Stanford



# Daniel Herschlag

Professor of Biochemistry and, by courtesy, of Chemical Engineering


### CONTACT INFORMATION

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## Bio

### BIO

The overarching goal of the Herschlag Lab is to understand the fundamental behavior of RNA and proteins and, in turn, how these behaviors determine and impact biology more broadly. We are particularly interested in questions of how enzymes work, how RNA folds, how proteins recognize RNA, and the roles of RNA/protein interactions in regulation and control, and the evolution of molecules and molecular interactions. The lab takes an interdisciplinary approach, spanning and integrating physics, chemistry and biology, and employing a wide range of techniques.

### ACADEMIC APPOINTMENTS

- Professor, Biochemistry
- Professor (By courtesy), Chemical Engineering
- Member, Bio-X
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute

### ADMINISTRATIVE APPOINTMENTS

- Senior Associate Dean of Graduate Education and Postdoctoral Affairs, School of Medicine, (2011-2015)

### HONORS AND AWARDS

- Bristol Myers Squibb Award in Enzyme Chemistry and Chemical Biology, ACS Division of Biochemistry and Chemical Biology (2026)
- Alumni Achievement Award, Binghamton University (2024)
- Member, American Academy of Arts and Sciences (2023)
- Stein and Moore Award, Protein Society (2022)
- Founders Award, Biophysical Society (2020)
- Excellence in Mentoring and Service Award, Stanford University Biosciences (2019)
- Member, National Academy of Sciences (2018)
- Student Service Faculty Award, Biochemistry, Stanford School of Medicine (2012)

- William Rose Award, ASBMB (2010)
- Fellow, AAAS (2005)
- Merit Award, NIH (2002)
- Cope Scholar Award, ACS (2000)
- Established Investigator, AHA (1998-2002)
- Pfizer Award for Enzyme Chemistry, ACS (1997)
- Fellowship in Science and Engineering, David and Lucile Packard (1995-2000)
- Scholar, Searle (1993-1996)
- Scholar in Biomedical Science, Lucille P. Markey (1990-1997)
- Postdoctoral Fellowship, Helen Hay Whitney (1989-1990; Colorado)
- Fellowship, Gillette Foundation (1986-1987; Brandeis)
- Award in Biochemistry, American Institute of Chemists (1982; SUNY)
- Award for Excellence in Biochemistry, SUNY (1982)
- Phi Beta Kappa, Michigan (1979)
- Scholar, James B. Angell (1978, 1979; Michigan)

### LINKS

- Herschlag lab website: http://herschlaglab.stanford.edu

## Research & Scholarship

### CURRENT RESEARCH AND SCHOLARLY INTERESTS

The overarching goal of the Herschlag Lab is to understand the fundamental behavior of RNA and proteins and, in turn, how these behaviors determine and impact biology more broadly. We are particularly interested in questions of how enzymes work, how RNA folds, how proteins recognize RNA, and the roles of RNA/protein interactions in regulation and control, and the evolution of molecules and molecular interactions. The lab takes an interdisciplinary approach, spanning and integrating physics, chemistry and biology, and employing a wide range of techniques.

## Teaching

### COURSES

**2026-27**

- Developing an Original Research Proposal: BIOC 360 (Spr)

**2025-26**

- Chemistry for Biologists and Others: BIOS 294 (Aut)
- Developing an Original Research Proposal: BIOC 360 (Spr)
- Understanding Kinetics for Biologists and Biology: BIOS 202 (Win)

**2024-25**

- Biochemistry Department Minicourse: BIOC 202 (Aut)
- Chemistry for Biologists and Others: BIOS 294 (Win)
- Developing an Original Research Proposal: BIOC 360 (Spr)
- Generating Models for Biological Processes Using Core Principles from Chemistry and Physics: BIOS 418 (Spr)

**2023-24**

- Biochemistry Mini-Course: BIOC 202 (Aut)
- Developing an Original Research Proposal: BIOC 360 (Spr)

### STANFORD ADVISEES

**Doctoral Dissertation Reader (AC)**

Simone Evans

**Postdoctoral Faculty Sponsor**

Patrick Almhjell, Qianzhen (QZ) Shao

**Doctoral Dissertation Advisor (AC)**

Preston Kellenberger, John Shin, Gabriel Tauber

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biochemistry (PhD Program)
- Biophysics (PhD Program)

