"I saw coming to Michigan as an opportunity for me to broaden my credentials and to interact with experienced faculty, not just at the dental school, but with other units on campus."

His father was an anesthetist and, for about two years, the only one in the western Upper Peninsula town of Bessemer, Michigan. His mother was a nurse. So, naturally, from an early age, Paul Krebsbach thought about becoming a physician.

"But since my dad was the only anesthetist covering that part of the state and on call twenty-four hours a day, seven days a week, I began thinking about a career in dentistry," Krebsbach said. "Dentistry seemed to be more interesting and more fun because you could combine science and art and set your own office hours."

But doubts about becoming a dentist surfaced during Krebsbach's first year in dental school.

"The science was not as deep as I had hoped," he said. "I spent a lot of time memorizing information, but wanted to do more than memorize what I read in a book. I wanted to be more hands-on and do science that someday would be published in the textbooks that dental students were reading."

Following a conversation with Dr. Robert Gorlin, a prominent Minnesota pathologist who convinced him to participate in a summer research program, Krebsbach remained in dental school and graduated with his DDS in 1987.

"I was in the early stage of my dental school education, and couldn't see beyond my efforts in the preclinical labs," Krebsbach said. "Dr. Gorlin opened my eyes to a broad range of possibilities that included more in-depth science and research. These opportunities reshaped my attitude and career aspirations and led to a rewarding career that includes teaching, practicing dentistry, and scholarship."

NIH: "Felt Like a Kid in a Candy Store"

He then traveled to the east coast and in 1993 earned both a certificate in periodontology and a PhD in biological sciences at the University of Connecticut. Krebsbach also became an attending periodontist at the Veterans Administration Hospital in Newington, Connecticut, and was in private practice for three years in Laurel, Maryland.

"I enjoyed being a clinician, but didn't have the experience I needed to become a research scientist, so I jumped at a post-doctoral fellowship opportunity at the National Institutes of Health," he said. "During the three years I was there (1993-1996), I felt like a kid in a candy store. It's the best place in the world to do basic science research."

Krebsbach said he took advantage of opportunities to collaborate with other principal investigators. "I'm especially grateful to three of my mentors at NIH, Yoshi Yamada, Ken Yamada, and Pam Roby," he said.
As Krebsbach was considering his next steps and wrapping up his work at NIH in 1996, he met Dr. Peter Polverini, who chaired the University of Michigan School of Dentistry’s Department of Oral Medicine and Pathology. Polverini urged Krebsbach to visit Ann Arbor and decide if Michigan might be a good fit for him and his research plans.

It was. Krebsbach said several factors influenced his decision.

“I saw coming to Michigan as an opportunity to broaden my credentials and to interact with experienced faculty, not just at the dental school, but with other units on campus,” he said. “I was impressed with the dental school’s emphasis on ‘the big picture.’ That is, this School sees itself being connected to other units, such as medicine and engineering. I thought Michigan would give me the opportunities I wanted to not only conduct research, but also teach and be involved with those other schools and colleges here.”

In March 2005, Krebsbach was named chair of the Department of Biologic and Materials Sciences and the Division of Prosthodontics by Polverini who, two years earlier, returned to the School of Dentistry to become dean. As chair, Krebsbach directs a department with 36 faculty members, 26 adjunct faculty, and 86 staff.

### Stem Cell Research, Tissue Regeneration

“It was a major transition from managing a handful of people in a laboratory to managing so many more as department chair,” he said with a laugh. “But I enjoy the challenge of running a complex scientific and clinical operation.”

In addition to his administrative responsibilities, Krebsbach also mentors PhD students and postdoctoral fellows, teaches at U-M Hospital, and does research in the areas of embryonic and adult stem cells and tissue engineering and regeneration.

“We’re conducting embryonic and adult stem cell research to understand how a stem cell either remains a stem cell or becomes a more specialized type of cell,” he said. Asked what role the School of Dentistry would have in the new U-M consortium to create new embryonic stem cell lines that was announced in the spring, Krebsbach said, “it’s too early to tell, but several dental school faculty members will have the opportunity to contribute.”

As for tissue engineering and regeneration research, he said he and other researchers are “trying to take the knowledge discovered in recent years and develop new tissues for patients to replace those that may have been damaged or lost.”

In the past, Krebsbach said that research “might have focused on regenerating a single tissue, such as bone or cartilage, but our current work is much more complex because these tissues don’t exist in isolation.”

