

H. SCOTT FOGLER



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Professor Scott Fogler's contributions to chemical engineering education have been enormous. Details about Scott's numerous achievements can be found at AIChE and University of Michigan websites.^[1,2] Here I will focus on the impressive awards and accolades that Scott earned that highlighted a life of intelligence, curiosity and dedication to the field of chemical engineering and especially chemical engineering education. The reflections from his former students and colleagues that follow will shed additional light on his passion, his humor and his impact – both professionally and personally – on so many of us who were lucky enough to call Scott a teacher, a friend, a mentor, and a colleague.

Professor H. Scott Fogler passed away on August 21, 2021 after an active 56 years as a University of Michigan Chemical Engineering professor. He served as chair of the department from 1985 to 1990 and at the time of his death held the titles of Arthur F. Thurnau Professor and Ame & Catherine Vennema Professor of Chemical Engineering.

Scott authored *Elements of Chemical Reaction Engineering* and *Essentials of Chemical Reaction Engineering*. These textbooks, currently used in an estimated 75% of the chemical engineering programs in the US, have dominated the world market for the past 25 years, helping to prepare generations of chemical engineers. Scott co-authored *Strategies for Creative Problem Solving*, winning the American Society for Engineering Education's (ASEE) Meriam/Wiley Distinguished Author Award (1996), and, in addition, was honored with the AIChE Warren K. Lewis Award for Chemical Engineering Education (1995) for contributions of lasting educational influence. He recently launched a new *Process Safety Across the Chemical Engineering Curriculum* initiative.

Scott's most notable service was to AIChE, where he served as President in 2009, and, among other achievements, created the long-running and much lauded Chem-E-Car Competition®. Scott's most recent honors include an honorary degree, *Doctor Honoris Causa*, recognizing his international impact, from Universitat Rovira i Virgili, Tarragona, Spain (2017); the AIChE F.J. & Dorothy Van Antwerpen Award for Service to the Institute (2019); the ASEE CACHE Award for Excellence in Computing in Chemical Engineering Education (2019); and the Michigan Distinguished Professor of the Year from the Michigan Association of State Universities (2020).

Scott is survived by his wife, Jan; his 3 children, Peter, Robert, and Kristin; and 4 grandchildren.

TRIBUTES FROM COLLEAGUES

Scott was a giant in our community who made a significant impact on all he encountered. Even more than 25 years after taking his class, he is someone who always arises in conversation anytime I bump into another U-M ChE alum. He left an indelible mark on everyone who passed through his classroom. It was ever more rewarding to get to know him as a colleague working in catalysis and reaction engineering in later years.

— **Christopher W. Jones**

*John F. Brock III School Chair & Professor
Georgia Institute of Technology (BSE ChE 1995, Michigan)*

I am deeply saddened by this news. I am a 1994 graduate of Chemical Engineering from Michigan, and Scott is the reason that I am a faculty member. When I was a senior, I worked for him as an Undergraduate Teaching Assistant and was responsible for the development and grading of his open-ended problems for his class. I told him I was thinking about graduate school, and he encouraged me to be a professor. He was a wonderful man and a great mentor, and I will be forever grateful for his passion for education and love for students. Would you please pass along my condolences to his family and the department. We have lost a giant in the profession.

— **Susan M. Williams (Stagg-Williams)**

*Charles E. & Mary Jane Spahr Professor and Chair Chemical and Petroleum Engineering
University of Kansas (BSE ChE 1994, Michigan)*

Professor Fogler touched the lives of countless students through his lifelong commitment to education. Despite decades in education and having one of the most widely adopted textbooks worldwide, Professor Fogler adopted a process of continued improvement and refinement to adopt new teaching styles, incorporate advancements in technology, and generate modern examples to engage younger generations of students. I was fortunate enough to witness his dedication firsthand during my graduate studies under his supervision. It was a frequent occurrence when I met with Professor Fogler to see him pouring over and revising his notes for an upcoming lecture or diligently working on new editions for his pioneering texts. Professor Fogler's commitment to education also encompassed his approach to graduate education. The utmost goal was always to use a given research challenge as an instructional tool of rigorous scientific thinking, first principles approaches, and clear communication. Professor Fogler's approach represents the gold standard of excellence in education that all in education should strive for.

