Approved by the Regents
May 18, 2023

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Mechanical Engineering

Chinedum E. Okwudire, associate professor of mechanical engineering, with tenure, Department of Mechanical Engineering, and associate professor of integrative systems and design, without tenure, Division of Integrative Systems and Design, College of Engineering, is recommended for promotion to professor of mechanical engineering, with tenure, Department of Mechanical Engineering, and professor of integrative systems and design, without tenure, Division of Integrative Systems and Design, College of Engineering.

Academic Degrees:

Ph.D.	2009	University of British Columbia, Mechanical Engineering, Vancouver, Canada
M.S.	2005	University of British Columbia, Mechanical Engineering, Vancouver, Canada
B.S.	2003	Middle East Technical University, Mechanical Engineering, Ankara, Turkey

Professional Record:

2020 – present	Associate Professor (without tenure), Integrative Systems and Design, University of Michigan
2017 – present	Associate Professor (with tenure), Department of Mechanical Engineering, University of Michigan
2011 – 2017	Assistant Professor, Department of Mechanical Engineering, University of Michigan

Summary of Evaluation:

Teaching: Professor Okwudire is an outstanding teacher who has led advancements in manufacturing education at the undergraduate and graduate levels. His record spans a mix of laboratory courses and theoretical courses including ME 350, ME 584, ME 240 and ME/ISD 599 (FND & SMS) with average Q1/Q2/Q4 scores of 4.42/4.64/4.29 since Fall 2011. His dedication to teaching manufacturing hands-on and laboratory courses to large numbers of students is exemplary - particularly in ME 350, where despite the heavy workload of the class, students rank it highly. He has mentored a large number of undergraduate students who note his passion and accessibility. Professor Okwudire has graduated six Ph.D. students as the chair or co-chair with another six in progress including three who are expected to graduate this year. In addition, he has advised two masters students, several undergraduate students, and mentored four post-doctoral scholars. His efforts have been recognized with the 2022 ISD Distinguished Faculty Award and the 2016 Ralph Teetor Educational Award from SA International.

Research: Professor Okwudire's scientific identity is as an expert in dynamics, controls, and mechatronics with applications to traditional machining manufacturing and advanced manufacturing operations such as 3D printing, nano-positioning, and distributed manufacturing. He has published 50 papers in top dynamics, control, and manufacturing journals, 30 while in rank. His students figure prominently as the first one or two authors in the majority of them. He and his students have earned numerous awards including several best paper awards. Professor

Okwudire has received a NSF CAREER Award, an Outstanding Young Manufacturing Engineer Award from SME (formerly known as the Society for Manufacturing Engineers), and a Young Investigator Award from the International Symposium on Flexible Automation. He has also been honored with named visiting faculty awards from the University of Waterloo and UC Berkeley. He has been named to two NASEM committees which is unusual at his current rank, and in 2022 the SME named him one of 25 Leaders Transforming Manufacturing. He has been successful in raising funding for his efforts. To date, he has participated in grants totaling $5.2M, with his share at over $3.4M.

Recent and Significant Publications:

Ramani, Keval S, He, Chuan, Tsai, Yueh-Lin, Okwudire, Chinedum E, "SmartScan: An intelligent scanning approach for uniform thermal distribution, reduced residual stresses and deformations in PBF additive manufacturing," *Additive Manufacturing*, 52 (2022): 102643.

Ramani, Keval S., and Chinedum E. Okwudire, "Optimal Selection of Basis Functions for Robust Tracking Control of Uncertain Linear Systems—With Application to Three-Dimensional Printing," *Journal of Dynamic Systems, Measurement, and Control*, 143.10 (2021).

Ramani, Keval S., Nosakhare Edoimioya, and Chinedum E. Okwudire, "A Robust Filtered Basis Functions Approach for Feedforward Tracking Control—With Application to a Vibration-Prone 3-D Printer," *IEEE/ASME Transactions on Mechatronics*, 25.5 (2020): 2556-2564.

Lin, Bo, Chinedum E. Okwudire, and Jason S. Wou, "Low order static load distribution model for ball screw mechanisms including effects of lateral deformation and geometric errors," *Journal of Mechanical Design*, 140.2 (2018).

Duan, Molong, Deokkyun Yoon, and Chinedum E. Okwudire, "A limited-preview filtered B-spline approach to tracking control–With application to vibration-induced error compensation of a 3D printer," *Mechatronics*, 56 (2018): 287-296.

Service: Professor Okwudire has served as the associate chair of ISD, chair of the Dean's Advisory Council for Faculty of Color, and the ME Advisory Committee. His efforts to promote DEI within UM are noteworthy and award winning, inclusive of the MLK Spirit Award in 2017, the Harold R. Johnson Diversity Service Award in 2019, and the Raymond J. and Monica E. Schultz Outreach and Diversity Award in 2020. He co-initiated highly valued DEI programs including NextProf Pathfinder and the Detroit Area Middle School STEM outreach program. He has also contributed to the hiring and mentorship of numerous faculty, student groups, and students of color.

External Reviewers:

Reviewer A: "Prof. Chinedum Okwudire has demonstrated that his role in pushing innovation in manufacturing science has only just begun and I feel he is currently in a prime place in his career to help even further bolster your manufacturing program due to his passion for manufacturing research and education."

Reviewer B: "Dr. Okwudire's impact in the field of manufacturing is quite crucial for the future of many industrial sectors, as zero-waste and precision manufacturing are significant pillars of the paradigm shifts for the twin (digital plus green) transition in industry."

Reviewer C: "…Dr. Okwudire is one of the most promising researchers in the field of advanced manufacturing…. His successes to date, his aggressive pursuit of funding, and active collaborations within and across disciplines are all clear indicators that Dr. is Okwudire on the right trajectory to succeed in his future endeavors…. Dr. Okwudire has been a critical player in the advancement of manufacturing in research and curricula."

Reviewer D: "…Dr. Okwudire is an extremely strong faculty member and has a nicely balanced research, education and service portfolio…. Dr. Chinedum Okwudire is a well-known and respected individual in the manufacturing and controls communities."

Reviewer E: "He is poised to make significant contributions to smart manufacturing in AM because the field is ripe for the integrated hardware-software innovations in which Dr. Okwudire specializes…. I find Dr. Okwudire to be a national and international thought leader in smart manufacturing and its application to timely topics such as AM, and his productivity to be strong in terms of funding and publications. I find his commitment to teaching and service, especially with respect to establishing DEI programs, to be unparalleled among junior faculty."

Reviewer F: "He is a recognized international leader in the field of mechatronics applied to manufacturing (smart manufacturing)."

Summary of Recommendation: Professor Okwudire is an internationally recognized leader in smart manufacturing who cares deeply about students and delivering exemplary education. He thrives as an instructor and mentor while providing research leadership and innovations which have a large real-world impact through his commercialization activities. It is with the support of the College of Engineering Executive Committee that I recommend Chinedum E. Okwudire for promotion to professor of mechanical engineering, with tenure, Department of Mechanical Engineering, and professor of integrative systems and design, without tenure, Division of Integrative Systems and Design, College of Engineering.

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

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