Approved by the Regents
May 16, 2024

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF BIOLOGICAL CHEMISTRY

Yan Zhang, Ph.D., assistant professor of biological chemistry, Department of Biological Chemistry, Medical School, is recommended for promotion to associate professor of biological chemistry, with tenure, Department of Biological Chemistry, Medical School.

Academic Degrees:

Ph.D.	2011	University of Wisconsin-Madison, Madison, WI
B.S.	2004	Peking University, Beijing, China

Professional Record:

2017 – Present	Assistant Professor, Department of Biological Chemistry, University of Michigan, Ann Arbor, MI

Summary of Evaluation:

Teaching: Dr. Zhang's teaching involves didactic instruction and mentoring of post-doctoral fellows, and graduate and undergraduate students. She lectures in Biological Chemistry Critical Analysis (BIOCHEM597), Regulatory RNA and Control of Gene Expression (BIOCHEM 640), Microbial Genetics (MCDB415), Responsible Conduct in Research (PIBS503), and designed and directed the special topics course, Emerging Areas of Biochemistry (BIOCHEM713). She created an international online learning initiative "CRISPR Gene Editing Teach-Out" and launched The Global Learning Platform Coursera in 2022 with international reach. She has mentored faculty members, post-doctoral fellows, graduate students, rotation students, undergraduate students, and research staff, with many of her trainees having successfully graduated and pursued successful careers. Teaching evaluations range from very good to excellent.

Research: Dr. Zhang's research area is CRISPR biology and mechanisms. She uses biochemical, microbiological, genetic, and genomic approaches to understand the biology of these prokaryotic systems and is developing tools to apply novel CRISPR-based tools to tackle diverse biological questions and as potential therapies. She is an innovator in this area with three existing and five pending patents. Dr. Zhang is currently funded by the National Institutes of Health (NIH) R35 Outstanding Young Investigator Award as a principal investigator and a supplement to the R35. Past funding sources include the NIH and institutional awards. Dr. Zhang has authored 15 peer review manuscripts in high impact journals such as *Molecular Cell* and *Current Biology*. Additionally, she published two invited commentaries that address major questions of how CRISPR-Cas systems acquire viral memory. She has established a national reputation in the CRISPR field as seen in the large number of invitations she has received to speak at the most impactful conferences in this area including as a Keynote Speaker at the Genetic Toxicology Association meeting and 11 other conferences and 22 seminars nationally. In 2023, she was awarded the Cutting-Edge Gene-Editing Therapies for Corneal Dystrophies: Research Scouts Award from the UM Office of Research.

Recent and Significant Publications:

Tan R, Krueger RK, Gramelspacher MJ, Zhou X, Xiao Y, Ke A, Hou Z, Zhang Y, "Cas11 enables genome engineering in human cells with compact CRISPR-Cas3 systems," *Molecular Cell*. 2022 Feb 17;82(4):852-867.e5. PMID: 35051351.

Hou Z, Hu C, Ke A, Zhang Y, "Introducing Large Genomic Deletions in Human Pluripotent Stem Cells Using CRISPR-Cas3," *Current Protocols*. 2022 Feb;2(2):e361. Cover article. PMID: 35129865.

Gramelspacher MJ, Hou Z, Zhang Y, "Biochemical characterization of RNA-guided ribonuclease activities for CRISPR-Cas9 systems," *Methods*. 2020 Feb 1;172:32-41. PMID: 31228550.

Dolan AE, Hou Z, Xiao Y, Gramelspacher MJ, Heo J, Howden SE, Freddolino PL, Ke A, Zhang Y, "Introducing a Spectrum of Long-Range Genomic Deletions in Human Embryonic Stem Cells Using Type I CRISPR-Cas," *Molecular Cell*. 2019 Jun 6;74(5):936-950.e5. PMID: 30975459.

Rousseau BA, Hou Z, Gramelspacher MJ, Zhang Y, "Programmable RNA Cleavage and Recognition by a Natural CRISPR-Cas9 System from Neisseria meningitidis," *Molecular Cell*. 2018 Mar 1;69(5): 906-914.e4. PMID: 29456189.

Service: Dr. Zhang performs service both at the national and institutional levels. Nationally, she served on the organizing committee for the Society of Biological Engineering. She has served as an ad hoc reviewer for an NIH study section and as an ad hoc reviewer for many journals including *BMC Biology*, *Cell*, and *Nature Communications*. Institutionally, she has served on several institutional committees and departmental committees including her role as a member of the executive committee of the Center for RNA Biomedicine. She has served on several preliminary and dissertation committees. Volunteer outreach service includes as a host for visiting high school students and as a guest lecturer for the Osher Lifelong Institute for retired professionals in the southeast Michigan area.

External Reviewers:

Reviewer A: "Editorial consideration is also reflected by her serving as a reviewer for high-profile journals (e.g. Science, Nature and Cell). This unequivocally establishes her domestic and to some extent her international standing."

Reviewer B: "A recent follow up paper (also in Mol Cell with Hou lab at Michigan) provided both exciting biological and technical advances with the discovery of an important 'hidden' cas11 gene. This recent paper again demonstrates Dr. Zhang's amazing ability to produce important and useful literature that blends biological and technical breakthroughs in the CRISPR field."

Reviewer C: "Dr. Zhang currently holds competitive peer reviewed grants and has a strong history of grant funding for her research. Her current funding includes an R35 Outstanding Investigator Award from the NIH which funds her to define the mechanisms of prokaryotic CRISPR immune memory formation. The creativity and innovation she has demonstrated in her early research program all suggest that she will continue to be successful in acquiring external funding in the future."

Reviewer D: "The work described above has made Dr. Zhang an important figure among the [early] investigators of the highly competitive CRISPR field, being invited to all the major meetings, where she gives fantastic talks."

Reviewer E: "Prof. Zhang is widely recognized for her important contributions to CRISPR biology and tool development. As a leading contributor in CRISPR biology discovery, she is celebrated for her robust and rigorous research data and stands as a model for the new generation of CRISPR biologists."

Reviewer F: "Simply put, Dr. Zhang is an outstanding scientist who has demonstrated a sustained record of international caliber research excellence throughout her independent career at The University of Michigan that continues to escalate in strength and prestige with her ongoing endeavors. She is exceptionally driven and dedicated and her research output is consistently of high caliber."

Reviewer G: "…Yan Zhang's publications are very strong in quality and creativity. The publications in her independent faculty phase at University of Michigan are in strong venues, including Molecular Cell (at least 3!) and Current Protocols."

Summary of Recommendations:
Dr. Zhang is an exceptional researcher who has established a national reputation for her outstanding research and innovation in the field of CRISPR biology where she has made substantial and impactful contributions. She is an effective didactic teacher and an excellent and prolific research mentor. She is actively performing appropriate service and outreach activities. I am pleased to recommend Yan Zhang, Ph.D. for promotion to associate professor of biological chemistry, with tenure, Department of Biological Chemistry, Medical School.

Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School

May 2024