

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

Jayakrishnan Nandakumar, assistant professor of molecular, cellular, and developmental biology, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of molecular, cellular, and developmental biology, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2007	Memorial Sloan-Kettering Cancer Center, Cornell Medical College
M.S.	2001	Indian Institute of Science
B.S.	1998	Presidency College, India

Professional Record:

2013 – present	Assistant Professor, Department of Molecular, Cellular, and Developmental Biology, University of Michigan
2009 – 2012	HHMI - Research Fellow, Helen Hay Whitney Foundation, Departments of Chemistry and Biochemistry, University of Colorado, Boulder
2007 – 2009	HHMI Post-doctoral Research Fellow, Departments of Chemistry and Biochemistry, University of Colorado, Boulder

Summary of Evaluation:

Teaching – Professor Nandakumar is an exceptionally committed and successful educator, and a thoughtful and dedicated mentor to early career scientists. His primary teaching assignments have been to co-teach the large enrollment course “Introduction to Biochemistry” (MCDB 310) and to teach all of the courses on Telomerase Function (MCDB 401/448) that he developed. Introduction to Biochemistry is one of the most important courses in the Department of Molecular, Cellular, and Developmental Biology’s (MCDB) curriculum. It is required for most of the MCDB majors and is also taken by students majoring in other disciplines. Professor Nandakumar has become a star lecturer in this rotation, and the department’s faculty agreed that he is a naturally gifted teacher. In exit surveys conducted over the past five years of students in the Program in Biology, students named Professor Nandakumar’s MCDB 310 as their favorite science course. He is also an exceptional mentor to his trainees in the research laboratory, where he has trained many doctoral students, post-doctoral fellows and undergraduate students.

Research – Professor Nandakumar is a molecular biologist who specializes in the biology of telomeres, which are DNA/protein complexes found at the ends of chromosomes. They have important functions in health and disease, and Professor Nandakumar has made seminal discoveries that have expanded our understanding of how these structures form and are maintained. His most important findings have focused on a protein called TPP1, that serves to recruit the enzyme telomerase, which catalyzes DNA replication at chromosomal ends. His biochemical and biophysical studies have illuminated how TPP1 functions, and they have elucidated how mutations in this protein can lead to disease states in humans. In addition to his contributions to basic telomere biology, Professor Nandakumar’s work has provided critical information that may lead to the development of therapies to treat human disease.

#### Recent and Significant Publications:

- “The N terminus of the OB domain of telomere protein TPP1 is critical for telomerase action,” with S. Grill, et al, *Cell Reports*, 22, 2018, pp. 1132-1140. PMID: PMC5815312.
- “Dissecting the telomere-inner nuclear membrane interface formed in meiosis,” with D. F. Pendleury, et al, *Nature Structural and Molecular Biology*, 24, 2017, pp. 1064-1072. PMID: PMC5755706.
- “Structural and functional consequences of a disease mutation in the telomere protein TPP1,” with K. Bisht, et al, *Proceedings of the National Academy of Sciences U.S.A.* 113, 2016, pp. 13021-13026. PMID: PMC5135350.
- “Hoyeraal-Hreidarsson syndrome caused by a germline mutation in the TEL patch of the telomere protein TPP1,” with H. Kocak, et. al, *Genes and Development*, 28, 2014, pp. 2090-2102. PMID: PMC4180972.

Service – Professor Nandakumar’s service to the department, the university and the scientific community has been admirable. He has served on several important MCDB committees, including their Graduate Admissions Committee, a faculty search committee, and as an elected member of the MCDB Executive Committee. He serves as a mentor for several National Institutes of Health training grants, and he is a member of the Executive Committee for the Center for RNA Biomedicine (CRB). He has been a reviewer for many high profile scientific journals, and served as an ad hoc reviewer. He is currently a regular study section member for the American Cancer Society’s grant program. Professor Nandakumar is also an active member of INDIGO, the LSA Asian and Asian American Faculty Alliance.

#### External Reviews:

##### Reviewer (A)

“I would rank his recent work on TPP1 published earlier this year in *Cell Reports* and presently under review in *Molecular Cell* among the most significant recent publications in this field. This work is a first in revealing a whole new layer of regulation in telomere biology. There is no doubt on my mind that JK is among the top five...investigators in this field and will be leading it in years to come.”

##### Reviewer (B)

“...[Dr. Nandakumar] has built a strong research group at Michigan, published important papers, established his ability to obtain and maintain major research funding, and trained students at a high level both in the classroom and in his research laboratory. Furthermore, he is a rare interdisciplinary scholar who represents the sort of colleague around whom one wants to build a world-class department. Thus, I consider your decision to be an easy one.”

##### Reviewer (C)

“[Dr. Nandakumar] is without exaggeration one of the most promising rising stars in the telomere field. He is an expert on telomerase and telomere protein structure and function, and has made highly significant strides in providing the mechanistic basis for the many functions of telomeres and how they are coordinated. ...he is clearly one of the most successful telomere researchers [in his cohort] with a clear upward trajectory. He has both published outstanding completely independent work and established fruitful and exceedingly worthwhile collaborations.”

Reviewer (D)

“Since starting his faculty position in 2013, Dr. Nandakumar has continued to distinguish himself in the telomeres and telomerase field. I would like to note that this is an extremely challenging field that is also rife with errors and misinterpretations of data. Dr. Nandakumar’s work stands out for its scientific rigor and creativity. ... Dr. Nandakumar is clearly a scholar and scientist of the highest caliber, as well as a dedicated teacher and a good citizen to his department and the scientific community.”

Reviewer (E)

“Dr. Nandakumar strikes me as an outstanding scientist. His talks are always very clear and the data presented in his talks and his papers are of excellent quality. ...[he] is well-respected in the field of research. The recognition is illustrated by the talks he regularly obtains at telomere meetings. He is clearly among the outstanding emerging scientists [in his cohort]....”

Reviewer (F)

“Since establishing an independent research program at the University of Michigan, [Dr. Nandakumar]’s accomplishments have substantially grown, and he is recognized as a leader in studying how the telomere recruits telomerase. ... The body of work produced from [Dr. Nandakumar]’s laboratory is remarkable both in the quantity and more importantly, in the quality of the science. He is opening new doors for the field. ...Nandakumar is an extraordinarily talented, thoughtful and productive scientist. He has a strong track record of accomplishment...”

Reviewer (G)

“[Dr. Nandakumar] is a remarkable [junior] scientist and rising star in the telomere field. I fully support this well-deserved promotion. ... JK has created a special niche where he combines his great talents in biochemistry and structural analysis with important biological questions and advancements that can impact human health.”

Summary of Recommendation:

Professor Nandakumar has made important discoveries in his research that have uncovered fundamental mechanisms by which the protein TPP1 recruits telomerase to chromosome ends. He has demonstrated outstanding commitment to teaching and service. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Jayakrishnan Nandakumar be promoted to the rank of associate professor of molecular, cellular, and developmental biology, with 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 Arts

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