

PROMOTION RECOMMENDATION
The University of Michigan
School of Dentistry

Kenichi Kuroda, PhD, assistant professor of dentistry, School of Dentistry, assistant professor of biomedical engineering, College of Engineering and Medical School, assistant professor of macromolecular science and engineering, College of Engineering, and assistant professor of chemistry, College of Literature, Science, and the Arts is recommended for promotion to associate professor of dentistry, with tenure, School of Dentistry, associate professor of biomedical engineering, without tenure, College of Engineering and Medical School, associate professor of macromolecular science and engineering, without tenure, College of Engineering, and associate professor of chemistry, without tenure, College of Literature, Science, and the Arts.

Academic Degrees:

PhD	2003	Chemistry, Massachusetts Institute of Technology
M of Eng	1997	Biochemistry, Kyoto University, Japan
B of Eng	1995	Polymer Chemistry, Kyoto University, Japan

Professional Record:

2013 – present	Assistant Professor (joint appointment), Macromolecular Science and Engineering Center, University of Michigan
2007 – present	Assistant Professor, Chemistry (joint appointment), College of Literature, Science, and Arts, University of Michigan
2006 – present	Assistant Professor (joint appointment), Biomedical Engineering, College of Engineering and Medical School, University of Michigan
2006 – present	Assistant Professor, Biologic and Materials Sciences, School of Dentistry, University of Michigan
2003 – 2006	Post-doctoral Fellow (Biomaterials) University of Pennsylvania School of Medicine

Teaching:

Professor Kuroda contributes substantially to the teaching mission of the School of Dentistry as well as three other units on campus where he holds joint appointments. Professor Kuroda began his teaching responsibilities at UM in a subject area that was outside of his core training. Over the past six years, he has incorporated advanced biomaterials content with dental materials and has significantly modified the two courses assigned to him. He is serving as the course director of both *Applied Biomaterials* 508 and 610. This was an enormous undertaking, however it has been rewarding, as these courses have become very highly regarded. He also has significant involvement in the dental hygiene course, *Biomaterials* 335. Outside the dental school he lectures in five other courses within engineering and chemistry. His teaching

evaluations indicate considerable improvement in lecture style and presentation material, as well as engaging students in discussions of case-based scenarios and effectively managing the overall classroom environment. He is known for interjecting humor into his lectures while presenting topics with great clarity and scientific impact. Professor Kuroda has mentored six graduate students, 10 visiting scholars, 11 undergraduate students, six post-doctoral fellows, and served on 22 dissertation committees. This is an extraordinary number of students given the short time he has been part of the faculty, and it speaks very highly of his success and the recognition of his teaching and mentoring skills.

Research:

Professor Kuroda's most important intellectual contributions target the development of antimicrobial polymers as new antibiotic candidates effective against drug-resistant bacteria. Due to the rapid and increasing resistance developed by microorganisms, there is an urgent need to develop new antimicrobial agents. Professor Kuroda has developed interdisciplinary collaborations with several university investigators, both within the dental school and with the two other units on campus in which he has joint appointments. These interdisciplinary research efforts bring together chemical synthesis and design, biological evaluation and biophysical methods leading toward potential applications in pharmaceuticals and biomedical engineering. In this area he has made strong progress in scholarship and has developed a thriving independent research program.

Professor Kuroda is first or senior author on 14 of 16 articles published in high-impact journals since his appointment in the dental school (27 total peer-reviewed publications). These publications provide good evidence of the quality and depth of his science and represent considerable experimental effort. His experimental designs are rigorous and thoughtful. He has also contributed to a book, been involved on 28 oral or poster presentations and has published nine abstracts. His NSF Career Award is of particular significance as it is the first in the dental school in nearly 20 years, and is the only NSF Career Award currently held by a dental school faculty member in the country. The NSF award is a prestigious and very competitive award mechanism. Additionally, Professor Kuroda has received funding for an NIH R21, support as a subcontractor on a SBIR grant, and is a co-PI on a MICHR seed grant. He has applications pending for major funding from both NSF-Division of Materials Research and NIH-NIDCR.

Recent and Significant Publications:

- Kuroda K*, Caputo GA*, DeGrado WF. The role of hydrophobicity in the antimicrobial and hemolytic activities of polymethacrylate derivatives. *Chem. Eur. J.* 2009; 15: 1123. PMID: 19072946
- Palermo EF, Kuroda K*. chemical structure of cationic groups in amphiphilic polymethacrylates modulates the antimicrobial and hemolytic activities. *Biomacromolecules* 2009; 10: 1416. PMID: 19354291
- Palermo EF, Sovadinova I, Kuroda K*. Structural determinants of antimicrobial activity and biocompatibility in membrane-disrupting methacrylamide random copolymers. *Biomacromolecules* 2009; 10: 1216. PMID: 19803480