Describing some of the research being conducted, Krebsbach said “we are developing methods to spatially control how growth factors and genes are delivered from biomaterials to regenerate the interfaces between tissues, like the bone and cartilage interface of an articulating joint.” He added that these approaches will require incorporating concepts from both biology and engineering. “Consequently, the work requires collaboration with scientists with different backgrounds. That’s what makes it fun,” he said.

Asked how soon it might be before that laboratory research might be used by dentists in their offices, Krebsbach said it would take time. “Already, gene therapy trials are underway and in other instances proteins are being delivered from materials and are currently used in clinics. But as we learn more, new questions arise that need answers.”

### Rewards of Teaching, Benefits to Students

Mentoring PhD students and teaching at the U-M Hospital complement Krebsbach’s other duties. “I am a teacher, a scientist, an administrator, and a mentor, so as a result, I’m super busy. But I enjoy that,” he said.

“What’s especially gratifying is to see a student who takes the information from a classroom lecture or research laboratory or clinic, understands it, and comes up with what I call ‘the total picture.’ What’s even more impressive is when the student takes that information and begins exploring in new directions,” he said. “When that happens,” Krebsbach said, “It shows we have done our job as teachers or...
as mentors and that a student has confidence to think independently and go in a new or different direction."

**Giving Direction to the Dean's Vision**

Krebsbach is doing some of that himself. As chair of the dean's Vision Implementation Steering Committee, he is investigating possible new opportunities for dental educators and new directions for dental education. Since December 2008, the committee has been meeting weekly to take the findings of the Strategic Assessment Facilitating Committee and implement Dean Peter Polverini's directive to create the dental school of the future. Key elements include continuing the School's tradition of excellence while also developing innovative approaches to classroom education, clinical instruction, research, and outreach that could reshape dental education and the profession of dentistry itself. "Soon we will have recommendations that we can begin implementing," he said.

When he's away from the dental school, Krebsbach relaxes playing baseball with his children and playing the piano. "I've been taking lessons for four or five years. I enjoy the blues and jazz, especially improvisational jazz."

Krebsbach sees a connection between his new leisure pursuit and his work.

"When I was studying for my dental degree, I didn't want to just memorize someone else's science, I wanted to make new discoveries and take science in new directions. That's innovation. It's like playing jazz because you learn the basics and then see what happens when you go in a different direction."

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**Faculty News**

**Dr. Lysle Johnston Receives Callahan Memorial Award for 50 Years of Contributions to Orthodontics**

Dr. Lysle Johnston, Jr., who chaired the School of Dentistry's Department of Orthodontics and Pediatric Dentistry, directed the graduate orthodontics program from 1991-2004, and who was the Robert W. Browne Professor of Dentistry, was honored by the Ohio Dental Association for his 50 years of contributions to orthodontics.

Johnston received the prestigious Callahan Memorial Award during this year's Callahan Celebration of Excellence in Columbus, Ohio. The award is named for John Ross Callahan, a noted Ohio dental researcher and leader in organized dentistry. Established by the association in 1920, committee members consider the achievements and contributions of nominees worldwide before selecting a recipient.

Dr. Sunil Kapila, current chair of Orthodontics and Pediatric Dentistry, lauded Johnston as "an exceptional intellectual who has continued to challenge his students and the profession. Lysle has always sustained a superior level of excellence as a teacher and scholar, and has set a high standard for future generations of educators. For all these reasons, he is highly deserving of the Callahan Memorial Award," Kapila said.

Johnston earned his DDS from U-M in 1961 and a Master of Science degree in orthodontics in 1964. He received the School of Dentistry's Distinguished Service Award during graduation ceremonies in May 2005 for his contributions to U-M, the School, and orthodontics.

Johnston is the recipient of numerous honors, most notably the Albert H. Ketcham Award from the American Board of Orthodontics, the 5th International Award of the Italian Society of Orthodontists and the Dewel Award of the American Association of Orthodontists.

He has delivered the Mershon and Salzmann Lectures of the American Association of Orthodontics, the Angle Memorial Lecture of the E.H. Angle Society of Orthodontists (twice), the Northcroft Lecture of the British Society for the Study of Orthodontics and the Arthur Thornton Taylor Memorial Lecture of the Australian Society of Orthodontics. He is a fellow of both the American and International Colleges of Dentists and, by election, a fellow in dental surgery of the Royal College of Surgeons of England.

Johnston has served on the editorial boards of a number of journals, including the American Journal of Orthodontics, Dentofacial Orthopedics and the [British] Journal of Orthodontics. He was also a member of the Oral Biology and Medicine Study Section of the National Institutes of Health and a director of the Edward H. Angle Society of Orthodontists.