## Publications

### PUBLICATIONS

- **Dissecting hydrogen bond energetics to answer the age-old question: "How much do hydrogen bonds contribute to enzymatic catalysis?".** *Proceedings of the National Academy of Sciences of the United States of America*
  Pinney, M. M., Liu, C., Herschlag, D.
  2026; 123 (24): e2534793123
- **Thermodynamic prediction of RNA cellular activity from sequence via conformational ensembles.** *Cell*
  Geng, A., Roy, R., Ken, M., Li, L., Chime, A., Abou Assi, H., Liu, B., Bou-Nader, C., Lee, Y., Zhang, J., Herschlag, D., Goff, S. P., Al-Hashimi, et al
  2026
- **Understanding how enzymes work: the journey to ensemble-function studies.** *The FEBS journal*
  Herschlag, D., Du, S.
  2026
- **Conformational ensembles reveal the origins of serine protease catalysis.** *Science (New York, N.Y.)*
  Du, S., Kretsch, R. C., Parres-Gold, J., Pieri, E., Cruzeiro, V. W., Zhu, M., Pinney, M. M., Yabukarski, F., Schwans, J. P., Martínez, T. J., Herschlag, D.
  2025; 387 (6735): eado5068
- **Decoupling of catalysis and transition state analog binding from mutations throughout a phosphatase revealed by high-throughput enzymology.** *Proceedings of the National Academy of Sciences of the United States of America*
  Markin, C. J., Mokhtari, D. A., Du, S., Doukov, T., Sunden, F., Cook, J. A., Fordyce, P. M., Herschlag, D.
  2023; 120 (29): e2219074120
- **RNA conformational propensities determine cellular activity.** *Nature*
  Ken, M. L., Roy, R., Geng, A., Ganser, L. R., Manghrani, A., Cullen, B. R., Schulze-Gahmen, U., Herschlag, D., Al-Hashimi, H. M.
  2023
- **Ensemble-function relationships to dissect mechanisms of enzyme catalysis.** *Science advances*
  Yabukarski, F., Doukov, T., Pinney, M. M., Biel, J. T., Fraser, J. S., Herschlag, D.
  2022; 8 (41): eabn7738
- **Systematic investigation of the link between enzyme catalysis and cold adaptation** *ELIFE*
  Stark, C. D., Bautista-Leung, T., Siegfried, J., Herschlag, D.
  2022; 11
- **High throughput and quantitative enzymology in the genomic era.** *Current opinion in structural biology*

Mokhtari, D. A., Appel, M. J., Fordyce, P. M., Herschlag, D.
2021; 71: 259-273

- **Revealing enzyme functional architecture via high-throughput microfluidic enzyme kinetics.** *Science (New York, N.Y.)*
Markin, C. J., Mokhtari, D. A., Sunden, F., Appel, M. J., Akiva, E., Longwell, S. A., Sabatti, C., Herschlag, D., Fordyce, P. M.
2021; 373 (6553)

- **Revealing enzyme functional architecture via high-throughput microfluidic enzyme kinetics** *SCIENCE*
Markin, C. J., Mokhtari, D. A., Sunden, F., Appel, M. J., Akiva, E., Longwell, S. A., Sabatti, C., Herschlag, D., Fordyce, P. M.
2021; 373 (6553): 411-+

- **Parallel molecular mechanisms for enzyme temperature adaptation.** *Science (New York, N.Y.)*
Pinney, M. M., Mokhtari, D. A., Akiva, E., Yabukarski, F., Sanchez, D. M., Liang, R., Doukov, T., Martinez, T. J., Babbitt, P. C., Herschlag, D.
2021; 371 (6533)

- **Assessment of enzyme active site positioning and tests of catalytic mechanisms through X-ray-derived conformational ensembles.** *Proceedings of the National Academy of Sciences of the United States of America*
Yabukarski, F., Biel, J. T., Pinney, M. M., Doukov, T., Powers, A. S., Fraser, J. S., Herschlag, D.
2020; 117 (52): 33204–15