- Lamboy JA, Arter JA, Knopp KA, Der D, Overstreet CM, Palermo EF, Urakami H, Yu TB, Tezgel O, Tew GN, Guan ZB, Kuroda K, Weiss GA*. Phage wrapping with cationic polymers eliminates nonspecific binding between M13 phage and high p/target proteins. *J Amer. Chem. Soc.* 2009; 131: 16454. PMID: 19856910
- Palermo EF, Lee DK, Ramamoorthy A, Kuroda K*. Role of cationic group structure in membrane binding and disruption by amphiphilic copolymers. *J. Phys. Chem. B.* 2011; 115: 366. PMID: 21171655
- Han H, Wu J, Avery CW, Mizutani M, Jiang X, Kamigaito M, Chen Z, Xi C, Kuroda K*. Immobilization of amphiphilic polycations by catechol functionality for antimicrobial Coatings. *Langmuir* 2011; 27: 4010.
- Oda Y, Kanaoka S, Sato T, Aoshima S*, Kuroda K*. Block versus random amphiphilic copolymers as antibacterial agents. *Biomacromolecules* 2011; 12: 3581. PMID: 21846110
- Sovadinova I, Palermo EF, Urban M, Mpiga P, Caputo GA, Kuroda K*. Activity and mechanism of antimicrobial peptide-mimetic amphiphilic polymethacrylate derivatives. *Polymers* 2011; 3: 1512.
- Palermo EF, Vemparala S*, Kuroda K*. Cationic spacer arm design strategy for control of antimicrobial activity and conformation of amphiphilic methacrylate random copolymers. *Biomacromolecules* 2012; 13: 1632. PMID: 22475325
- Mizutani M, Palermo EF, Thoma LM, Satoh K, Kamigaito M*, Kuroda K*. Design and synthesis of self-degradable antibacterial polymers by simultaneous chain- and step-growth radical copolymerization. *Biomacromolecules* 2012; 13: 1554. PMID: 22497522
- Gibney KA, Sovadinova I, Lopez AI, Urban M, Ridgway Z, Caputo GA, Kuroda K*. Poly(ethylene imine)s as antimicrobial agents with selective activity. *Macromol. Biosci.* 2012; 12: 1279. PMID: 22865776
- Hu K, Schmidt NW, Zhu R, Jiang YJ, Lai GH, Wei G, Palermo EF, Kuroda K*, Wong GCL*, Yang L*. A critical evaluation of random copolymer mimesis of homogeneous antimicrobial peptides. *Macromolecules* 2013; 46:1908–1915

Service:

Professor Kuroda's level of service has been consistently impressive. He has been actively engaged as a citizen of the university, and his professional community is well recognized nationally and internationally. His service activities have impacted all areas in which he is appointed at Michigan. He has served on a department search committee and has been highly involved in two endowed professor award committees. At the school level, he has served multiple years as a poster judge for Research Day and as a Science Foundation Core Team member. He has also served on committees within the Department of Chemistry and the College of Engineering. He has been active in reviewing papers for 18 journals and has served as a grant reviewer for the National Science Foundation and Natural Sciences and Engineering Research Council of Canada. One impressive accomplishment has been his activities to develop joint agreements with two Japanese institutions. This has resulted in numerous student exchanges and a joint symposium with Nagoya University. He has taken the lead role in organizing this

activity for several years, including sessions in both Ann Arbor and Japan. He is currently involved in establishing a partnership between the School of Dentistry and Yonsei University in Korea. These sets of relationships speak to the high quality of his work, his developing international stature, and his personal interactions with researchers from multiple environments. As a result of his many accomplishments, he was recognized as one of a select group of international speakers chosen to present at the 1st Biomacromolecules Symposium held at the Philadelphia American Chemical Society meeting in August of 2012. Professor Kuroda's record of service to the school, university and scientific community is exemplary and will further enhance his opportunities for more in-depth research collaborations.

External Reviewers:

Reviewer (A): "My summary overall is that Kenichi is a creative, developing scientist with an admirable record of performance in research and teaching and a positive trajectory of accomplishments that reflect confidence in his future professional contributions and production for your department and university."

Reviewer (B): "Dr. Kuroda's future goal is to extend his research on antimicrobial materials to include potential clinical applications and the translation of laboratory research to a product. The success of his research will provide a new approach in antimicrobial development, leading to new antibiotics and antimicrobial applicants in dentistry and medicine."

Reviewer (C): "In my view, hallmarks for Professor Kuroda's work include elegant and sophisticated polymer design and synthesis, devised with the specific goal of imparting antimicrobial functionality to the synthesized polymers."

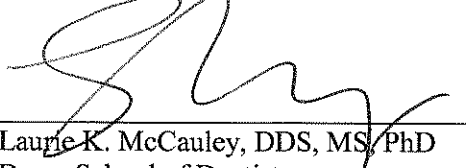
Reviewer (D): "He has done excellent work to develop an international research/student exchange program that has certainly added research experience to the visiting scholar participants. This is a particularly good example of effective leadership and innovation."

Reviewer (E): "Dr. Kuroda has attained a high visibility for his research program. His scholarly publications have been of high quality and have attracted considerable attention. His lecturing skills are excellent. There is no question that he would attain promotion with tenure at our school."

Summary of Recommendation:

Professor Kuroda's research and publications are timely, important and on an upward trajectory. He has already achieved funding and demonstrates consistent productivity. He maintains a highly effective laboratory that will foster the education of the next generation of scientists. Professor Kudora's record of teaching and mentoring is broad and has made positive impacts on many students at Michigan. His service is exemplary, as he has already established an international reputation. It is with the support of the School of Dentistry's Executive Committee that I recommend Kenichi Kuroda, PhD for promotion to associate professor of dentistry, with tenure, School of Dentistry, associate professor of biomedical

engineering, without tenure, College of Engineering and Medical School, associate professor of macromolecular science and engineering, without tenure, College of Engineering, and associate professor of chemistry, without tenure, College of Literature, Science, and the Arts.



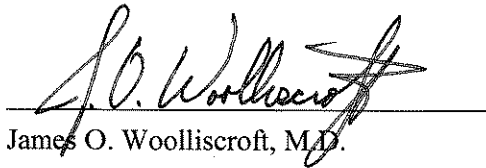
Laurie K. McCauley, DDS, MS/PhD
Dean, School of Dentistry



David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering



Susan A. Gelman
Heinz Werner Distinguished University Professor,
Professor of Psychology, and Interim Dean
College of Literature, Science, and the Arts



James O. Woolliscroft, M.D.
Dean, Medical School

May 2014