



The College of Polymer Science and Polymer Engineering is proud to recognize all of our successful and exceptional alumni who are doing exciting things both personally and professionally. Do you know who our next alumni spotlight should feature? Email us at [cpspe-alumni@uakron.edu](mailto:cpspe-alumni@uakron.edu).

**Dr. Joseph V. Kurian**, Polymer Scientist and VP of Materials Technology, discusses his career path since graduating from the College of Polymer Science and Polymer Engineering and how the Polymer Science program has contributed to his success.

### How has the College of Polymer Science and Polymer Engineering (CPSPE) influenced your career choice?

The University of Akron's Polymer Science and Polymer Engineering program is well known around the world and the department is regarded as a global leader in polymer research and teaching. I grew up next to a natural rubber plantation in Kerala, India, and from my early childhood I developed a passion for rubber and its mechanical properties.

I completed my undergraduate degree in Kerala and then pursued an advanced degree in Polymer Science and Rubber Technology from CUSAT. During this time period, I learned about the polymer science program and research conducted at the University of Akron and my dream was to gain admission to the University for higher studies. I was lucky enough to meet and interact with Professor Joseph Kennedy in June of 1986 who introduced me to his pioneering research in carbocationic polymerization. At that time, the Kennedy research group was developing new knowledge in ionic polymers and expanding the boundaries of macromolecular engineering to design new functional polymers. Professor Kennedy had a very diverse research group and I admired the way he was training researchers, conducting technical reviews, running group meetings and publishing technical papers. Professor Kennedy is a wonderful teacher, mentor, scientist and "guru" who provided essential guidance concerning career choices. The annual holiday parties at Professor Kennedy's were awesome! In the middle of my research work, I did an internship at GE Plastics which helped me to choose a polymer research career in the industry. While at CPSPE, I also learned about new polymers, modification, polymer processing and protection of technologies via patents. Teaching chemistry classes at C&T College as a TA gave me enough confidence to present technical papers at various conferences and also to become a successful technical leader later on in my career. I treasured the chance to interact with enthusiastic professors, visiting scientists and polymer researchers from around the world, and learned a great deal from each and every one of them. In addition to polymer expertise, they instilled values such as scientific integrity, hard work, honesty, team work, patience and perseverance.

### How has CPSPE prepared you for your career?

Core courses and electives taught by leading polymer science professors were in-depth with significant scientific content and thought-provoking discussions. Those courses provided a solid foundation in polymer science topics and elevated my ability to easily interact with fellow polymer professionals at DuPont. I remember, confidently steering numerous technical discussions and debates relating to polymer structure, characterization and properties with colleagues. The polycondensation course taught by Dr. Frank Harris was of enormous help in regard to my work on condensation polymers such as polyamides and polyesters that I was involved with at DuPont. There is no substitute for learning from hands-on research and CPSPE has done well in this area. I fondly remember the freedom provided by Professor Kennedy to choose my own projects and to learn from mistakes along the way. Assistance was always provided to become an effective researcher through selection of projects, detailed literature searches, designed experiments, hypothesis development, understanding mechanisms and finding applications for newly created materials. For example, performing carbocationic polymerization in an inert environment inside a glovebox at extremely low temperatures was challenging and required significant patience, planning and coordination. Those experimental skills aided me as I was conducting polymerization in large reactors at DuPont and other companies, not



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in gram scale but producing millions of pounds of polymer! Those feared cumulative exams were actually very helpful in broadening my understanding of current events in polymer science and engineering. I still remember a question in one of the cumulative exams by Professor Alan Gent relating to the redesign of the Space Shuttle Rocket Booster, immediately after the Space Shuttle Challenger disaster. At that time, Professor Gent was serving as a member of the technical evaluation panel of NASA. Similar ideas and stimulating problems were provided by other professors including Dr. Harwood, Dr. McIntyre, Dr. Quirk, Dr. Kelley, Dr. Hamed and others. These real life examples gave me the inspiration to be creative and perform meaningful work as I moved to developing a career in the industry.

### **What has your journey been like since graduating from CPSPE?**

I joined DuPont in 1990, as a Polymer Research Chemist in the Nylon Division at Seaford, Delaware. The Seaford Nylon plant was the first commercial-scale plant DuPont had built immediately after the invention of nylon by Wallace Carothers. DuPont built a new polymer lab next to the plant for continued nylon polymer research. Nylon polymer was produced mostly through continuous polymer production process. Some of those lines had polymer throughputs close to 10,000 lbs/hr! I conducted research on nylon copolymers, polymer modification, pigments, stabilizers, and on functional additives. During this time, I had the opportunity to work on several nylon manufacturing related problems and delivered solutions worth tens of millions of dollars in savings. I led several task teams to increase manufacturing efficiency in polymer and fiber production. After four years at Seaford, I was transferred to the DuPont Experimental Station in Wilmington, DE, and began work on DuPont's advanced polymers. In 1995, I started research work in a project called 3GT, which later became Sorona<sup>®</sup> Polymer, developing polymer grade 1,3-propanediol, polymerization know-how and application technologies. Around the same time, DuPont shifted corporate research strategy and began work on biological processes and technologies to produce monomers and polymers from renewable feedstocks. I led the Sorona<sup>®</sup> Polymer and renewably sourced materials team for about 16 years at DuPont, developing new technologies, high-value products and applications. Sorona<sup>®</sup>, an environmentally friendly polymer, has received numerous awards and recognition from both industry and government. Today, Sorona<sup>®</sup> Polymer is often referred to as a Visionary Innovation and became a commercially successful polymer platform of the DuPont Company. This partially bio-based polymer is adding significant value to the apparel, carpet, automotive and packaging markets. The Sorona<sup>®</sup> team won several awards including: the Bolton-Carothers Innovative Science Award, Corporate Sustainability Award, and the Corporate Marketing Excellence Award. After the Sorona<sup>®</sup> project, I continued my research and leadership work at W. L. Gore & Associates developing game-changing lightweight, flame resistant, protective GORE-TEX<sup>®</sup> garments for the US military and industrial markets. These advanced technical textile garments are now sold commercially under the brand GORE<sup>®</sup> PYRAD<sup>®</sup>. In 2016, I joined RPM international as a Corporate Technology Leader with responsibility for developing next generation materials for the building, construction and sealant markets. Overall, I am enjoying my exciting career in the industry and working with scientists from around the world in solving unique problems. I have filed nearly 80 patents, published about 50 technical papers and participated/presented in over 60 conferences.

### **What is your career path now?**

Sustainability has received significant attention in recent years and the impact of climate change is in the news every day. As we are fast moving towards a circular economy globally, there is a growing need to develop environmentally sustainable polymers that provide performance and functionality equivalent to or better than today's petroleum-derived materials. There are serious challenges associated with plastic waste (more than 300 million tons of plastic waste is produced per year), pollution and disposal. New commercially attractive polymer technologies must be developed to address these concerns. Currently I work with a team developing environmentally sustainable, high-value polymers using waste greenhouse gases such as methane and carbon dioxide as a feedstock. I also continue to collaborate with academia and various research organizations.

### **Is there anything else you would like to share about yourself or your family?**

I am an active member of several professional and engineering societies and organized several symposiums in renewably sourced materials. My wife works for DuPont and we have three children, two sons and a daughter. Our older son is finishing up graduate school in biomedical research, our daughter is a medical doctor and our younger son recently finished college and started a job in the healthcare field. I am a passionate supporter of science activities for students and mentor's students for various STEM related events. In our spare time, we love travelling and visiting family and friends.