— **Michael Hoepfner**

*Associate Professor of Chemical Engineering,
University of Utah (Former PhD Student of Scott Fogler at Michigan, 2013)*

The creativity of his works made it obvious that Scott had fun being a professor. He created AIChE's Chem-E-Car Competition, and being the gifted educator he was, he could see across generations. He had a passion and interest (in the 2010s) in Millennials, in which he invested deep thought on how to evolve engineering education to better teach future generations. His textbook problems often involved real case studies or scripted investigations where not even Sherlock Holmes stood a chance, like something from the movies. Scott taught his students how to be problem solvers by applying chemical reaction engineering principles to just about anything, from hippopotamus digestion, snake-bite envenomation, and computer chip manufacturing, to environmental remediation, solar energy, and transdermal drug delivery. In more recent years, he led an initiative to teach process safety across the chemical engineering curriculum, creating safety modules of real-life cases for all core chemical engineering courses.

— **Ryan Hartman**

*Associate Professor of Chemical and Biomolecular Engineering
New York University (Former PhD Student of Scott Fogler at Michigan, 2006)*

Scott Fogler was one of those rare professors who excelled at writing textbooks, publishing research, training graduate students, being an outstanding teacher, and providing major service to the profession. I first met Scott sometime in the 1980's and we interacted many times over the years. I used his reactor design book in my undergraduate course for many years, until I was assigned to teach a different course. I first used it in typed form before it was published. I also read his spiral-bound reaction engineering textbook/workbook that required students to answer questions on each page; it was ahead of its time. Even though many chemical engineering kinetics textbooks were available, his reaction engineering textbook became the dominant textbook for undergraduate courses. Scott and I spent many hours discussing how to teach kinetics and how to make screencasts for kinetics. We also spent many hours in friendly arguments over the definition of selectivity for chemical reactors. I preferred the definition that was used in the research literature in heterogeneous catalysis, and that was the definition I used in screencasts I recorded for the LearnChemE website. Scott used a different definition in his textbook, and he insisted this was the only correct definition. He pointed out to me over several years that my screencasts were wrong, and he wanted to be able to refer students to our screencasts. Since eighty percent of undergraduate chemical engineering students used his textbook, it made sense to use his definition in our screencasts and so I remade them. In addition to his reaction engineering textbook, he published a book on problem solving. He also created a computer program that was used to teach trouble shooting; this was also ahead of its time.

Scott had several connections with Colorado and the University of Colorado Boulder. He received his PhD from our department (before I joined the department). He was on the department advisory board for several years. He owned a condo in Winter Park, Colorado for many years and visited Colorado often during ski season. More recently, Scott and Jan purchased a condo in Louisville, Colorado, which is about 10 miles from Boulder, and stayed there often when visiting their children and grandchildren, who live in Denver. Thus, my wife and I were able to get together with Scott and Jan for dinner when they were in town, most recently in June of 2021. We will truly miss Scott.

— **John L. Falconer**

*Mel and Virginia Clark Emeritus Professor of Chemical and Biological Engineering
University of Colorado Boulder*

When I was a new assistant professor, I stopped by the U-M reception at AIChE, and he made a beeline for me because a kind emeritus professor from my unit had tipped him off that I was teaching reactor design. Scott spent the next half hour chatting with me about the book, learning about my class, and telling me about his new edition (*Essentials*) that would be a better fit for the Q system. I was super nervous the whole time, and he couldn't have been kinder. I left that meeting feeling energized and excited about my class. Now, every time I'm at conferences, I try my best to spend some time with new faculty and emerging investigators even though it is not a natural comfort zone for me.

— **Jim Pfaendtner**

*Steven and Connie Rogel Endowed Professor Chemical Engineering
University of Washington*

Professor Fogler's approach was to make his graduate students great thinkers, more than just experts on the narrow subject of the PhD. He believed that the critical thinking skills developed during a PhD, particularly when analyzing things from first principles, can allow one of his students to handle any problem faced before them. He also took great pride in the career trajectories of his graduate students, whether they were entering industry (petroleum or otherwise) or academia. I particularly appreciated his enthusiasm for the path I chose to take, one as a professor at a teaching-focused, undergraduate only institution.

