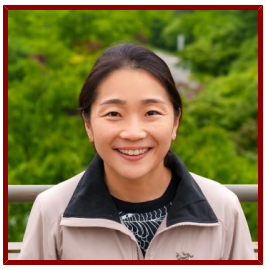
Stanford



Ellen Youngsoo Rim

Assistant Professor of Chemical Engineering

Bio

BIO

Plants are increasingly vulnerable to environmental stressors—such as pathogen infection, drought, and heat—from climate change. These challenges threaten global food security and limit the carbon sequestration potential of plants. Our research goal is to sustainably enhance plant productivity and resilience through protein engineering. We engineer proteins involved in plant immune and hormone signaling pathways using directed evolution in high-throughput single cell systems. Directed evolution is a synthetic biology approach that enables rapid development of proteins with novel or improved functions. We combine this approach with machine learning, which allows us to learn from large datasets generated during the directed evolution process. Engineered proteins are then introduced into plants to enhance crop yields and climate resilience.

ACADEMIC APPOINTMENTS

- Assistant Professor, Chemical Engineering
- Member, Bio-X

HONORS AND AWARDS

- Terman Faculty Fellow, Stanford University (2025)
- Life Sciences Research Foundation Postdoctoral Fellow, Simons Foundation (2022)
- Stanford Graduate Fellowship, Stanford University (2012)

PROFESSIONAL EDUCATION

- Postdoctoral training, University of California, Davis (2025)
- Ph.D., Stanford University (2020)
- B.A., Harvard University (2012)

LINKS

- Lab Website: https://rim.stanford.edu/

Teaching

COURSES

2026-27

- Advanced Biochemical Engineering: BIOE 355, CHEMENG 355 (Spr)
- Undergraduate Honors Seminar: CHEMENG 191H (Aut, Win, Spr)

2025-26

- Advanced Biochemical Engineering: BIOE 355, CHEMENG 355 (Spr)
- Undergraduate Honors Seminar: CHEMENG 191H (Aut, Win, Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Guy Robinson, Wenjie Zeng

Doctoral Dissertation Advisor (AC)

Claudia Phillips

Doctoral Dissertation Co-Advisor (AC)

Grace Yang

Publications

PUBLICATIONS

- **Vascularization of neonatal liver lobules presages adult liver size.** *Nature communications*
  Azizoglu, D. B., Perez, K., Zheng, S. L., Rahman, S., Rim, E. Y., Anbarchian, T., Fish, M., Loh, K. M., Red-Horse, K., Nusse, R.
  2025; 16 (1): 9989
- **Integration of crop modeling and sensing into molecular breeding for nutritional quality and stress tolerance.** *TAG. Theoretical and applied genetics. Theoretische und angewandte Genetik*
  Berlingeri, J., Fuentes, A., Ranario, E., Yun, H., Rim, E. Y., Garrett, O., Howard, A., LaPorte, M. F., Lo, S., Pauli, D., Hershberger, J., Earles, M., Van Deynze, et al
  2025; 138 (9): 205
- **APEX2-Mediated Proximity Labeling of Wnt Receptor Interactors Upon Pathway Activation.** *microPublication biology*
  Rim, E. Y., Nusse, R.
  2023; 2023
- **Climate change challenges, plant science solutions** *PLANT CELL*
  Eckardt, N. A., Ainsworth, E. A., Bahuguna, R. N., Broadley, M. R., Busch, W., Carpita, N. C., Castrillo, G., Chory, J., DeHaan, L. R., Duarte, C. M., Henry, A., Jagadish, S., Langdale, et al
  2023; 35 (1): 24-66
- **Plant immunity: Rice XA21-mediated resistance to bacterial infection** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Ercoli, M., Luu, D., Rim, E., Shigenaga, A., de Araujo, A., Chern, M., Jain, R., Ruan, R., Joe, A., Stewart, V., Ronald, P.
  2022; 119 (8)
- **The Wnt Pathway: From Signaling Mechanisms to Synthetic Modulators** *ANNUAL REVIEW OF BIOCHEMISTRY*
  Rim, E., Clevers, H., Nusse, R.
  2022; 91: 571-598
- **Beta-catenin-mediated Wnt signal transduction proceeds through an endocytosis-independent mechanism.** *Molecular biology of the cell*
  Rim, E. Y., Kinney, L. K., Nusse, R.
  2020: mbcE20020114
- **MUT-14 and SMUT-1 DEAD Box RNA Helicases Have Overlapping Roles in Germline RNAi and Endogenous siRNA Formation** *CURRENT BIOLOGY*
  Phillips, C. M., Montgomery, B. E., Breen, P. C., Roovers, E. F., Rim, Y., Ohsumi, T. K., Newman, M. A., van Wolfswinkel, J. C., Ketting, R. F., Ruvkun, G., Montgomery, T. A.
  2014; 24 (8): 839-844

- **PIWI Associated siRNAs and piRNAs Specifically Require the Caenorhabditis elegans HEN1 Ortholog henn-1** *PLOS GENETICS*
  Montgomery, T. A., Rim, Y., Zhang, C., Dowen, R. H., Phillips, C. M., Fischer, S. E. J., Ruvkun, G.
  2012; 8 (4): 72-83