- **Rapid and accurate determination of atomistic RNA dynamic ensemble models using NMR and structure prediction.** *Nature communications*
Shi, H., Rangadurai, A., Abou Assi, H., Roy, R., Case, D. A., Herschlag, D., Yesselman, J. D., Al-Hashimi, H. M.
2020; 11 (1): 5531

- **The individual and the team in collaborative science.** *Proceedings of the National Academy of Sciences of the United States of America*
Herschlag, D.
2020; 117 (28): 16116

- **How to measure and evaluate binding affinities.** *eLife*
Jarmoskaite, I. n., AlSadhan, I. n., Vaidyanathan, P. P., Herschlag, D. n.
2020; 9

- **A Quantitative and Predictive Model for RNA Binding by Human Pumilio Proteins** *MOLECULAR CELL*
Jarmoskaite, I., Denny, S. K., Vaidyanathan, P. P., Becker, W. R., Andreasson, J. O. L., Layton, C. J., Kappel, K., Shivashankar, V., Sreenivasan, R., Das, R., Greenleaf, W. J., Herschlag, D.
2019; 74 (5): 966-+

- **Ion counting demonstrates a high electrostatic field generated by the nucleosome.** *eLife*
Gebala, M. n., Johnson, S. L., Narlikar, G. J., Herschlag, D. n.
2019; 8

- **The roles of structural dynamics in the cellular functions of RNAs.** *Nature reviews. Molecular cell biology*
Ganser, L. R., Kelly, M. L., Herschlag, D. n., Al-Hashimi, H. M.
2019

- **The Story of RNA Folding, as Told in Epochs.** *Cold Spring Harbor perspectives in biology*
Herschlag, D., Bonilla, S., Bisaria, N.
2018; 10 (10)

- **High-Throughput Investigation of Diverse Junction Elements in RNA Tertiary Folding.** *Cell*
Denny, S. K., Bisaria, N., Yesselman, J. D., Das, R., Herschlag, D., Greenleaf, W. J.
2018

- **Hydrogen Bonds: Simple after All?** *BIOCHEMISTRY*
Herschlag, D., Pinney, M. M.
2018; 57 (24): 3338–52

- **Differential catalytic promiscuity of the alkaline phosphatase superfamily bimetallo core reveals mechanistic features underlying enzyme evolution** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Sunden, F., AlSadhan, I., Lyubimov, A., Doukov, T., Swan, J., Herschlag, D.
2017; 292 (51): 20960–74

- **Lessons from Enzyme Kinetics Reveal Specificity Principles for RNA-Guided Nucleases in RNA Interference and CRISPR-Based Genome Editing.** *Cell systems*
  Bisaria, N., Jarmoskaite, I., Herschlag, D.
  2017; 4 (1): 21-29
- **Kinetic and thermodynamic framework for P4-P6 RNA reveals tertiary motif modularity and modulation of the folding preferred pathway.** *Proceedings of the National Academy of Sciences of the United States of America*
  Bisaria, N., Greenfeld, M., Limouse, C., Pavlichin, D. S., Mabuchi, H., Herschlag, D.
  2016; 113 (34): E4956-65
- **Evaluation of the Catalytic Contribution from a Positioned General Base in Ketosteroid Isomerase.** *Journal of the American Chemical Society*
  Lamba, V., Yabukarski, F., Pinney, M., Herschlag, D.
  2016; 138 (31): 9902-9909
- **The solution structural ensembles of RNA kink-turn motifs and their protein complexes.** *Nature chemical biology*
  Shi, X., Huang, L., Lilley, D. M., Harbury, P. B., Herschlag, D.
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- **Evolutionary Conservation and Diversification of Puf RNA Binding Proteins and Their mRNA Targets** *PLOS BIOLOGY*
  Hogan, G. J., Brown, P. O., Herschlag, D.
  2015; 13 (11)
- **Extensive site-directed mutagenesis reveals interconnected functional units in the alkaline phosphatase active site** *ELIFE*
  Sunden, F., Peck, A., Salzman, J., Ressl, S., Herschlag, D.
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- **Understanding nucleic Acid-ion interactions.** *Annual review of biochemistry*
  Lipfert, J., Doniach, S., Das, R., Herschlag, D.
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- **Use of anion-aromatic interactions to position the general base in the ketosteroid isomerase active site** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Schwans, J. P., Sunden, F., Lassila, J. K., Gonzalez, A., Tsai, Y., Herschlag, D.
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- **Fundamental challenges in mechanistic enzymology: progress toward understanding the rate enhancements of enzymes.** *Biochemistry*
  Herschlag, D., Natarajan, A.
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- **Implications of molecular heterogeneity for the cooperativity of biological macromolecules** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
  Solomatin, S. V., Greenfeld, M., Herschlag, D.
  2011; 18 (6): 732-734
- **Biological Phosphoryl-Transfer Reactions: Understanding Mechanism and Catalysis** *ANNUAL REVIEW OF BIOCHEMISTRY, VOL 80*
  Lassila, J. K., Zalatan, J. G., Herschlag, D.
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- **Origins of catalysis by computationally designed retroaldolase enzymes** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Lassila, J. K., Baker, D., Herschlag, D.
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- **Multiple native states reveal persistent ruggedness of an RNA folding landscape** *NATURE*
  Solomatin, S. V., Greenfeld, M., Chu, S., Herschlag, D.
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- **Concordant Regulation of Translation and mRNA Abundance for Hundreds of Targets of a Human microRNA** *PLOS BIOLOGY*
  Hendrickson, D. G., Hogan, D. J., McCullough, H. L., Myers, J. W., Herschlag, D., Ferrell, J. E., Brown, P. O.
  2009; 7 (11)

