're aiming for at least 10 to 15 more by Spring 2024.

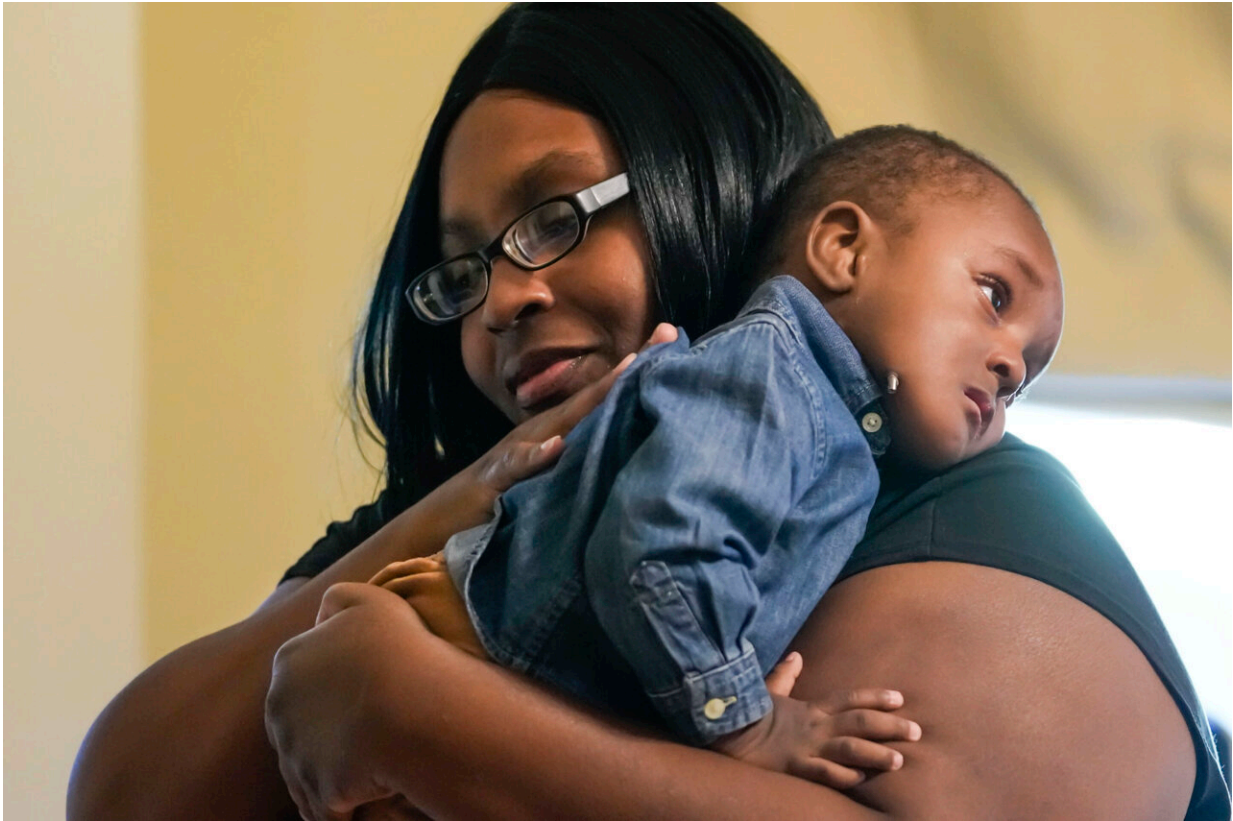


This photo released by Tulane University shows biomedical engineering student Alyssa Bockman uses a screwdriver to secure a side panel of a mobility chair, as

she builds the specially designed chairs for children at the MakerSpace workshop at the university Sunday, Sept. 24, 2023. The students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: Sabree Hill/Tulane University via AP



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Crystal Jack holds her son Elijah Jack, 1, at her home in New Roads, La., Thursday, Nov. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert



Crystal Jack straps her son Elijah Jack, 1, into his mobility chair, which was built as a donation by Tulane University students, at her home in New Roads, La., Thursday, Nov. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert



Heather Hampton kisses her daughter Freya Baudoin, 18 months, as she is introduced to her mobility chair for the first time, at the Children's Hospital New Orleans Rehabilitation Center, in Metairie, La., Monday, Oct. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert



Freya Baudoin, 18 months, sits in her mobility chair for the first time at the Children's Hospital New Orleans Rehabilitation Center in Metairie, La., Monday, Oct. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert



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Crystal Jack assists her son Elijah Jack, 1, in his mobility chair, which was built as a donation by Tulane University students, at her home in New Roads, La., Thursday, Nov. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert



Crystal Jack places her son Elijah Jack, 1, into his mobility chair, which was built as a donation by Tulane University students, at her home in New Roads, La., Thursday, Nov. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert



Heather Hampton helps her daughter Freya Baudoin, 18 months, into her new mobility chair at the Children's Hospital New Orleans Rehabilitation Center in Metairie, La., Monday, Oct. 30, 2023. Tulane science and engineering students are making the second batch of mobility chairs for toddlers, that will eventually go to pediatric patients at Children's Hospital. Wheelchairs are expensive, and insurance won't cover the cost for children unless the child proves they can operate it independently. Credit: AP Photo/Gerald Herbert

"We coordinate with our clinical partners to find kids that would be a good fit for these devices," he said. "We work with the clinical team to make sure each [chair](#) fits the individuals and make customizations if necessary."

Platt said the chairs cost less than \$200 each to make, and even though

these chairs were donated to patients at no cost, the price is still much lower than most pediatric wheelchairs on the market and electric-powered wheelchairs can run into the thousands.

The student-made chairs also look and feel more like toys than hospital equipment, Platt said. They're made to be light and easy to maneuver.

Platt said he'd ultimately like to see the chairs be made in high schools and colleges across the country.

"For the students that I work with, I tell them this is just the beginning," Platt said. "I'm trying to open their eyes to kind of a lifelong passion that they'll have to solving these problems because once you see the problems, you see the scope of the problems and you can't really ignore them."

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Citation: Custom made by Tulane students, mobility chairs help special needs toddlers get moving (2023, December 21) retrieved 2 May 2024 from <https://medicalxpress.com/news/2023-12-custom-tulane-students-mobility-chairs.html>

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