

Celebrating The Women Behind Some of Toyota's Most Innovative Patents for International Women in Engineering Day

June 23, 2022



Ask any engineer what motivates them, and the answer likely has something to do with solving problems. That drive is exactly what keeps Toyota — and its people — moving forward. It's also one of the reasons why Toyota received [more patents than any other automaker in 2021](#). In keeping with its pillar of Continuous Improvement, Toyota continues to invest in research and development (R&D) across the company.

Lauren Abro, principal engineer at Toyota Motor North America Research & Development (Toyota R&D), believes that anyone — from any department — can develop an idea for a patent. And in shifting from a car company to a mobility company, she says, Toyota is not limiting itself.

“We’re constantly trying to use each of our backgrounds and experiences to develop something more efficient and better for our customers,” she says. “Patents aren’t just for design. We all have the ability to come up with a patent when we think about what our customers need and how we can implement it.”

Abro is one of many female engineers at Toyota whose innovative ideas solve problems for customers every

day. Women make up 14.5% of all engineers around the world, according to June 2021 data cited by the Women's Engineering Society (WES). Boosting the numbers of women in the field is at the heart of [International Women in Engineering Day \(INWED\)](#). The celebration, which is in its ninth year, is organized annually by WES in June.

In honor of INWED, read more about Abro and some of her colleagues who are consistently bringing new ideas to life.

Making Lives Easier

Abro, who joined Toyota in 2003 and now works in the Product Development Office, is an example of why representation in engineering is important. She has 13 issued US patents, 13 defensive publications, one patent application currently pending at the United States Patent and Trademark Office, and three more being considered by Toyota's legal team. While a few of those patents came from her time in the Instrument Panel and Design group at Toyota, she's developed just as many ideas since she transferred departments in 2011.



Lauren Abro

As a mom, many of the ideas she's generated with colleagues solve problems she faces as a customer. For instance, she co-designed a headrest sleeve for tablets to entertain children in rear-facing car seats with Angie Piculi, principal engineer of Vehicle Performance Development at Toyota Motor Engineering & Manufacturing North America (TEMA). And she thought of a way to create more space in the second row to make room for a child's car seat without impeding the driver's seat, allowing the driver to sit comfortably.

"It seems like a small thing, but it's going to make my life and many other parents' lives better and easier," Abro says. "That's the goal. I want to develop something that makes it easier for somebody else to use their car."

Innovating a Seat at the Table

Tangie Tolbert, product owner for Toyota's Service Connect, started five years ago in the multimedia planning

group at Connected Technologies. She developed a system for improving transportation infrastructure that includes a network access device to receive vehicle behavior data from multiple vehicles. The goal of this product is to help identify ways to improve transportation infrastructure, ultimately, helping to reduce traffic, increase driver comfort, and increase road safety. When it was patented, Tolbert says she felt like she earned her seat at the table.

“For me, it was a proud moment because my idea was something actually seen as valuable to the company and that would be useful for people in general,” says Tolbert. “Being awarded the patent, that was really big for me in terms of confidence.”



Tangie Tolbert

Tolbert, who has an electrical engineering degree from Purdue University and a master’s in marketing, knew she was interested in using her technical background for consumer products. She now works on the newly formed Product Development team.

“I’ve never had tunnel vision when it came to what I’ve wanted to do,” Tolbert says. “I’ve always wanted to dabble in various opportunities because of the engineer in me. I like to understand things and solve problems.”

Tolbert helped create the infrastructure system as a part of Patent-A-Thon, an event organized regularly by Connected Technologies that assembles Toyota employees from different departments into teams to develop new ideas based on a theme.

“There’s value in versatility of thought, so you may have someone on your team from the business side, someone from engineering, someone from another country on your team,” Tolbert says. “Patent-A-Thon is the perfect melting pot for the new ideas that are important to be at the forefront of change.”

A Team Effort

Like many Toyota employees, Lindsay Anne-Allor Babian, a principal engineer who specializes in seat design,

often comes up with ideas for patents outside of her normal responsibilities at Toyota. According to Babian, she and Abro spent a weekend with two other engineers developing patent concepts. The group ultimately came up with 11 proposals that went to Toyota Legal One: Seven became defensive publications and two are proceeding through the patent office.

“We went into this discussion purposefully trying to keep ourselves in check from squashing ideas early,” says Babian. “As engineers, while we often require proof of everything, sometimes we can get ahead of ourselves or get in our own way and say, ‘We can’t do that.’ or ‘That won’t work.’ It is important to pause, consider the idea or challenging proposal and ask ‘but why can’t we?’”

Because each of the women work in different departments at Toyota, they brought a unique perspective to the conversation. But because of their similarities, they often have the same challenges they’re looking to solve.



Lindsay Anne-Allor Babian

“We’re all moms to children under nine. We’re all engineers and married to Toyota engineers, actually,” Babian says. “There are a lot of similarities, but we work in different groups, so we also have very different, diverse technical skills, all with mom insight.”

One of Babian’s favorite projects is [Toyota for Families](#), an innovation that she created with coworker Jennifer Pelky, that helps parents install car seats correctly. According to the engineers, a huge percentage of parents install car seats incorrectly — and Babian understood how complicated it was when she became a mother. The duo wanted to create a digital tool to get the information into the palm of customers’ hands and more accessible than an owner’s manual in the glovebox.

“With my coworker’s experience in seat safety and my experience in seat design, we started off on a mission to gather the data and evidence to show why this is a big problem,” Babian says. “In less than two years, we were able to tackle this massive innovation project and launch it to the website and app.”

The duo started by creating a fake app in an effort to grow awareness and publicize the possibilities of a digital

tool. This led to them identifying key partnerships within Toyota to help develop the tool. Babian says they discovered teams they didn't even know existed — people who had the skills and capabilities to take their idea to the next level.

“My role was as one of the subject matter experts in seat design, but one of us alone couldn't do this,” says Babian. “We had to partner with a fully functioning team, each with different strengths and weaknesses that complemented each other.”

Babian had a similar experience while working on the second-row seats in the Sienna. She said the seats slide almost two and a half times closer to the rear than any standard seat Toyota offers in other vehicles. The problem? Sliding the seat that far back puts the passenger too far away from fixed objects in the vehicles, like the cupholders in the center console. Babian was challenged by Monte Kaehr, group vice president of Advanced Mobility Research & Development at TEMA, to figure out a way to integrate those features into the seat, so she took to her sewing machine to cobble together a design good enough to get some more direction from the chief engineer.

“Through experience as the customer, a mother, a seat designer and just general curiosity about sewing, I was able to patch this together,” says Babian. “And because Toyota has such a talented pool of people with so many different experiences and capabilities, if you don't have the skill, you can find someone who can fill in that gap. So as a team, you come up with a solution.”