SAE INTERNATIONAL®

EATON
Powering Business Worldwide

# DEVELOPING MOBILITY ENGINEERS FOR A DEMANDING FUTURE

Given a glass with some water in it, the optimist would say that it's half full. The pessimist would say that it's half empty. The engineer, however, would probably say that the glass is too big!

Professional engineers are like that. They rely on solid data input to frame each problem as it really is, and use good tools to work toward a realistic solution. That's how **Dr. Jim McCarthy, Jr., Chief Engineer of Vehicle Technology and Innovation at Eaton**, views the critical challenge of developing new engineering talent to meet future demands in the search for engine design solutions at one of the largest enterprises in the mobility field. To Jim, it's all about using the best tools at hand to solve a problem.

## JIM McCARTHY

Jim earned a Ph.D. Mechanical Engineering from Purdue and began his career with Detroit Diesel in 1995. He moved to Eaton in 2003. A total of 59 patents have his name on them and he has been published 25 times in SAE journals and magazines. He received SAE's John Johnson Award for best diesel paper in 2018 and Best Presentation Award for his work at SAE Brazil in 2019. Purdue honored him with its Outstanding Mechanical Engineering Career award in 2020.

# TECHNICAL TALENT REALITIES

With success comes structural challenges. The U.S. will need to fill over 140,000 new engineering jobs by 2026, according to the U.S. Bureau of Labor Statistics. Couple this with a Society of Human Resource Management forecast of a 27% drop in manufacturing sector employees due to retirement in the next decade, and the problem begins to come into focus.

Managers like Jim know that it can also take more than eight years for a new engineer to acquire the expertise needed to make difficult technical decisions. Shortening this learning curve in a technical job market that is expanding, and a labor pool that is contracting, requires creative thinking, motivation and collaboration on resources.

In most manufacturing organizations, like Eaton, engineers are considered "critical talent" because of the ROI and organizational value their efforts can create. Part of the development of critical talent in our rapidly changing world, according to Jim, is through improvement in communication skills, especially with new engineers.

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# TRAIN, CHALLENGE & MOTIVATE

Through his efforts at Eaton, Jim has made it his personal mission to help new engineers advance their careers and prepare them for future mobility challenges. He says that one of the best ways to do this is by taking advantage of communication tools that have been used, improved, and accepted by the profession for many years. "In my opinion," according to Jim, "organizations like SAE have one super strength in the development of an engineer, and that is, you can publish a paper as part of a technical meeting and present it on the same day."

This "publish and present" strategy is at the core of Jim's mentoring and motivating efforts with upcoming engineers at Eaton. "The best venue that allows me to help develop communication skills in young engineers is SAE, because you get potential access to respected, peer-reviewed technical paper publications, and the opportunity to present your information in front of 500 or so people — live, which makes this process so important" he says.

According to Jim, the focus of having to produce the structured logic of a paper, coupled with the ability to present your data in front of industry and academic peers, not only builds experience and recognition, but also skill-based confidence and a career head start. Three of Jim's direct reports have received best presentation awards at three different SAE events and two have earned Engineer of the Year honors at Eaton.


# BUILDING THE TALENT PIPELINE

**The many engineers that Jim has helped through this “publish and present” process are now doing the same thing for younger engineers. One of the people Jim mentored while at Eaton is Tim Korhumel, currently a Certification Engineer at Toyota Motor North America Research and Development. Tim has been a member of SAE since graduating from the University of Michigan and currently works on several SAE committees.**

Some of the goals that Jim set for Tim included producing one patent application and one paper for publication each year. According to Tim, the experience of researching and writing to meet the high standards of publishing in SAE’s influential journals, and for events like SAE COMVEC™, has been crucial in his career and has helped with his Master’s thesis. “Networking and recognition from publishing is important,” Tim added, “but working on a team to write a paper and networking at an associated meeting like COMVEC is a great experience. People go to SAE events to see where the industry is headed.”

Mrunal Joshi, currently an Electrification Controls Engineer with Cummins, met Jim while she was a grad student at Purdue in 2016. They teamed up on a project, together with people from Cummins, Eaton and Purdue, exploring strategies to make diesel engines more efficient. She says Jim promoted the idea of doing a paper on their work which was subsequently presented at the 2018 SAE World Congress.

Mrunal has been an SAE member since 2016 and has since produced two papers as first author and seven as co-author. She was also part of a student panel on powertrains at SAE COMVEC in 2019. According to her, “The biggest advantage of presenting at an SAE event is the large, talented audience of technically strong people who give you immediate questions and feedback which adds so much value in terms of improving your existing ideas.”

As part of his ongoing efforts at Eaton, Jim usually starts working with new engineers by giving them two or three SAE journal papers to read as part of their training. This exposure begins the process of learning and understanding the system of research, communication, peer feedback, and subsequent improvement. As Jim notes, “The world is changing. We have to constantly make things better, and part of making it better is via communication, which we do through journals and papers and conferences. If you don’t communicate, you don’t even get input into what you are doing.”

Due to the distancing effects of the Covid-19 virus, Jim says that Eaton is now setting up webinars and is also sponsoring the student sessions at SAE COMVEC. You can count on Jim continuing his passion for developing the skills of new engineers. “SAE has so many tools to offer,” Jim adds. “They are present all over the world, so several times per year I can find something in almost any country where we can meet work objectives. Their networking ability is second to none.”

## SUMMARY

With an aging technical workforce, increasing demand for engineering talent, and the constant need to effectively communicate, using professional tools and solutions like SAE technical paper publishing and professional meetings and courses to nurture and develop critical talent is essential. SAE is committed to collaborating with industry professionals like Jim McCarthy to educate, develop and produce mobility engineers able to handle the challenges ahead. Eaton’s engineering management encourages its team to make intelligent and productive use of the tools available. This process not only works for the individual engineers involved, but also for the entire enterprise.


**30** Technical Communications and Networking Events

**7,500** Recent SAE Journal Articles

**140,000** SAE Technical Papers

**14** Scholarly Journals

## ADDITIONAL RESOURCES

SAE International publishes 13 scholarly journals, 6 professional magazines, and produces and hosts over 30 technical communication and networking events worldwide each year. Over 7,500 recent SAE journal articles and more than 109,000 full-text SAE technical papers are also accessible via the SAE MOBILUS technical resource platform. These influential tools are available to academic and working professionals to aide in the dissemination of important research and practical solutions for the mobility engineering field.

For further information, visit **sae.org**.

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