

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Literature, Science, and the Arts

David K. Lubensky, associate professor of physics, with tenure, and associate professor of biophysics, without tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of physics, with tenure, and professor of biophysics, without tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2001	Harvard University
A.M.	1997	Harvard University
D.E.A.	1995	Université Louis Pasteur
A.B.	1994	Princeton University, Physics

Professional Record:

2015 – present	Associate Professor, Program in Biophysics, University of Michigan
2013 – present	Associate Professor, Department of Physics, University of Michigan
2006 – 2013	Norman M. Leff Assistant Professor, Department of Physics, University of Michigan
2004 – 2006	Post-doctoral Researcher, Department of Physics and Department of Astronomy, Vrije Universiteit, Amsterdam
2003 – 2004	Post-doctoral Research Associate, BioMaPS Institute, Rutgers University
2001 – 2004	Post-doctoral Member of Technical Staff, Bell Labs, Lucent Technologies

Summary of Evaluation:

Teaching – Professor Lubensky has maintained a diverse portfolio of teaching experience, including courses at the introductory level, courses for physics majors, and graduate courses. Notably, he has taught a course on mathematical modeling to help first-year graduate students get up to speed on theoretical methods relevant for biophysics. For all his courses, student evaluations have been consistently high, and the student comments further attest to Professor Lubensky's effectiveness. In recognition of his teaching efforts, Professor Lubensky received the Class of 1923 Memorial Teaching Award (2013). In addition to teaching courses, he has a strong track record in mentoring. Over the past five years, he has served as the sole dissertation advisor for six graduate students, co-advisor for two students, rotation advisor for six students, and has been a member of seventeen Ph.D. dissertation committees and preliminary exams. In addition to graduate students, Professor Lubensky has supervised three post-doctoral fellows, all of whom are continuing their careers in physics and biophysics, and he has supervised the research of fourteen undergraduate students.

Research – Professor Lubensky works in the general area of biological physics, with a specialization in theoretical and computational work. His overarching goal is to identify the physical mechanisms driving self-organization of living matter at various spatial scales, as it displays an astonishing degree of functionality and robustness. This work studies the collective behavior of interacting biological units at various spatio-temporal scales, ranging from biochemical interactions of protein complexes to mechanical force interactions between cells.

Professor Lubensky's recent work falls into two main categories. The first centers around elucidating what mechanisms drive cellular self-organization into structured organs during development, when a fertilized embryo grows into an adult organism. In this line of work, he has studied how mechanical forces, together with biochemical signaling, drive self-organization of epithelial cells into ordered spatial arrangements. The second line of work aims to obtain a better understanding of the function of circadian clocks in living organisms. These clocks are autonomous oscillators built from networks of interactive genes and proteins. They are important for the proper functioning of living organisms as they allow them to predict changes in light and dark cycles and provide temporal organization of biochemical processes within the organisms.

#### Recent and Significant Publications:

"Robustness of clocks to input noise," with M. Monti and P. R. ten Wolde, *Physical Review Letters*, 121, 2018, p. 078101, doi: [10.1103/PhysRevLett.121.078101](https://doi.org/10.1103/PhysRevLett.121.078101).

"Vertex stability and topological transitions in vertex models of foams and epithelia," with M. A. Spencer and Z. Jabeen, *The European Physical Journal E*, 40(2), 2017, doi: [10.1140/epje/i2017-11489-4](https://doi.org/10.1140/epje/i2017-11489-4).

"Discrete gene replication events drive coupling between the cell cycle and circadian clocks," with J. Pajmans, et al., *Proceedings of the National Academy of Sciences, USA*, 113, 2016, p. 4063-4068, doi:[10.1073/pnas.1507291113](https://doi.org/10.1073/pnas.1507291113).

"Epithelial tricellular junctions act as interphase cell shape sensors to orient mitosis," with F. Bosveld, et al., *Nature*, 530, 2016, pp. 495-498, doi: [10.1038/nature16970](https://doi.org/10.1038/nature16970).

Service – Professor Lubensky has made a large number of important service contributions to the Department of Physics, the College of Literature, Science, and the Arts, and to the wider physics community. At the local level, he has served as an undergraduate advisor, on a third year review committee, a junior faculty mentor, and organizer of the quantitative biology seminar series. In addition, his leadership skills have been recognized by being elected to serve on the Executive Committee for the Michigan Center for Theoretical Physics (now the Leinweber Center for Theoretical Physics) and he is currently serving on the departmental Executive Committee. On the national level (and beyond), Professor Lubensky has been a session organizer for the annual meetings of the American Physical Society (APS), a guest editor for the journal *Computational Biology*, and a co-organizer of a local APS networking event.

#### External Reviews:

##### Reviewer (A)

"...Lubensky has developed very much along the track that he set out on as Assistant Professor. It is a courageous and unique program that combines advanced molecular and cell biology with concepts borrowed from statistical physics. ...patterning of cones in the eye of the zebrafish. ...this is a remarkable achievement. ...I enthusiastically support his promotion."

##### Reviewer (B)

"Far fewer do what one would recognize as top notch theory, including picking potentially paradigmatic (but often not fashionable) systems, framing key questions, developing and analyzing models, and driving experimental directions. David Lubensky is definitely one of these and at a high level. David's largest body of work... has been on circadian oscillators...he

has become *the* world leader. ... He would be a major asset to any university and I wish I had him as a colleague.”

Reviewer (C)

“I believe...[Lubensky] is an extremely talented scientist. ...a perfectionist with very high standards. ...[his] scholarly visibility in the international community is very high. ...[Lubensky] is an excellent speaker – very lively and scientifically clear and ‘to the point.’”

Reviewer (D)

“He wrote several key papers on eye development which have had a significant impact and which are helping create opportunities for physics ideas to ‘infiltrate’ relatively new intellectual territory for our community. Indeed, applications of physics to developmental biology are indeed spreading in part based on David’s research. ...Lubensky is and has been a significant contributor to multiple aspects of the field and is recognized as such by the physics of living systems community.”

Reviewer (E)

“...David has introduced the coupling of the gene expression approach with cell mechanics. This was again pioneering work, which I find of prime importance. ... David[’s] work on circadian clocks is also profound and important. ... He is one of the world leaders of his generation and his work will stand as definitive ground-breaking contributions in the field.”

Reviewer (F)

“The central theme of David’s research is to understand the self-organization in space and time of living systems. ...David made systematic and impactful progress, having published a good number of papers of originality and high quality.”

Summary of Recommendation:

Professor Lubensky has established a productive and internationally recognized research program in biological physics. He is an outstanding teacher and mentor, and a generous citizen of department and the discipline at large. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor David K. Lubensky be promoted to the rank of professor of physics, with tenure, and professor of biophysics, without tenure, College of Literature, Science, and the Arts.



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Elizabeth R. Cole, Interim Dean  
Professor of Women’s Studies, Psychology,  
and Afroamerican and African Studies  
College of Literature, Science, and the Art

May 2019