— **Michael Senra**

*Associate Professor of Chemical and Biomolecular Engineering
Lafayette College (Former PhD Student of Scott Fogler at Michigan, 2009)*

This is indeed a tragic loss for our community. Scott was amongst the leaders in reaction engineering, and many of us were first introduced to the subject by his excellent textbook. However, Scott's impact on the profession went way beyond the impact of his book, as he played a pivotal role in the evolution of reaction engineering in the chemical engineering community. Here at the University of Tennessee, Knoxville, we are saddened by the news of Scott's passing. We wish to offer our most heartfelt condolences to his family and his colleagues.

— **Bamin Khomami**

*Head, Chemical & Biomolecular Engineering
University of Tennessee*

My favorite, personal memories of Scott:

- Taking his undergrad reaction engineering course at U-M (including him inviting the entire class to his house for a picnic at the end of the semester)
- Getting to be one of his undergrad teaching assistants for reaction engineering in-class problem solving sessions as a senior; that was one of the experiences that helped me know that I wanted to be a professor
- The way he would always take time at conferences to check in and see how things were going as a young faculty member

Tremendous energy and passion. Tremendous individual.

— **Kenneth M. Benjamin**

*Interim Department Head/Associate Professor of Chemical and Biological Engineering (CBE)
South Dakota Mines (BSE 1995, PhD 2005)*

Sending sincere condolences on behalf of the ChE faculty at Wayne State University. Such a huge loss to our community. It would be difficult to find a chemical engineer who was not impacted by Scott's work. I still remember the conversation we had about balancing teaching and research when I was a tenure-track assistant professor. I had gotten myself skewed a bit too heavy towards teaching, and my research was lagging. He said, as an assistant professor, I should be focused on research, and kicking field goals in my teaching. Kicking field goals? I couldn't believe what I was hearing and I thought we were going to have some grand conversation about ChE education. Nope. It was get your research moving, get tenure, and then think about education. It was good, pragmatic advice, and it gave me a nudge in the right direction just when I needed it.

— **Jeffrey Potoff**

*Interim Chair, Department of Chemical Engineering and Materials Science
Wayne State University*

This is very sad news indeed. Scott was an inspiring teacher, mentor, and friend to me. He had a unique ability to connect to people and was generous with his time and advice. He was of course a giant in chemical engineering education whose legacy will live forever. My sincere condolences to the department and his family.

— **Prodromos Daoutidis**

*College of Science and Engineering Distinguished Professor Chemical Engineering and Materials Science
University of Minnesota (PhD ChE 1991, Michigan)*

ALUMNI MEMORIES

It took me a while to get to the point where I could sit down and draft my thoughts about the passing of a great icon, teacher, motivator, and colleague. There are some rare moments I remember as a student where I knew that I was in the presence of someone who was great and full of legacy inside of them. These individuals were sometimes students and professors. Regardless, Scott Fogler was one of them.

I never had someone teach me chemical engineering concepts with the clarity, confidence, boldness, and elegance like he did, and I'm so glad that he spread his gift and purpose to the world. I'm blessed to have been one of his undergraduate students and even help proctor some classes for him as a post-doc. He wrote one of my reference letters for graduate school which totally changed the trajectory of my career and life.

His impact on me, my family, the community, and the ChE industry at large is unmatched, and I hope to continue representing all of the knowledge he poured into us in the best way that I can.

He was always fair, inclusive, and committed to teaching each of us, often spending massive amounts of quality time outside of the classroom making sure we were clear on various topics around reaction engineering and kinetics. I always enjoyed his honest and candid approach as a professional and friend. He will be missed greatly.

