YUAN HE, *Ph.D.*

Department of Molecular Biosciences
Northwestern University
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EDUCATION

Postdoc	Life Sciences Division **Lawrence Berkeley National Laboratory** – Berkeley, California, USA	2014
Ph.D.	Interdepartmental Biological Sciences Graduate Program **Northwestern University** – Evanston, Illinois, USA	2008
B.S.	Department of Chemical Engineering **Beijing Tech. and Bus. University** – Beijing, China	2003

RESEARCH

Associate Professor 2021 - present
Northwestern University, Department of Molecular Biosciences

Assistant Professor 2015 - 2021
Northwestern University, Department of Molecular Biosciences

Project Scientist 2013 - 2014
Lawrence Berkeley National Laboratory
Principal Investigator: Eva Nogales
Research Project: *Near-atomic resolution visualization of human transcription initiation*

Postdoctoral Fellow 2008 - 2013
Lawrence Berkeley National Laboratory
Principal Investigator: Eva Nogales
Research Project: *Structural studies of human transcription by cryo-electron microscopy*

Ph.D. Graduate Student 2003 - 2008
Northwestern University, Department of Molecular Biosciences
Advisor: Ishwar Radhakrishnan
Research Project: *Structure-function analysis of the mammalian Sin3 corepressor complex*

Undergraduate Research 2002 - 2003
Tsinghua University, Department of Biological Sciences and Biotechnology
Advisor: Zengyi Chang
Research Project: *Biochemical analysis of hemoglobin o of Mycobacterium tuberculosis*

RESEARCH INTERESTS

Transcription regulation, DNA repair, structural biology

HONORS & AWARDS

Burton Medal 2022
Microscopy Society of America

Rising Star Award 2022
Fusion: 5th DNA repair/replication structures & cancer conference

NIGMS Director's Featured Research Advance 2013
National Institutes of Health

Spot Award for outstanding contributions to the study of transcription 2013
Lawrence Berkeley National Laboratory

PEER REVIEWED PUBLICATIONS

Note: Underlined names indicate He Lab graduate student co-authors and asterisked names indicate He Lab postdoc co-authors

(27) Koo, C.W., Tucci, F.J., **He, Y.** and Rosenzweig A.C. (2022) Recovery of particulate methane monooxygenase structure and activity in a lipid bilayer. ***Science***, 375:1287-91.

(26) Reyes, A.A., Fishbain, S. and He, Y. (2022) Structural and functional analysis of the SET3 histone deacetylase complex. ***Acta Crystallogr F Struct Biol Commun.***, 78:113-118.

(25) Chen, S., Lees-Miller, J.P., **He, Y.** and Lees-Miller, S.P. (2021) Structural insights into the role of DNA-PK as a master regulator in NHEJ. ***Genome Instability & Disease***, 2, 195-210.

(24) Chen, S., Lee, L., Naila, T., Fishbain, S., Wang, A., Tomkinson, A.E., Lees-Miller, S.P. and **He, Y.** (2021) Structural basis of Long-range to Short-range synaptic transition in NHEJ. ***Nature***, 593, 294-8.

(23) Reyes, A.A., Marcum, R.D.* and **He, Y.** (2021) Structure and function of ATP-dependent chromatin remodeling complexes. ***Journal of Molecular Biology***, doi: 10.1016/j.jmb.2021.166929

(22) Abdella, R., Talyzina, A., Inouye, C., Tjian, R. and **He, Y.** (2021) Structure of the human Mediator-bound transcription pre-initiation complex. ***Science,*** 372:52-56.

(21) Mashtalir, N., Suzuki, H., Farrell, D.P., Sankar, A., Luo, J., D'Avino, A.R., Filipovski, M., Yang, Y., Valencia, A.M., Pierre, R., Onikubo, T., Roeder, R.G., Han, Y.*, **He, Y.**, Ranish, J.A., DiMaio, F., Walz, T., Kadoch, C. (2020) A structural model of the endogenous human mSWI/SNF (BAF) complex informs disease mechanisms. ***Cell***, 183(3):802-817.e24

(20) Marcum, R.D.*, Reyes, A.A. and **He, Y**. (2020) Structural insights into the evolutionarily conserved BAF chromatin remodeling complex. ***Biology***, 9(7):E146

(19) Han, Y.*, Reyes, A.A., Malik, S. and **He, Y.** (2020) Cryo-EM structure of SWI/SNF complex bound to a nucleosome. ***Nature***, 579, 452-5.

(18) Abdella, R., Aggarwal, M., Okura, T., Lamb R.A. and **He, Y.** (2020) Structure of a paramyxovirus polymerase complex reveals a unique methyltransferase-CTD conformation. ***Proc Natl Acad Sci USA*** 117, 4931-4941.

(17) Yan, C., Dodd, T., **He, Y.**, Tainer, J.A., Tsutakawa, S.E., Ivanov, I. (2019) Transcription preinitiation complex structure and dynamics provide insights into genetic diseases. ***Nature Structural and Molecular Biology***, 26, 397-06.

(16) Han, Y.*, Yan, C., Fishbain, S., Ivanov, I. and **He, Y.** (2018) Structural visualization of RNA polymerase III transcription machineries. ***Cell Discovery*** 4, 40.

