Approved by the Regents
May 17, 2018

PROMOTION RECOMMENDATION
The University of Michigan-Dearborn
College of Arts, Sciences, and Letters

Nicholas A. Licata, assistant professor of physics, Department of Natural Sciences, College of Arts, Sciences, and Letters is recommended for promotion to associate professor of physics, with tenure, Department of Natural Sciences, College of Arts, Sciences, and Letters.

Academic Degrees:

Ph.D.	2008	University of Michigan, Ann Arbor, MI
M.S.	2005	University of Michigan, Ann Arbor, MI
B.S.	2003	Rice University, Houston, TX

Professional Record:

2012 – present	Assistant Professor of Physics, University of Michigan-Dearborn, MI
2010 – 2012	Post-doctoral Research Associate, Indiana University, IN
2010 – 2008	Visiting Scientist, Max Planck Institute for Physics of Complex Systems, Dresden, Germany

Summary of Evaluation:
Teaching: Professor Licata is rated excellent in teaching. He integrates his teaching philosophy very well into classes, and learning strategies are outlined throughout all his courses. His students see him as highly knowledgeable, very approachable, and readily available to offer assistance. Professor Licata frequently teaches General Physics 150 for students with a background in calculus. This class is a large (greater than 100 students) service course for engineers. Professor Licata designs and implements the course in line with the discipline priorities. Students say the course is very challenging, their learning is positively reinforced by the online homework, discussion sessions, and laboratory exercises. Professor Licata asks students to embrace inquiry, apply critical thinking, and continually reflect on the effectiveness of the learning process. This includes learning outside of the lecture classroom, and recognition of the variation of learning styles among our students. Using in-class demonstrations, mathematical and modeling approaches, Professor Licata aligns the course's specific learning objectives and assessment tools using a thoughtful and analytical strategy towards undergraduate learning. His student evaluations show 65% of the students ranked his efforts as above average to excellent. Professor Licata's teaching in the laboratory and discussion sections in both are also strong, with more than 80% of the respondents rating his performance as above average or excellent.

In addition to the Physics 150 offerings, Professor Licata expands his teaching repertoire as evidenced by his development of the Computational Physics (PHYS 314); physics major's elective. Other upper level courses Professor Licata teaches are: Mechanics (PHYS 401), Electricity and Magnetism (PHYS 403), and Biological Physics (PHYS 416). Evaluations for these classes are highly praiseworthy and enthusiastically rated the 'best ever.' Besides classes, Professor Licata embraces the teacher/scholar model of our campus. Some of his former students are co-authors on his peer-reviewed papers, and some are now in graduate school.

Research: Professor Licata is rated excellent in his research. His research is theoretical biophysicist, and he often works in coordination with experimentalists. At the University of Michigan-Dearborn, Professor Licata published four peer-reviewed papers in esteemed journals such as: *Biophysical Journal* and *Physical Review E.* Professor Licata has a fifth paper in review. His publications focus on new and very significant overlapping domains within the physical and biological disciplines such as: the diffusion of bacteria through different semisolid supports, their adhesion, and their mechanical considerations for swimming. Professor Licata has given four talks at the American Physical Society March meeting and also attended workshops at those meetings. Additionally, he presented his work at the local Meeting of Minds several times. Professor Licata received funding of $7,000 through campus internal grants for his proposal entitled: "Concentration Sensing in Bacterial Chemotaxis." In summary, Professor Licata is a strong, active, and collaborative researcher in the Natural Sciences Department and campus community.

Recent and Significant Publications:

Licata, Nicholas A., Bitan Mohari, Clay Fuqua, and Sima Setayesghar. Diffusion of Bacterial Cells in Porous Media, *Biophysical Journal* 110, 247-257, (2016).

Bitan Mohari, Nicholas A. Licata, David T. Kysela, Peter M. Merritt, Suchetana Mukhopadhyay, Yves V. Brun, Sima Setayesghar, and Clay Fuqua. mBio. Novel Pseudotaxis Mechanisms Improve Migration of Straight Swimming Bacterial Mutants Through a Porous Environment, 6.2 (2015): e00005-15.

Licata, Nicholas A., Aaron Clark†. Fluid flow enhances the effectiveness of toxin export by aquatic microorganisms: A first-passage perspective on microvillli and the concentration boundary layer. *Physical Review* E 91, 012709, (2015).