— **Cory Phillips (BSE 1993)**

You are a proud student of Professor Fogler when:

- You remember the dreaded in-class reaction assignments that required pre-reading/understanding of the material taught in class that day
- You still dream about CSTRs and PFRs
- You still talk about the reactions group practical project like you worked on it yesterday; mine was the AIChE competition Chemical Battery Operated Car
- You still proudly display your yellow copy of *Elements of Chemical Reaction Engineering* in your office so you can tell everyone you were taught reactions by Professor Fogler

Professor Fogler was not just the leading expert in reactions engineering; he was also passionate about sharing his knowledge and was just a nice person. He will be missed; however, his legacy will continue on.

— **Julie Rivard (BSE 2002)**

I had emailed him a few months ago to try and arrange a meeting to catch up over lunch. We both agreed that when COVID settled down that we would try to make our calendars align and now he is gone, so very sad. Regarding a memory... of course everyone revered Professor Fogler's *Reaction Engineering* book. While I was his student in 2000-2001, he would give each student a fifty cent piece if you caught a mistake/error in the current copy of his book. Professor Fogler was using all his current students as extra editors before the next revision was going to be published. While working on a homework assignment, I found an error or typo in his book. I couldn't believe that I had found a flaw, so I confirmed with a few of my peers and they agreed with me. I was so nervous to share it with him because perhaps I was not understanding the concept fully and it was just my mistake, "how could his book be incorrect?"

My fears were quickly set aside as Professor Fogler was thrilled with my find and gave me my reward. I could have cared less about the fifty cent piece, but seeing that my act had made this influential person's face light up with glee was so rewarding. I think he was a) happy I had caught a mistake and b) thrilled that I had read to such a detail that I caught such a small error, which meant I was truly learning the material.

I learned so much in ChE 344 and have retained much that Professor Fogler taught me in his class.

— **K.C. Chomistek (BSE 2002, MSE 2006)**

Scott was both a colleague and a personal friend. Three things stand out in my mind: his commitment to undergraduate education, his early acknowledgment of biotechnology as a part of chemical engineering, and his leadership in pushing new ideas.

When our company was trying to educate students about career opportunities in the food industry, Scott came up with the idea of including related problems in his text and courses. He reached out to those of us in industry for assistance and provided summer employment for students who learned while helping to write up problem sets.

When many professors were focused on graduate students, he understood the importance of undergraduate education. When he came up with the idea of the Chem-E-Car Competition for AIChE, we worked together to get it started.

He taught more than reaction engineering. His book *Strategies for Creative Problem Solving* proved very useful in a product development course that I taught at the University of Minnesota. I truly understood his impact on our profession at an AIChE meeting during my Presidential year. We were talking, and I observed a group of students looking at us and whispering in a bit of awe, “that’s Scott Fogler.” Everyone connected to chemical engineering knew and respected him.

Helping him get elected as AIChE president was a pleasure which proved his worth as he urged ideas such as webinars which were new at the time.

Scott Fogler was a special friend. He will be missed.

— Sid Sapakie (BSE 1967)

So sad to lose the last of those I learned so much from during my time in Ann Arbor. I transferred to U of M in the fall of 1976 and jumped into my engineering classes. I felt like I was under water for quite a while as I was taking some of my ChE classes lacking helpful prerequisite courses.

By the time I landed in my Reaction/Kinetics class in January 1977, I was feeling a little better...until Professor Fogler started to speak! Initially I found him super intimidating, but quickly learned he was an outstanding educator and a wonderful person. While I was thoroughly challenged...it was far and away the best class I took in my BSChE journey! I was back with Professor Fogler in the summer of ‘78 for an independent study course before my graduation. So many fond memories of the man...so thankful for his legacy.

— Jim Cross (BSE 1978)



Professor Scott Fogler with the 2019 University of Michigan AIChE Chapter Student Leadership Team. Under Professor Fogler’s guidance as Faculty Advisor from 2008 to 2019, U-M received AIChE’s Outstanding Student Chapter Award 10 years in a row.

REFERENCES

1. (AIChE Memorial) *H. Scott Fogler, AIChE Fellow and Past President*, available at <https://www.aiche.org/chenected/2021/08/h-scott-fogler-aiche-fellow-and-past-president>
2. (University of Michigan Memorial) *Remembering H. Scott Fogler, 1939-2021*, available at <https://che.engin.umich.edu/2021/08/24/remembering-h-scott-fogler/>