PROMOTION RECOMMENDATION
The University of Michigan
School of Nursing

Matthew A. Davis, assistant professor of nursing, School of Nursing, is recommended for promotion to associate professor of nursing, with tenure, School of Nursing.

Academic Degrees:

PhD	2014	Dartmouth College, Hanover, NH
MPH	2010	Dartmouth College, Hanover, NH
DC	2004	New York Chiropractic College, Seneca Falls, NY
BA	2000	Colby College, Biochemistry and Molecular Biology, Waterville, ME

Professional Record:

2014 – Present	Assistant Professor, School of Nursing, University of Michigan
2014 – Present	Adjunct Assistant Professor, School of Medicine, Dartmouth College
2010 – 2014	Instructor, School of Medicine, Dartmouth College

Summary of Evaluation:

Teaching: Professor Davis is an outstanding educator who has made significant contributions to the teaching mission of the School of Nursing in his term as assistant professor, including the development of a unique new course in health analytics that he is currently piloting, and which may well change how we teach in this area. As faculty of record, Professor Davis has made major revisions to two quantitative - Doctor of Nursing Practice (DNP) courses – N802, Epidemiology for Health Professionals, and N800, Statistics for Advanced Practice including making them web-blended courses. He has developed unique problem sets, and problem-based learning experiences for each of these courses. The student evaluations for these courses are admirable. Both student and peer evaluations speak to his ability to effectively teach complex analytical concepts and technical skills to a variety of students ranging from undergraduate to post-doctoral research fellows. He often uses his own research to demonstrate applications of analytic methods.

Professor Davis has given six invited guest lectures (Child Health Evaluation and Research Center; National Clinician Scholars Program; N456 undergraduate Community Health) since 2014. Students nominated Professor Davis for the university-wide Golden Apple Award in 2017. Peer evaluations identify him as a creative teacher who has the ability to communicate complex quantitative concepts in "engaging and creative ways." Professor Davis has developed a University of Michigan (UM) wide course on Analysis of Large U.S. Health Data. The course has received support by the Institute for Healthcare Policy and Innovation (IHPI), the Institute for Social Research (ISR) and the School of Nursing faculty launched in Winter, 2018. Professor Davis received a competitive UM grant from the Center for Research on Learning and Teaching (CRLT) to support development of course materials. Being the first course of its kind, Professor Davis anticipates that it will lead to a paradigm shift in how students effectively learn about large data management and analysis.

Professor Davis is currently the co-chair of one PhD dissertation committee and past co-chair of a PhD student who graduated in 2017. He has been instrumental in guiding both of these students to successful completion of their dissertation research. He has supervised an undergraduate student and also mentored two Master's students, a DNP student, and a post-doctoral research fellow from

Thailand funded by a D43 grant. He is the graduate student research supervisor for two PhD students, one from the UM School of Public Health, and the other from the School of Nursing. He has authored six papers with trainees. He is also currently a member of one DNP student's scholarly project. His students have received student awards including the Karl Ma Rackham Award. Professor Davis is a co-sponsor for a K23 under review and is a co-principal investigator (co-PI), in conjunction with his D43 post-doctoral research fellow, for an R21 grant under review at the Fogarty Center. He is also a faculty mentor on the funded institutional training, Complexity: Innovations in Promoting Health and Safety and the D43 training grant, Strengthening Nurse NCD Research and Training Capacity in Thailand.

Research: Professor Davis' primary goal is to accelerate the development of scientific methods in the use of large data sources in order to better inform critical health policy decisions. He has melded his chiropractic, epidemiological, and big data skills into a research program that has helped inform health care policy, especially in the area of complementary and alternative medicine (CAM). He has a funded program of health services research with a dual focus on advancing novel scientific methods and health policy through leveraging large healthcare data. He is using national administrative Medicare data and geospatial data on providers to determine whether chiropractic care substitutes for medical care. He excels in the analysis of large U.S. data to investigate critical questions regarding population health and use of health services nationally that have policy relevance. He has applied rigorous and innovative methods from biostatistics and epidemiology to analyze a range of large databases, including insurance claims data, national surveys, and social media data from Facebook and Twitter. His specific areas of inquiry include identification of trends and patterns in national healthcare use, healthcare provider substitution, and population exposure assessment.

Professor Davis has a solid record of grantsmanship to support his research. He completed his K01 during his appointment and received an R01 from the National Institutes of Health (NIH) (2015-2019). Professor Davis is using national Medicare data and geospatial data to determine if chiropractic care substitutes for medical care. Findings from this research will inform health policy decisions regarding coverage of chiropractic care by Medicare. He is also applying new analytic methods in this research – relocation of Medicare patients, geographic information system methods, and two-step floating catchment area methods. Cumulative funding in direct costs for his program of research is $1.9 million since 2010.

Professor Davis' novel methodological approaches in his Medicare data experiments, his end-of-life research, and his exposure to toxic metals work reflects creativity and flexibility in his research endeavors. Professor Davis' research on patterns of end-of-life healthcare spending was published in *Health Affairs* and received national and international attention by other investigators and policy analysts. *Health Affairs* highlighted the novelty of his methods in their journal through a publication – *New Methodology to Examine Spending Patterns for End-of-Life Care*. *Health Affairs* also published two letters to the editors highlighting the policy relevance of this research. Professor Davis was the first to use data from the National Health and Nutrition Survey in combination with data from the U.S. Department of Agriculture to explicate the dietary sources of toxic metal exposure. His work in this area, specifically arsenic exposure, received the attention of the U.S. Environmental Protection Agency and resulted in an independent analysis of food safety by Consumer Reports and the U.S. Food and Drug Administration (FDA), as well as the development of guidelines by the FDA to regulate arsenic contamination in rice. At the request of the FDA, Professor Davis wrote one of six invited papers on arsenic exposure published and featured in the journal, *Science of the Total Environment*. In addition, research teams from the Centers for Disease

Control and Prevention (CDC), Brown University, and John Hopkins University have subsequently used Professor Davis' analytic approach and methods for their studies.

