

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Engineering  
Department of Electrical Engineering and Computer Science

Pei-Cheng Ku, associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, and associate professor of macromolecular science and engineering, without tenure, Molecular Science and Engineering Program, College of Engineering, is recommended for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, and professor of macromolecular science and engineering, without tenure, Macromolecular Science and Engineering Program, College of Engineering.

Academic Degrees:

Ph.D. 2003 University of California, Berkeley, CA  
B.S. 1995 Electrical Engineering, National Taiwan University, Taipei City, Taiwan

Professional Record:

2012 – present Associate Professor (without tenure), Macromolecular Science and Engineering Program, University of Michigan  
2012 – present Associate Professor (with tenure), Department of Electrical Engineering and Computer Science, University of Michigan  
2011 – 2018 Scientific Advisor, Arborlight, Ann Arbor, MI,  
2006 – 2012 Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan  
2004 – 2005 Senior Process Engineer, D2 Lithography Group, Intel Corporation, Santa Clara, CA,  
2004 – 2004 Post-doctoral Researcher, Department of Electrical Engineering and Computer Science, University of California, Berkeley

Summary of Evaluation:

Teaching: Professor Ku's work as an educator at the University of Michigan has been strong, impacting both the undergraduate and graduate level. He has developed new course content for courses such as EECS 429, 529, and 540 as well as preparing to introduce a new laboratory course (300). He has also taught 320, a very large and required course. Although a challenging course for students, student letters describe Professor Ku as "supportive, patient, and good at explaining difficult concepts." His commitment to education is further exemplified by his willingness to serve as the associate chair for undergraduate affairs in EECS, a natural evolution from his earlier work serving as the chief undergraduate program advisor and numerous other undergraduate committees. He has enabled over 45 undergraduate students to participate in a research experience in his laboratory, including a number of URM students. Professor Ku has chaired the doctoral committees of nine graduated Ph.D. students and co-chaired another. In addition, he has supervised 10 post-doctoral scholars and is actively advising M.S. and undergraduate students. His work in outreach has had a significant impact with 100 participants from high school students involved in Electrify Nano Camp. His work in this area also includes

going to schools closer to Detroit with a greater URM population and giving talks about pursuing a degree in electrical engineering.

Research: Professor Ku's expertise lies in optoelectronic devices and materials, focusing on solid state lighting, displays, and quantum communications. He has broken new ground in each of these areas. He was the first to demonstrate site-controlled single-photon emitters with polarization control for quantum information. He has been successful in making pixilated multicolor LEDs, which generated particularly great excitement among his external reviewers. They were also impressed with his latest contributions to strain engineering, noting the innovation that went into the ideas and the immediate and likely long-term impact of the work. Professor Ku has published solid scholarly work in highly regarded journals. During his time in rank, he has published 27 archival journal articles, with another three currently under review. During this same time, he has received at least \$3.2M in funding for his work from the NSF, NIH, and Samsung.

Recent and Significant Publications:

Jingyang Sui, Kunook Chung, Feng Tian, Pei-Cheng Ku, "A Tensorial Shear Stress Sensor Based on Light-Emitting GaN Nanopillars," *Applied Physics Letters*, 2019; 115: 021103.

Brandon Demory, Kunook Chung, Adam Katcher, Jingyang Sui, Hui Deng, Pei-Cheng Ku, "Integrated Parabolic Nanolenses on MicroLED Color Pixels," *Nanotechnology*. 2018; 29: 165201.

Kunook Chung, Jingyang Sui, Brandon Demory, Chu-Hsiang Teng, Pei-Cheng Ku, "Monolithic Integration of Individually Addressable Light-Emitting Diode Color Pixels," *Applied Physics Letter*. 2017; 110: 111103.

Brandon Demory, Adam Katcher, Tyler Hill, Chu-Hsiang Teng, Cheng Zhang, Jay Guo, Hui Deng, P.C. Ku, "Improving the Radiative Efficiency of InGaN Quantum Dots via an Open Top Cavity," *ACS Photonics*, 2017;4: 795-799.

C.-H. Teng, L. Zhang, T. A. Hill, B. Demory, H. Deng, P.C. Ku, "Elliptical quantum dots as on-demand single photons sources with deterministic polarization states," *Applied Physics Letters*, 2015; 107: 191105.

Service: Professor Ku's internal service contributions demonstrate excellent citizenship, with the quantity of service exceeding expectations. In EECS, he has served on numerous committees and worked as the UM advisor to the IEEE Student Association. He also served as a member and then as the chair of the Undergraduate Recruiting/Outreach and Undergraduate Recruiting/Advisory Committees. During this period, he was able to double the fraction of URM undergraduate students in the EECS program from 7% to 14%. Beyond the department, Professor Ku has served on the CoE Council for the LNF as well as various other committees. At the national and international level, he has served on the organizing committee for five different international conferences and served as the chair of an international academic-industrial collaboration conference. He has been a guest editor and associate editor for archival journals. He has also been active in multiple outreach activities involving local community groups and schools, including working to involve and recruit URM students.

External Reviewers:

Reviewer A: “Professor Ku publishes high-quality work in fields that I view as important and impactful (IIN materials and devices).”

Reviewer B: “Prof. Ku’s group has made one of the key breakthroughs for realizing deterministic single photon emitters.”

Reviewer C: “Prof. Ku is a very serious scholar of high caliber. ... Dr. Ku belongs to the top tier in his peer group in optoelectronics in terms of research accomplishments and his overall professional standing in our community.”

Reviewer D: “His group brilliantly developed an interesting method to engineer nanostructures using ‘conventional’ lithography techniques. ... His research and service activities at professional societies are recognized internationally.”

Reviewer E: “Prof. Ku has an impressive record of publication [sic] in top tier engineering and applied physics journals.”

Summary of Recommendation: Professor Ku is a highly regarded researcher with an international reputation for his work in strain engineered devices and creating a scalable approach to fabrication of quantum light sources. He has a strong record as an educator. His contributions to internal and external service have been excellent. It is with the support of the College of Engineering Executive Committee that I recommend Pei-Cheng Ku for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, and professor of macromolecular science and engineering, without tenure, Macromolecular Science and Engineering Program, College of Engineering.



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Alec D. Gallimore, Ph.D.  
Robert J. Vlasic Dean of Engineering  
College of Engineering

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