

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

Kristin S. Koutmou, assistant professor of chemistry, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of chemistry, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D. 2009 University of Michigan, Ann Arbor  
B.A. 2003 University of Colorado, Denver

Professional Record:

2021-present Affiliate faculty member, Department of Biological Chemistry, University of Michigan  
2019-present Seyhan N. Ege Assistant Professor, Department of Chemistry, University of Michigan  
2016-present Faculty member, Program in Chemical Biology, University of Michigan  
2016-present Assistant Professor, Department of Chemistry, University of Michigan  
2011-2016 Post-doctoral fellow, Johns Hopkins School of Medicine  
2009-2011 Teaching Post-doctoral Fellow, Department of Chemistry, University of Michigan

Summary of Evaluation:

Teaching: Professor Koutmou is a dedicated teacher of undergraduate and graduate students. She has chaired thirteen Ph.D. committees and mentored five undergraduate students. She has taught five different courses to students in chemistry and other programs in the biosciences, and has made significant curricular changes to the undergraduate biochemistry class, including adding peer-to-peer learning opportunities as well as introducing a writing component to the class. At the graduate level, Professor Koutmou has redesigned the first-year course in chemical biology. She has strategically implemented small group discussions in course design to take advantage of the virtual format necessitated by the pandemic. In addition to excellence in the classroom, she has extended her teaching by becoming an educational coach for faculty and graduate student instructors. She is committed to introducing an inquiry mindset to teaching practices to improve student outcomes and was awarded the Seyhan Ege Junior Faculty Development Award for her contributions to teaching.

Research: Professor Koutmou has gained national and international recognition as an expert in the field of chemical biology. The goals of her research are to combine structural biology, mechanistic enzymology, and nucleoside biochemistry to answer questions about the origin and functional role of chemical modifications in RNA for protein synthesis. She has published numerous papers in high-quality, high-impact journals and is a highly sought collaborator, particularly with the studying modifications in RNA viruses such as SARS-CoV-2. Many external reviewers comment on her depth of thought, the scientific rigor of her scholarship, and her leadership in the field. She has won several prestigious awards, including a National Science

Foundation CAREER Award, a Cottrell Scholar Award, a Maximizing Investigator's Research Award from the National Institutes of Health, and a Research Corporation grant that together provide over \$2.2M in direct funding.

Recent and Significant Publications:

- Purchal, M.K., Eyler, D.E., Tardu, M., Franco, M.K., Korn, M.M., Khan, T., McNassor, R., Giles, R., Lev, K., Sharma, H., Monroe, J., Mallik, L., Koutmos, M., & Koutmou, K. (2022). Pseudouridine synthase 7 is an opportunistic enzyme that binds and modifies substrates with diverse sequences and structures. *Proceedings of the National Academy of Sciences*, *119*(4), e2109708119.
- Franco, M.K. & Koutmou, K. (2022). Chemical modifications to mRNA nucleobases impact translation elongation and termination. *Biophysical Chemistry*, *285*, 106780.
- Tardu, M., Jones, J.D., Kennedy, R.T., Lin, Q., & Koutmou, K. (2019). Identification and quantification of modified nucleosides in *Saccharomyces cerevisiae* mRNAs. *ACS Chemical Biology*, *14*(7), 1403-1409.
- Eyler, D.E., Franco, M.K., Batool, Z., Wu, M.Z., Dubuke, M.L., Dobosz-Bartoszek, M., Jones, J.D., Polikanov, Y.S., Roy, B., & Koutmou, K. (2019). Pseudouridylation of mRNA coding sequences alters translation. *Proceedings of the National Academy of Sciences*, *116*(46), 23068-23074.

Service: Professor Koutmou has been an outstanding departmental citizen and a valuable contributor to the college, university, and discipline at large. She has made substantial service contributions in graduate student recruiting, graduate admissions, and safety. She has re-energized the chemical biology seminar program during the pandemic. A notable contribution has been her service as a NextProf faculty participant and mentor. She is recognized externally for writing Spotlights on graduate students and early-career faculty within the RNA Society.

External Reviewers:

Reviewer (A): "I was quite impressed by [Professor Koutmou's] accomplishments in research, teaching, and service. Her work is focused on the discovery and characterization of covalent modifications to RNA. This is an especially timely and impactful area of RNA research. What sets her work apart from the rest of the field is the careful analytical and mechanistic approach she takes."

Reviewer (B): "[Professor Koutmou] is an expert in RNA chemical modifications and their impact on translation. Her selection of pseudouridine as a focal point could not be more timely... N1 methylpseudouridine is a critical component of the mRNA vaccines produced by Moderna and Pfizer/BioNTech... In the medium to long-term, she is well positioned as a chemist and biochemist to have a large impact on the field of translation... [Professor Koutmou] has all the elements of success—publications, funding, invited talks, but more importantly there is quality, depth and excitement in her work."

Reviewer (C): "...this is one of the strongest cases that I have seen in the past decade... Dr. Koutmou's work to develop methods for rapid assessment of mRNA modifications is highly important to the RNA field. Rather than just building off existing RNA-Seq methods, she took

an innovative approach that involved improved RNA purification and mass spectrometry. She is also working with mRNA targets that can be extremely challenging to handle...I believe that Dr. Koutmou has positioned herself well to make new discoveries and continue to publish outstanding work, along with providing an outstanding training environment for students.”

Reviewer (D): “The identification of these new [RNA] modifications opens the door for the other aspects of her program to understand the functional and structural impact on translation and the enzyme ‘writers’ that install these modifications in mRNA...This work also provides chemical biology tools/approaches that will impact diverse research area [sic]. This foundation will also allow the Koutmou program to continue to flourish long into the future.”

Reviewer (E): “The most important contributions made by [Professor Koutmou] is her recent work on detailed investigations of consequences of RNA modifications on translation...She is prolific and executes very well...She is well positioned to the next stage of her career development. She compares very well with her peers and others at her stage of career. I strongly support her promotion.”

Reviewer (F): “Professor Koutmou’s research stands out and its excellence is manifest at multiple levels...I want to note that I was blown away by the teaching approaches and impact described by Professor Koutmou in her candidate statement. What she has done is several standard deviations beyond the mean, and could only happen with a combination of caring, depth of scholarship, extensive creativity, humility (to seek help from others), and attention to detail. These traits are rarely found in one individual and still rarer to see in academia where the ‘glory’ goes to research accomplishments.”

Summary of Recommendation:

Professor Koutmou is gaining both national and international recognition in her research area of chemical biology. She is a dedicated scholar who excels in teaching and service. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Kristin S. Koutmou be promoted to the rank of associate professor of chemistry, with tenure, College of Literature, Science, and the Arts.



Anne Curzan, Dean  
Geneva Smitherman Collegiate Professor of  
English Language and Literature, Linguistics,  
and Education  
Arthur F. Thurnau Professor  
College of Literature, Science, and the Arts

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