INSIDE 'THE BLACK ROOM'

FORD'S VIRTUAL REALITY: GOING FROM PAPER TO PAVEMENT.

BY MIA DEANGELIS

Featured in many of Ford Motor Company's TV commercials, Elizabeth Baron is one of the select engineers working at Ford's Immersive Vehicle Evaluation Lab in Michigan. The "FiVE" lab, as it is nicknamed, is responsible for creating virtual models of a car for both designer and customer to look at.

Using 3D visualization technology, the FiVE lab has cut months, even up to a year, off the time it takes to get a Ford car or truck into production. It also has saved tons of money, because Ford does not have to make as many clay models during the design process. ‣

YOU'RE VIRTUALLY THERE

The "virtual car" is really just a black room with a seat in it and a headset with goggles that the "driver" wears. When Baron looks inside the goggles, she describes what she sees as "life-like." The viewer gets the ability to look at a car, and the person becomes immersed in realistic dimensions.

"You can see shadows and reflections (of the car and its interior); the leather interior actually has a visible grain pattern to it," Baron explains. "The car depicts a reflection from its sheet metal, and you are able to see city lights, creating the feel of a night in a real car. Everything changes just like it would in the physical world.

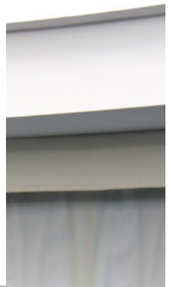
"So if you'd open a door using the technology, it would be just like opening a real door," she continues. "And with this, she and her team at Ford make measurements and inspections of the car they are seeing."

SHE'S THE 'IDEA GIRL'

Baron's job title is "virtual reality and advanced visualization technical specialist," but she really is the "idea girl" when it comes to looking for new technologies to incorporate. When asked what her normal day is like, she actually just laughed. For Baron, each day is something new. Sometimes she is collaborating with one of her nine other teammates or she is investigating new technology for the next Ford vehicle.

To get where she did in her job at Ford, Baron first went to college and got a degree in computer science. Then she got hired at Ford and began her career as a developer, working with computer graphics. One day, Baron approached her boss with, what else, an idea. She pointed out that there wasn't a specialist in virtual reality at Ford, and she wanted to be that person. Her boss loved the idea, and the rest is history.

ELIZABETH BARON STARTED HER JOB AT FORD AFTER EARNING HER COMPUTER SCIENCE DEGREE.



SHE NEVER GAVE UP

Baron is the only woman at her job, but she says she doesn't really notice that fact often. Her advice for any girl who wants to be an engineer in a field that is male dominant is to "never give up."

Baron reflected on a time where she wanted something to be understood by someone, but initially it was a bust. Even though she had trouble getting her point across to a male worker the first time, she went about it again from a different angle. This was a success. Baron extends this advice to everyone.

To become an engineer at Ford, or in any STEM field, Baron recommends a lot of math classes and any that deal with engineering or science in a student's high school and college career.

Working in a STEM field can make your dreams come to life.

A GLIMPSE THROUGH THE GOGGLES IN FORD'S IMMERSIVE VEHICLE EVALUATION LAB

BUILD A BETTER SCHOOL BUS

DESIGNING CARS IS FUN, BUT MAKING THAT SCHOOL BUS YOU'RE RIDING ON BETTER AND SAFER IS IMPACTFUL.

BY MIA DEANGELIS

TED WERNER USES HIS ENGINEERING DEGREE TO DESIGN SCHOOL BUSES.

It's 7 a.m. on a Monday. You're probably on a school bus or waiting for one. Eventually, you're on your way to another day of geometry, calculus, etc. You may start to think, who needs these classes? Do I really need to know how to calculate angles or the circumference of a circle?

But maybe you sit back and your mind begins to wander, and you take notice of that bus you're riding on. You ask yourself, who created this bus? Is it safe? How do we know it's safe? Who said it is? Is that somebody's job to say it's safe? Who even has a job making school buses?

Well, Ted Werner does. And so does David Harris. Werner and Harris are both engineers for Thomas Built Buses, which is a division of Daimler. Yes, that's the same company that makes those sweet Mercedes cars and trucks. The engineers at Thomas have a pretty awesome job themselves: making your "big yellow taxi" come to life!