Cecile Berne, Xiang Ma, Nicholas A. Licata, Bernardo R. A. Neves, Sima Setayeshgar, Yves V. Brun, and Bogdan Dragnea. Physiochemical Properties of Caulobacter crescentus Holdfast: A Localized Bacterial Adhesive, *The Journal of Physical Chemistry*, B 117 (36), 10492-10503, (2013).

†University of Michigan-Dearborn undergraduate co-author

Service: Professor Licata's on-campus service work includes substantial efforts in campus and department committees of importance. Professor Licata represented the department by participating on several search committees by providing complete and professional analysis of each candidate. As the colloquium committee chair, Professor Licata was a good leader with positive feedback. Professor Licata provided outstanding coordination in regards to chairing the Natural Sciences Poster Session during the previous three years; he also worked with students to present posters at both the Natural Sciences Poster Session and the Meeting of Minds. Professor Licata is an academic advisor to students with a major in physics, providing support in planning courses, graduation, and careers. Professor Licata has represented the College of Arts, Sciences, and Letters at Faculty Senate. Professionally, he is a member of the American Physical Society and referees the prestigious journal, *Physical Review E.* and the premier physics journal, *Physical Review Letters.*

External Reviewers:

Reviewer A: "The 2013 Journal of Physical Chemistry paper is a testament to his breadth of interests, studying how bacteria adhere to surfaces to form biofilms. This is again a problem worth studying, and combines experimental observations and theory. I am also very impressed by the breadth of undergraduate research projects supervised by Prof. Licata, both for the range of theoretical to applied problems and for the variety of systems studied. His rate of producing strong papers, his ability to successfully engage undergraduates in research, and his rich experiment/theory research collaborations all point to a long and successful career for Prof. Licata as a scholar."

Reviewer B: "He performs extensive teaching duties, advises many undergraduate students, and manages to write technically sophisticated theoretical physics papers with some of them. I believe that in all these functions he will continue to be a valuable member of your department and therefore recommend that you grant him tenure."

Reviewer C: "This work, published last year in the highly prestigious Biophysical journal and having already received 5 citations, is my favorite among Licata's papers. He elegantly constructed a 'microscopic' model for bacteria motion and made the connection between the micro-scale and the macro-scale, deriving the diffusion constant for cell migration as a function of the 'microscopic' details: cell speed, cell steady-state tumbling frequency, and cell tumble angle distribution. Since a cell can adapt these characteristics to the environment (for example, to the average pore size of the medium), cell spreading can be optimized… In summary, Professor Nicholas Licata is an accomplished scholar with great potential, and I fully support his promotion to the rank of Associate Professor of Physics with tenure."

Reviewer D: "I would recommend that Professor Nicholas Licata be promoted from the rank of Assistant Professor of Physics without tenure to the rank of associate professor of physics with tenure. Licata is right that much of the biological environment is porous media so this is potential fruitful and relatively neglected area to explore. In our experience wild type eukaryotic cells respond to bumping."

Reviewer E: "Overall the quality, quantity, focus and scholarly impact of Professor Licata's works are substantial and particularly impressive given the apparent limitation of funding and the teaching responsibilities both in formal courses and in student supervision… I think the publication record and the career path that Professor Licata has taken are strong indicators of a very fruitful career in biological physics and therefore recommend this promotion to associate Professor with tenure."

Reviewer F: "I particularly enjoyed the insightful description of the connection between sea urchin development and a diffusion (or convection diffusion) problem. I found the paper to be of high quality, and I enjoyed reading it… Reading his articles I feel that his work is of high quality…The quantity of his publication amount to about one per year, which seems appropriate given the significant teaching commitments of his appointment."

Summary of Recommendation:

Professor Licata is a superb teacher and scholar. His research is thoughtful, collaborative, and

seeks to understand the complex integration of the worlds of physics and biology. He combines solid teaching and interdisciplinary research to promote the department's mission, engaging all in collaborative research/scholarly projects. The Department of Natural Sciences greatly values his service contributions, particularly in searches. In the classroom, discipline, department, and the campus community, Professor Licata makes substantial contributions, quite valuable to his department, college and our university. We are pleased to recommend, with strong support of the College of Arts, Sciences, and Letters Executive Committee, Nicholas A. Licata for promotion to associate professor of physics, with tenure, Department of Natural Sciences, College of Arts, Sciences, and Letters.

Martin J. Hershock, Dean
College of Arts, Sciences, and Letters

Daniel Little, Chancellor
University of Michigan-Dearborn

May 2018