



RIVERSIDE | College of Natural & Agricultural Sciences

CMDB-GGB-MCBL Seminar Series Winter 2025



Joanna Kovalski, Ph.D.

Associate Specialist, Department of Urology

University of California, San Francisco

“Decoding the Translation Control Code”

Wednesday, January 15, 2025 | 12:00 pm
Genomics Auditorium 1102A

Abstract: The overarching goal of my research program is to uncover fundamental mechanisms of post-transcriptional control of gene expression that enable specific cellular responses to maintain core biological processes. RNA transcript levels predict less than half of protein abundance, which is the prime determinant of cellular function. This stresses the importance of selective translational control to precisely and rapidly alter the proteome to alter cell state. Post-transcriptional control mechanisms have remained elusive, particularly the functional interactions between RNA binding proteins (RBPs) and select target genes. Like transcriptional control, where a defined set of factors bind to specific DNA elements to drive selective transcription, how does a repertoire of RBPs act in *trans* to selectively regulate gene expression? In my research, I addressed this gap with new tools and novel perspectives to systematically probe functional, selective regulators of post-transcriptional control. Using a novel flow cytometry-based translational reporter system combined with CRISPRi screening, I identified a translational regulatory network controlling Myc expression in cancer cells. In particular, I uncovered how a specific RNA-binding protein, RBM42, enhances Myc protein production by restructuring the *MYC* mRNA 5'UTR and facilitating translation initiation. By mapping the RBP-RNA code, we can illuminate post-transcriptional regulatory mechanisms that drive homeostasis and disease, particularly cancer, and identify potential new therapeutic targets.

Biography: Dr. Joanna Kovalski's research focuses on uncovering the post-transcriptional regulatory mechanisms underlying cell fitness. She is currently an Associate Specialist in the lab of Dr. Davide Ruggero in the Helen Diller Comprehensive Cancer Center at the University of California San Francisco. She has pioneered new methods to study selective RNA translational control. Her recent work identified a first-of-its-kind translational regulatory network of the *MYC* oncogene and identified novel vulnerabilities to target pancreatic cancer. Dr. Kovalski earned her Ph.D. in Cancer Biology from Stanford University and her bachelor's degree in Molecular Biology & Biochemistry from Washington University in St. Louis. At Stanford University, she made significant contributions to understanding how the Ras protein oncogenic signaling drives cancer cell proliferation. Her research has been supported by prestigious awards, including the American Cancer Society Postdoctoral Fellowship and the UCSF Mentored Scientist Award in Pancreas Cancer. Dr. Kovalski is strongly committed to teaching and mentoring the next generation of scientists.