"IT'S PRETTY COOL GETTING TO SEE SOMETHING THAT YOU DESIGNED ON A COMPUTER IN REAL LIFE ALL OVER THE UNITED STATES."

Harris is a mechatronics engineer. He makes sure all of the integrated electronics on new buses work together. Werner is a mechanical engineer, also known as a design engineer.

Werner got his job when he was still fresh out of college. He graduated with a mechanical engineering degree from North Carolina State in December 2012, and two weeks later started his employment with Thomas. "I've known I wanted to be an engineer since fourth grade," he explains. "I've always been into design, whether it's been playing with LEGOs and going off script, building whatever came to mind."

Now he gets to design school buses every day, loving the work he does. In today's world, designing buses is a pretty high-tech business. "It's pretty cool getting to see something that you designed on a computer in real life all over the United States," Werner says.

Werner and Harris spend their days making their designs come to life with 3D CAD modeling. But don't think they are sitting in front of a computer all day! It is a balance of on-the-floor and computer work that makes this job more hands-on than what many think of engineering jobs.

And for a young engineer, Werner notes that this is no ordinary job, "especially for someone like me coming right out of college; it's unusual to have a job where they allow me freedom to design something and have it built and put on a bus," he says. "I think that's just awesome that you can say you designed it and see it roll down the road with kids on it."

After talking with Werner, we asked Harris what he enjoys most about his job, and he said he likes the collaboration he can have with his co-workers. Harris always works to "better his product." "You're able to be creative in your own way and look at new ways to do things," he says.

And if you're still wondering about how safe your bus is, these guys got you covered. The difference between designing school buses and designing cars is that each group of buses in each state is subject to different regulations. "We're basically building a customized bus every time," Werner points out. Harris adds, "There is a more robust structure. These buses feature padding, more joint strength, and a steel structure."

Automotive engineering, in general, is an exciting field, especially for those who are into building things. But to get there, you're going to need an engineering degree, something which Werner says sounds more intimidating than it is. "Pursuing engineering is worth it in the end," he says. "If you have any interest in engineering, don't let course work get in your way. A lot of my friends looked at my engineering classes and thought, 'that's tough.' It is hard, but it leads to a lot of rewards."

Harris points out that automotive engineering-based companies such as Daimler and Thomas offer a lot of opportunities for young engineers in many other fields as well. "All over the country, anything you want to do, you can do it here."

So next time you're sitting on the bus and dreading your next calculus exam, imagine yourself fresh out of college, building buses, doing what you love, with STEM.

DAVID HARRIS IS A MECHATRONICS ENGINEER AT THOMAS BUILT BUSES.

WANT TO KNOW YOUR STEM JOBS℠ TYPE? LOG ON TO STEMJOBS.COM AND CLICK 'TAKE THE STEM JOBS℠ TYPE QUIZ' TO FIND OUT!