Professor Davis has published 13 first-author data-based papers, and six co-authored manuscripts (three with students) in refereed journals since 2014; a total of 20 published papers with 565 citations on *Scopus*. He has four papers under review. These manuscripts are published in high-impact journals such as *Health Affairs*, *JAMA Internal Medicine*, *PLoS One*, *Environmental Health Perspectives*, and *Health Services Research*. Professor Davis' paper in *JAMA Internal Medicine* (2015) received widespread media attention by the *Associated Press*, *U.S.A. Today*, ABC and CBS news, and *Forbes Magazine*, as well as international outlets. His first-authored 2017 paper on prescription opioid use among adults with mental health disorders received wide national attention with articles published in the *Washington Post*, *Huffington Post*, *Kaiser Health News*, *STAT* (Boston Globe), NPR, and others. He wrote an op-ed that was published in STAT (Boston Globe). Professor Davis has made significant contributions to nationally important areas of health services research including population health exposure assessment, access to care/provider substitution, and healthcare expenditures, as well as contributing novel methodological approaches to "big data" science.

Recent and Significant Publications:

Davis, M., Guo, C., Titler, M., Friese, C. (2017). Advanced practice clinicians as usual source of care for adults in the United States. *Nursing Outlook* 2017, :65;41-49.

Davis, M., Nallamothu, B., Banerjee, M., Bynum, J. (2016). Identification of four unique spending patterns among older adults in the last year of life challenges standard assumptions. *Health Affairs* 2016, :35 (7); 1316-1323.

Davis, M., Yakusheva, O., Gottlieb, D., Bynum, J. (2015). Regional supply of chiropractic care and visits to primary care physicians for back and neck pain. *Journal of the American Board of Family Medicine* 2015, :28 (4); 481-490.

Davis, M., Anthony, D., Pauls, S. (2015). Seeking and receiving social support on Facebook for surgery. *Social Science & Medicine* 2015, :131:40-47.

Davis, M., Gilbert-Diamond, D., Karagas, M., Li, Z., Moore, J., Williams, S., Frost, H. (2014). A dietary-wide association study (DWAS) of environmental metal exposures in U.S. children and adults. *PLoS ONE* 2014, :9 (9); e104768.

Service: Professor Davis has contributed considerably to the professional and academic community. He serves as a reviewer for several professional journals including *Health Services Research*, *Journal of General Internal Medicine*, and *Health Affairs* - all high-impact journals. He is the associate editor-in-chief of *Statistics for Regional Anesthesia & Pain Medicine* (Impact Factor = 3.5), the official publication of the American Society of Regional Anesthesia and Pain Medicine and the European Society of Regional Anesthesia and Pain Therapy. Professor Davis' professional service includes serving as a member of the FDA collaborative of selected scientists to address exposure to arsenic via foods. He has been a reviewer for the NIH special emphasis panel for the NIH-DOD-VA Pain Management Collaboratory. He has a leadership role in the data analytics component for the D43 - a partnership between the School of Nursing and the Tai Ministry of Public Health. At the school level, Professor Davis has provided service by contributing to the development of the population emphasis area for the Department of Systems, Populations and Leadership - Master's Program; serving on the post-Master's DNP advisory board; and leading the Works in Progress research meeting for the department for the last three years. He was elected by the faculty as the chair-elect (2016-2017) for the School of Nursing Curriculum Committee and is currently serving as the committee's chair (2017-2018).

External Reviewers:

Reviewer A: "[Professor] Davis' curriculum vitae lists 47 manuscripts, published in high-impact journals, including JAMA Internal Medicine and Health Affairs. Relative to his peers, this number of publications is quite strong and he has an appropriate balance of first and last authorship in his papers."

Reviewer B: ". . . [Professor] Davis is the kind of colleague that we would all like to have on faculty at our hospital and medical school. He is an innovative and talented clinician investigator who has made influential contributions to research, teaching, and mentorship in a relatively short period of time."

Reviewer C: "The content of these important courses tends to be difficult for many students to grasp, and his efforts appear to have been successful. He reported high ratings that are consistent with the positive student comments that were quoted."

Reviewer D: "...[Professor] Davis is a candidate with good training who has shown the ability to get grant funding to support his work..."

Reviewer E: "[Professor] Davis is clearly an excellent instructor who has consistently received high ratings for his teaching in his courses. He has also brought innovations to the School of Nursing curriculum and revamped a quantitative analysis course including developing a web-blended course format. He also developed an interdisciplinary course on analysis of large U.S. health data, which has received support from multiple centers across the university."

Summary of Recommendation:
Professor Davis is a dynamic researcher who has made noteworthy contributions to advancing novel scientific methods and health policy through leveraging large healthcare data. He is successful as an independent researcher and as a collaborator. He has applied rigorous and innovative methods from biostatistics and epidemiology to analyze a range of large databases. Professor Davis has a solid record of academic, professional and community service. He is an admirable teacher and mentor. It is with the support of the School of Nursing Executive Committee that I recommend Matthew A. Davis for promotion to associate professor of nursing, with tenure, School of Nursing.

Patricia D. Hurn
Dean, School of Nursing

May 2018