- **Quantitative and comprehensive decomposition of the ion atmosphere around nucleic acids** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Bai, Y., Greenfeld, M., Travers, K. J., Chu, V. B., Lipfert, J., Doniach, S., Herschlag, D.
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- **Direct measurement of the full sequence-dependent folding landscape of single nucleic acids using an optical trap** *51st Annual Meeting of the Biophysical-Society*
  Woodside, M. T., Amhony, P. C., Larizadeh, K., Behnke-Parks, W. M., Herschlag, D., Block, S. M.
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- **Extensive association of functionally and cytotopically related mRNAs with Puf family RNA-binding proteins in yeast** *PLOS BIOLOGY*
  Gerber, A. P., Herschlag, D., Brown, P. O.
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- **Genome-wide analysis of mRNA translation profiles in Saccharomyces cerevisiae** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Arava, Y., Wang, Y. L., Storey, J. D., Liu, C. L., Brown, P. O., Herschlag, D.
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  Kraut, D. A., Carroll, K. S., Herschlag, D.
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- **Environmental effects on phosphoryl group bonding probed by vibrational spectroscopy: Implications for understanding phosphoryl transfer and enzymatic catalysis** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Cheng, H., Nikolic-Hughes, I., Wang, J. H., Deng, H., O'Brien, P. J., Wu, L., Zhang, Z. Y., Herschlag, D., Callender, R.
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- **Involvement of a specific metal ion in the transition of the hammerhead ribozyme to its catalytic conformation** *JOURNAL OF BIOLOGICAL CHEMISTRY*
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- **Use of intrinsic binding energy for catalysis by an RNA enzyme** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Hertel, K. J., Peracchi, A., Uhlenbeck, O. C., Herschlag, D.
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- **Mechanistic aspects of enzymatic catalysis: Lessons from comparison of RNA and protein enzymes** *ANNUAL REVIEW OF BIOCHEMISTRY*
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- **The change in hydrogen bond strength accompanying charge rearrangement: Implications for enzymatic catalysis** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
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- **Ras-catalyzed hydrolysis of GTP: A new perspective from model studies** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Maegley, K. A., Admiraal, S. J., Herschlag, D.
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- **The energetics of hydrogen bonds in model systems: Implications for enzymatic catalysis** *SCIENCE*
  Shan, S. O., Loh, S., Herschlag, D.
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- **RNA CHAPERONES AND THE RNA FOLDING PROBLEM** *JOURNAL OF BIOLOGICAL CHEMISTRY*
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- **PROTEIN ENHANCEMENT OF HAMMERHEAD RIBOZYME CATALYSIS** *SCIENCE*
  Tsuchihashi, Z., Khosla, M., Herschlag, D.
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- **SYNERGISM IN TRANSCRIPTIONAL ACTIVATION - A KINETIC VIEW** *GENES & DEVELOPMENT*
  Herschlag, D., Johnson, F. B.
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- **IMPLICATIONS OF RIBOZYME KINETICS FOR TARGETING THE CLEAVAGE OF SPECIFIC RNA MOLECULES INVIVO - MORE ISNT ALWAYS BETTER** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
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- **CATALYSIS OF RNA CLEAVAGE BY THE TETRAHYMENA-THERMOPHILA RIBOZYME .1. KINETIC DESCRIPTION OF THE REACTION OF AN RNA SUBSTRATE COMPLEMENTARY TO THE ACTIVE-SITE** *BIOCHEMISTRY*
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- **The Role of Induced Fit and Conformational Changes of Enzymes in Specificity and Catalysis.** *Bioorganic Chemistry*
  Herschlag, D.
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- **High-throughput biochemical phenotyping of SHP2 variants reveals the molecular basis of diseases and allosteric drug inhibition.** *bioRxiv : the preprint server for biology*
  Lee, A. A., Mokhtari, D. A., Egan, E. D., Blacklow, S. C., Herschlag, D., Fordyce, P. M.
  2026
- **Proteolytic activation of diverse antiviral defense modules in prokaryotes.** *bioRxiv : the preprint server for biology*
  Evans, S. A., Zhang, J., Lam, Y., Wang, K., Lin, Y. T., Herschlag, D., Feng, L., Gao, A.
  2025
- **SEISMICgraph: a web-based tool for RNA structure data visualization.** *Nucleic acids research*
  Fuchs Wightman, F., Yang, G., Martin des Taillades, Y. J., L'Esperance-Kerckhoff, C., Grote, S., Allan, M. F., Herschlag, D., Rouskin, S., Hagler, L. D.
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- **Has AlphaFold learned physics?**
  Du, S., Lyu, N., Ma, J., Herschlag, D.
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- **Quantifying protein unfolding kinetics with a high-throughput microfluidic platform.** *bioRxiv : the preprint server for biology*
  Atsavapranee, B., Sunden, F., Herschlag, D., Fordyce, P. M.

