Stanford

Nicole M. Martinez

Assistant Professor of Chemical and Systems Biology and of Developmental Biology

Bio

ACADEMIC APPOINTMENTS

- Assistant Professor, Chemical and Systems Biology
- Assistant Professor, Developmental Biology
- Member, Bio-X
- Institute Scholar, Sarafan ChEM-H
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Faculty Scholar, School of Medicine, Stanford University, (2024- present)
- Institute Scholar, Sarafan ChEM-H, (2022- present)
- Investigator, Chan Zuckerberg Biohub, (2022- present)

HONORS AND AWARDS

- Laure Aurelian Biomedical Research Award, Stanford Medicine (2025)
- Packard Fellowship for Science and Engineering, David and Lucile Packard Foundation (2023)
- Rita Allen Foundation Scholar, Rita Allen Foundation (2023)
- The Alba Tull Molecular Therapeutics Award for Innovative Medicines, Innovative Medicine Accelerator (IMA) (2023)
- Chan Zuckerberg Biohub Investigator, Chan Zuckerberg Initiative (2022)
- Gabilan Faculty Fellowship, Stanford University (2022)
- Intersections Science Fellow Symposium Fellowship, Intersections Science Fellows Symposium (2021)
- Pathway to Independence Award (K99/R00), National Institutes of Health (2020)
- Stanford.Berkeley.UCSF Next Generation Faculty Symposium Fellowship, Stanford.Berkeley.UCSF Next Generation Faculty Symposium (2020)
- Jane Coffin Childs Memorial Fund Postdoctoral Fellow, Jane Coffin Childs Memorial Fund (2017)
- Ruth L. Kirschstein National Research Service Award (F31), National Institutes of Health (2013)
- Research Supplement to Promote Diversity, National Institutes of Health (2011)
- HHMI Med into Grad Scholar, University of Pennsylvania (2009)
- Magna cum laude, University of Puerto Rico Mayaguez (2009)
- MARC U*STAR Program NIH Fellowship, University of Puerto Rico Mayaguez (2008)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Committee Member – Toward Sequencing and Mapping of RNA Modifications, National Academies of Sciences, Engineering, and Medicine (2023 - 2023)
- Member, Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (2022 - present)
- Member, RNA Society (2010 - present)

PROFESSIONAL EDUCATION

- Postdoctoral Fellow, Massachusetts Institute of Technology and Yale University , RNA Biology (2021)
- Doctor of Philosophy (PHD), University of Pennsylvania , Biochemistry and Molecular Biophysics (2015)
- Bachelor of Science (BS), University of Puerto Rico, Mayaguez , Industrial Biotechnology (2009)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our lab is broadly interested in RNA-based mechanisms of gene regulation. Precise control of gene expression at the level of messenger RNA processing is necessary for organismal development, required for response to environmental cues and its dysregulation is the basis of many diseases. We are keen to uncover mechanisms that control alternative mRNA processing and their downstream consequences on gene expression and cell physiology. Eukaryotic mRNA are extensively modified with non-canonical bases that have the potential to regulate pre-mRNA processing steps such as splicing and 3’ end processing. Dysregulation of RNA-modifying enzymes cause a wide range of human diseases, underscoring the need to elucidate this exciting new layer of gene regulation. Our current research studies mechanisms and functions of RNA modifications in pre-mRNA processing and their roles in development and disease through a combination of molecular biology, biochemistry, genomics, genetics, and systems biology.

Teaching

COURSES

2025-26

- Research Seminar: CSB 270 (Aut, Win, Spr)

2024-25

- Research Seminar: CSB 270 (Aut, Win, Spr)

2023-24

- Research Seminar: CSB 270 (Aut, Win, Spr)

2022-23

- Research Seminar: CSB 270 (Aut, Win, Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Colette Benko, Leyna Duong, Usman Enam, Jada Lauren Garzon, Austin Katzer, Haim Krupkin, Masaru Shimasawa, Abby Thurm, Eric Wong

Postdoctoral Faculty Sponsor

Matias Montes Serey

Doctoral Dissertation Advisor (AC)

Janie Kim, Nicolas Robalin, Becca Rodell, Wendy Trieu, Kailey Worner

Doctoral Dissertation Co-Advisor (AC)