10 HOT AUTOMOTIVE STEM JOBS BY SALARY

	AUTO PARTS SPECIALIST	AUTOMOTIVE COMPUTER SYSTEMS SPECIALIST	AUTOMOTIVE ASSEMBLER	AUTOMOTIVE TECHNICIAN	HIGH PERFORMANCE ENGINE TECHNICIAN
WHAT WILL I DO?	You'll need to know a little bit of everything and have excellent problem-solving skills. While you likely won't be getting your hands dirty, you'll be working with a wide range of do-it-yourself customers and professionals. Keeping the right balance of stock available and knowing where and how to source hard-to-find items is also part of the job.	You deal with the computer systems found inside automobiles. You specialize in using technological equipment in examining, testing, repairing and maintaining vehicles.	You are responsible for assembling the parts that are put into an automobile when it is made. They use their hands, machines, tools and even robots to install engines and different components that are used in many vehicles.	You construct, maintain, and test automotive equipment, machinery, and components. You will need to master a growing breadth of knowledge of parts, systems and brands. As automobile technologies continually improve, so does the importance of these positions.	You specialize in high performance vehicles or parts, such as those used in national and local car races, or the many after-market kits and upgrades. You'll need good communication, mechanical and technical skills, the ability to focus on details and dexterity.
MEDIAN SALARY	**$22,000**	**$35,000**	**$37,500**	**$39,000**	**$52,000**
STEM JOBS℠ TYPE	Producer	Solver	Maker	Solver	Designer
WILL I LIKE IT?	Trivial Pursuit really could use a "Cars Only" category.	"Automotive Brain Surgeon" has a nice ring to it...	You are "The Special."	Your hands are never truly clean.	Everything you buy from a store is a starting point.
SCHOOLS THAT TRAIN	• Bates Technical College • Central Community College • J.F. Drake State Community & Technical College • Northwood University • Southeast Community College	• Cossatot Community College of the University of Arkansas • Northland Community and Technical College • Red Rocks Community College • Seminole State College of Florida • Universal Technical Institute	• Austin Peay State University • Bismarck State College • Sowela Technical Community College • Saint Paul College • Washtenaw Community College	• Gwinnett Technical College • Northland Community and Technical College • **Rosedale Technical Institute** • Seminole State College of Florida • Washtenaw Community College	• Los Angeles Trade Technical College • NASCAR Technical Institute • Universal Technical Institute • Washtenaw Community College
WHO'S HIRING	• Chrysler • Lithia Auto Stores • NAPA • O'Reilly Auto Parts • Rosner Auto Group	• Christian Brothers Automotive • Goodyear • Penske Automotive • Snap-On Inc. • Tesla Motors	• Bertrandt • Honda • Mazak Corporation • Schaeffler Group • Telamon	• AutoNation • Elite Auto • Nissan • Sears • Toyota	• General Motors • Hendrick Motorsports • K1 Speed • Motor Werks Racing • Pratt & Whitney

	AUTOMOTIVE SIMULATION SPECIALIST	FUEL CELL RESEARCH TECHNOLOGIST	VEHICLE RELIABILITY ENGINEER	AUTOMOTIVE DESIGN ENGINEER	AUTOMOTIVE CONTROLS ENGINEER
WHAT WILL I DO?	You work closely with the automotive engineering group to test designs and performance against internal and external requirements and specifications. You don't create the cars and parts, you make them safer and more effective.	You focus on working with the engineering team and collaborating partners to integrate new fuel technologies into a power generation system. You'll toss around terms like catalytic reactors and fuel cell systems while you usher in the new age of automotive vehicles.	You analyze the reliability of design, cost, weight, production and consumer satisfaction of automotive products. You will develop the methods and measures of analysis based on customer and contractual obligations and prepare reports, charts and diagrams to disclose results and highlight areas for further investigation.	You may design anything from high performance engine components to vehicle interiors. Many people associate design with how the finished car looks, but every bolt and circuit on a modern vehicle requires design work.	You design, develop, and sometimes supervise all aspects of electrical control systems, equipment and machinery. With today's manufacturing processes, you will also be responsible for the successful integration of both external and internally developed parts, components and systems.
MEDIAN SALARY	**$76,000**	**$85,000**	**$86,000**	**$88,000**	**$97,000**
STEM JOBS℠ TYPE	Advisor	Explorer	Investigator	Designer	Solver
WILL I LIKE IT?	"So what would happen if..." is your favorite phrase.	You've been running on alternate fuel for years.	You constantly have to keep the dreamers grounded in the real world.	You want to know what happens to those concept cars.	Control freak, that's you.
SCHOOLS THAT TRAIN	• ECPI University • Robert Morris University • Rochester Institute of Technology • University of Colorado • University of Idaho	• Stanford University • University of California - Irvine • University of Maryland • University of South Carolina • University of Washington	• Georgia Institute of Technology • Michigan State University • Texas A&M University • University of California Davis • University of Maryland	• Clemson University - ICAR • Kettering University • Oakland University • University of Michigan • University of Texas	• Cal Poly Pomona • Ferris State University • Oklahoma State University • Southern Illinois University • Stark State College
WHO'S HIRING	• Allison Transmission Inc. • ESG Automotive • GM • Honda R&D • PASA Panasonic Automotive Company	• Cell Energy Inc. • Hyundai Kia America TC • Sensors & Electron Devices Directorate • Solazyme • Toyota	• Daimler Trucks North America • GE • Nissan • Tesla Motors • Volvo Group	• Daimler Trucks North America • GE • Harley-Davidson • Keihin North America • Roush Enterprises	• Dassault Systems • Ford Motor Company • Nexteer Automotive • TRW Automotive