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- **Exploring the energetic and conformational properties of the sequence space connecting naturally occurring RNA tetraloop receptor motifs.** *RNA (New York, N.Y.)*
  Shin, J. H., Cuevas, L. M., Roy, R., Bonilla, S. L., Al-Hashimi, H., Greenleaf, W. J., Herschlag, D.
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- **SEISMICgraph: a web-based tool for RNA structure data visualization.** *bioRxiv : the preprint server for biology*
  Wightman, F. F., Yang, G., Martin des Taillades, Y. J., L'Esperance-Kerckhoff, C., Grote, S., Allan, M. F., Herschlag, D., Rouskin, S., Hagler, L. D.
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- **Author Correction: RNA conformational propensities determine cellular activity.** *Nature*
  Ken, M. L., Roy, R., Geng, A., Ganser, L. R., Manghrani, A., Cullen, B. R., Schulze-Gahmen, U., Herschlag, D., Al-Hashimi, H. M.
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- **Refinement of Multiconformer Ensemble Models from Multi-temperature X-ray Diffraction Data.** *bioRxiv : the preprint server for biology*
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- **Obtaining anomalous and ensemble information from protein crystals from 220 K up to physiological temperatures.** *Acta crystallographica. Section D, Structural biology*
  Doukov, T., Herschlag, D., Yabukarski, F.
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- **Building a quantitative and predictive model of 5 ' SS selection by human U1 snRNP using RNA-map**
  White, D. S., Carrocci, T. J., Shin, J., Lin, C., Black, D. L., Greenleaf, W., Herschlag, D., Hoskins, A. A.
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- **Building a quantitative and predictive model of 5'SS selection by human U1 snRNP using RNA-map.** *Biophysical journal*
  White, D. S., Carrocci, T. J., Shin, J., Lin, C., Black, D. L., Greenleaf, W., Herschlag, D., Hoskins, A. A.
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- **Refinement of multiconformer ensemble models from multi-temperature X-ray diffraction data.** *Methods in enzymology*
  Du, S., Wankowicz, S. A., Yabukarski, F., Doukov, T., Herschlag, D., Fraser, J. S.
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- **A comprehensive thermodynamic model for RNA binding by the Saccharomyces cerevisiae Pumilio protein PUF4.** *Nature communications*
  Sadee, C., Hagler, L. D., Becker, W. R., Jarmoskaite, I., Vaidyanathan, P. P., Denny, S. K., Greenleaf, W. J., Herschlag, D.
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- **Evaluating the impact of X-ray damage on conformational heterogeneity in room-temperature (277 K) and cryo-cooled protein crystals.** *Acta crystallographica. Section D, Structural biology*
  Yabukarski, F., Doukov, T., Mokhtari, D. A., Du, S., Herschlag, D.
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- **Ensemble-function relationships to connect structure to mechanism: application of EnsemblePDB to the serine protease reaction coordinate and its catalytic features**
  Du, S., Kretsch, R. C., Parres-Gold, J., Penaherrera, D. A., Yabukarski, F., Pinney, M. M., Herschlag, D.
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- **Direct Measurement of Interhelical DNA Repulsion and Attraction by Quantitative Cross-Linking.** *Journal of the American Chemical Society*
  Hamilton, I., Gebala, M., Herschlag, D., Russell, R.
  1800