Zoya Gauhar

Publications

PUBLICATIONS

- **Nano-Mod-Amp reveals RNA sequence, structural and cell type specific features of pseudouridylation by PUS7.** *bioRxiv : the preprint server for biology*
  Rodell, R., Jain, R., Shenasa, H., Montes, M., Robalin, N., Prodic, S., Eyras, E., Martinez, N. M.
  2025
- **Charting a Future for Sequencing RNA and Its Modifications: A New Era for Biology and Medicine** *National Academies of Sciences, Engineering, and Medicine*
  Rodell, R., Jain, R., Shenasa, H., Montes, M., Robalin, N., Prodic, S., Eyras, E., Martinez, N. M.
  2024
- **Why U matters: detection and functions of pseudouridine modifications in mRNAs.** *Trends in biochemical sciences*
  Rodell, R., Robalin, N., Martinez, N. M.
  2023
- **Rewriting the message: Harnessing RNA pseudouridylation to tackle disease.** *Molecular cell*
  Montes, M., Martinez, N. M.
  2023; 83 (4): 503-506
- **Pseudouridine synthases modify human pre-mRNA co-transcriptionally and affect pre-mRNA processing.** *Molecular cell*
  Martinez, N. M., Su, A., Burns, M. C., Nussbacher, J. K., Schaening, C., Sathe, S., Yeo, G. W., Gilbert, W. V.
  2022; 82 (3): 645-659.e9
- **Pseudouridine site assignment by high-throughput in vitro RNA pseudouridylation and sequencing.** *Methods in enzymology*
  Martinez, N. M., Schaening-Burgos, C., Gilbert, W. V.
  2021; 658: 277-310
- **Investigating Pseudouridylation Mechanisms by High-Throughput in Vitro RNA Pseudouridylation and Sequencing.** *Methods in molecular biology (Clifton, N.J.)*
  Martinez, N. M., Gilbert, W. V.
  2021; 2298: 379-397
- **Regulation and Function of RNA Pseudouridylation in Human Cells.** *Annual review of genetics*
  Borchardt, E. K., Martinez, N. M., Gilbert, W. V.
  2020; 54: 309-336
- **mRNA structure determines modification by pseudouridine synthase 1.** *Nature chemical biology*
  Carlile, T. M., Martinez, N. M., Schaening, C., Su, A., Bell, T. A., Zinshteyn, B., Gilbert, W. V.
  2019; 15 (10): 966-974
- **Pre-mRNA modifications and their role in nuclear processing.** *Quantitative biology (Beijing, China)*
  Martinez, N. M., Gilbert, W. V.
  2018; 6 (3): 210-227
- **Inhibition of Zinc-Dependent Histone Deacetylases with a Chemically Triggered Electrophile.** *ACS chemical biology*
  Boskovic, Z. V., Kemp, M. M., Freedy, A. M., Viswanathan, V. S., Pop, M. S., Fuller, J. H., Martinez, N. M., Figueroa Lazú, S. O., Hong, J. A., Lewis, T. A., Calarese, D., Love, J. D., Vetere, et al
  2016; 11 (7): 1844-51
- **Position-dependent activity of CELF2 in the regulation of splicing and implications for signal-responsive regulation in T cells.** *RNA biology*
  Ajith, S., Gazzara, M. R., Cole, B. S., Shankarling, G., Martinez, N. M., Mallory, M. J., Lynch, K. W.
  2016; 13 (6): 569-81
- **Convergence of Acquired Mutations and Alternative Splicing of CD19 Enables Resistance to CART-19 Immunotherapy** *CANCER DISCOVERY*

Sotillo, E., Barrett, D. M., Black, K. L., Bagashev, A., Oldridge, D., Wu, G., Sussman, R., Lanauze, C., Ruella, M., Gazzara, M. R., Martinez, N. M., Harrington, C. T., Chung, et al
2015; 5 (12): 1282-1295

- **Widespread JNK-dependent alternative splicing induces a positive feedback loop through CELF2-mediated regulation of MKK7 during T-cell activation.** *Genes & development*
  Martinez, N. M., Agosto, L., Qiu, J., Mallory, M. J., Gazzara, M. R., Barash, Y., Fu, X. D., Lynch, K. W.
  2015; 29 (19): 2054-66

- **Induced transcription and stability of CELF2 mRNA drives widespread alternative splicing during T-cell signaling.** *Proceedings of the National Academy of Sciences of the United States of America*
  Mallory, M. J., Allon, S. J., Qiu, J., Gazzara, M. R., Tapescu, I., Martinez, N. M., Fu, X. D., Lynch, K. W.
  2015; 112 (17): E2139-48

- **Control of alternative splicing in immune responses: many regulators, many predictions, much still to learn.** *Immunological reviews*
  Martinez, N. M., Lynch, K. W.
  2013; 253 (1): 216-36

- **Alternative splicing networks regulated by signaling in human T cells.** *RNA (New York, N.Y.)*
  Martinez, N. M., Pan, Q., Cole, B. S., Yarosh, C. A., Babcock, G. A., Heyd, F., Zhu, W., Ajith, S., Blencowe, B. J., Lynch, K. W.
  2012; 18 (5): 1029-40

- **A novel HDAC inhibitor with a hydroxy-pyrimidine scaffold.** *Bioorganic & medicinal chemistry letters*
  Kemp, M. M., Wang, Q., Fuller, J. H., West, N., Martinez, N. M., Morse, E. M., Weïwer, M., Schreiber, S. L., Bradner, J. E., Koehler, A. N.
  2011; 21 (14): 4164-9