- **Systematic investigation of the link between enzyme catalysis and cold adaptation.** *eLife*
  Stark, C., Bautista-Leung, T., Siegfried, J., Herschlag, D.
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- **uPIC-M: Efficient and Scalable Preparation of Clonal Single Mutant Libraries for High-Throughput Protein Biochemistry.** *ACS omega*
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- **Cation enrichment in the ion atmosphere is promoted by local hydration of DNA.** *Physical chemistry chemical physics : PCCP*
  Ma, C. Y., Pezzotti, S., Schwaab, G., Gebala, M., Herschlag, D., Havenith, M.
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- **High-throughput dissection of the thermodynamic and conformational properties of a ubiquitous class of RNA tertiary contact motifs.** *Proceedings of the National Academy of Sciences of the United States of America*
  Bonilla, S. L., Denny, S. K., Shin, J. H., Alvarez-Buylla, A., Greenleaf, W. J., Herschlag, D.
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- **Instrumentation and experimental procedures for robust collection of X-ray diffraction data from protein crystals across physiological temperatures.** *Journal of applied crystallography*
  Doukov, T., Herschlag, D., Yabukarski, F.
  2020; 53 (Pt 6): 1493–1501
- **The structural ensemble of a Holliday junction determined by X-ray scattering interference.** *Nucleic acids research*
  Zettl, T., Shi, X., Bonilla, S., Sedlak, S. M., Lipfert, J., Herschlag, D.
  2020
- **Slow Molecular Recognition by RNA**
  Sengupta, R., Herschlag, D.
  WILEY.2020
- **Biosciences Proposal Bootcamp: Structured peer and faculty feedback improves trainees' proposals and grantsmanship self-efficacy.** *PloS one*
  Botham, C. M., Brawn, S. n., Steele, L. n., Barrón, C. B., Kleppner, S. R., Herschlag, D. n.
  2020; 15 (12): e0243973
- **Demonstration of protein cooperativity mediated by RNA structure using the human protein PUM2** *RNA*
  Becker, W. R., Jarmoskaite, I., Vaidyanathan, P. P., Greenleaf, W. J., Herschlag, D.
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- **Blind tests of RNA-protein binding affinity prediction.** *Proceedings of the National Academy of Sciences of the United States of America*
  Kappel, K., Jarmoskaite, I., Vaidyanathan, P. P., Greenleaf, W. J., Herschlag, D., Das, R.
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- **A Microfluidics-Based Assay for Mapping Connectivity in Highly Proficient Enzymes Reveals Functional Modularity**
  Markin, C. J., Mokhtari, D. A., Sunden, F., Herschlag, D., Fordyce, P. M.
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- **Sequence-dependent RNA helix conformational preferences predictably impact tertiary structure formation.** *Proceedings of the National Academy of Sciences of the United States of America*
  Yesselman, J. D., Denny, S. K., Bisaria, N. n., Herschlag, D. n., Greenleaf, W. J., Das, R. n.
  2019
- **Quantitative Studies of an RNA Duplex Electrostatics by Ion Counting.** *Biophysical journal*
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