(15) Jackobel, A.J., Han, Y.*, **He, Y.** and Knutson, B.A. (2018) Breaking the mold: structures of the RNA polymerase I transcription complex reveal a new path for initiation. ***Transcription*** 9 (4) 255-261.

(14) Han, Y.*, Yan, C., Nguyen, T.H.D., Jackobel, A.J., Ivanov, I., Knutson, B.A. and **He, Y.** (2017) Structural mechanism of ATP-independent transcription initiation by RNA polymerase I. ***Elife*** doi: 10.7554/elife.27414.

(13) Nogales, E., Louder, R.K., **He, Y.** (2017) Structural insights into the eukaryotic transcription initiation machinery. ***Annual Review in Biophysics*** 46, 59-83.

(12) Nogales, E., Louder, R.K., **He, Y.** (2016) Cryo-EM in the study of challenging systems: the human transcription pre-initiation complex. ***Current opinion in structural biology*** 40, 120-127.

(11) Han, Y., **He, Y.** (2016) Eukaryotic transcription initiation machinery visualized at molecular level. ***Transcription*** 7(5), 203-208.

(10) **He, Y.**, Yan, C., Fang, J., Inouye, C., Tjian, R., Ivanov, I., and Nogales, E. (2016) Near atomic resolution visualization of human transcription promoter opening. ***Nature***, 533, 359-65.

(9) Louder, R.K., **He, Y.**, Lopez-Blanco, J.R., Fang, J., Chacon, P., and Nogales, E. (2016) Structure of promoter-bound TFIID and model of human pre-initiation complex assembly. ***Nature***, 531, 604-9.

(8) Zhang, E., **He, Y.**, Grob, P., Fong, Y., Nogales, E., and Tjian, R. (2015) Architecture of the human XPC DNA repair and stem cell coactivator complex. ***Proc Natl Acad Sci USA*** 112(48):14817-22.

(7) **He, Y.**, Fang, J., Taatjes, D.J., and Nogales, E. (2013) Structural visualization of key steps in human transcription initiation. ***Nature*** 495, 481-6.

(6) Xie, T., **He, Y.**, Korkeamaki, H., Zhang, Y., Imhoff, R., Lohi, O., Radhakrishnan, I. (2011) Structure of the 30 kDa Sin3-Associated Protein (SAP30) in Complex with the Mammalian Sin3A Corepressor and its Role in Nucleic Acid Binding. ***J. Biol. Chem.*** 286, 27814–24.

(5) **He, Y.**, Imhoff, R., Sahu, A. and Radhakishnan, I. (2009). Solution structure of a novel zinc finger motif in the SAP30 polypeptide of the Sin3 corepressor complex and its potential role in nucleic acid recognition. ***Nucleic Acids Res.*** 37, 2142–2152.

(4) **He, Y.**, and Radhakishnan, I. (2008). Solution NMR studies of apo-mSin3A and mSin3B reveal that the PAH1 and PAH2 domains are structurally independent. ***Protein Sci.*** 17, 171-175.

(3) **He, Y.**, Hicke, L., and Radhakishnan, I. (2007). Structural basis for ubiquitin recognition by SH3 domains. ***J. Mol. Biol.*** 373, 190-196.

(2) Stamenova, S.D., French, M.E., **He, Y.**, Francis, S.A., Kramer, Z.B., and Hicke, L. (2007). Ubiquitin binds to and regulates a subset of SH3 domains. ***Mol. Cell*** 25, 273-284.

(1) Liu, C., **He, Y.**, and Chang, Z. (2004). Truncated hemoglobin *o* of *Mycobacterium tuberculosis*: the oligomeric state change and the interaction with membrane components. ***Biochem. Biophys. Res. Commun.*** 316, 1163-1172.

Link to published work in MyBibliogrphy:
https://www.ncbi.nlm.nih.gov/myncbi/yuan.he.1/bibliography/public/

INVITED TALK

Department of Chemical Physiology and Biochemistry, OHSU, Portland, OR	2022
NNF Symposium, Rethinking Transcription Factors, Copenhagen, Danmark	2022
Van Andel Institute Symposium on Epigenetics, Grand Rapids, MI	2022
Microscopy and Microanalysis, Portland, OR	2022
The 18th SCBA International Symposium, Boston, MA	2022
6th Telluride Workshop on Chromatin Structure and Dynamics, Telluride, CO	2022
Molecular Biology, Memorial Sloan Kettering Cancer Center, New York, NY	2022
Fusion: 5th DNA repair/replication structures & cancer conference, Cancun, Mexico	2022
Department of Biology, Johns Hopkins University, Baltimore, MD	2022
Social DNAing Webinar, Columbia University, NY	2022
Department of Biochemistry and Molecular Biology, Southern Illinois University, Carbondale, IL	2022
Department of Chemical Pathology, The Chinese University of Hong Kong, China	2022
Gordon Research Conference: “Mammalian DNA Repair”, Ventura, CA	2021
Functional consequences of genetic variants seminar series, Emory University, Atlanta, GA	2021
Department of Molecular Biology, Max Planck Institute for Biophysical Chemistry	2021
Department of Pharmacology, Case Western Reserve University, Cleveland, OH	2021
Department of Biochemistry, Vanderbilt University, Nashville, TN	2021
Division of Life Science, The Hong Kong University of Science and Technology, China	2021
Advanced Science Research Center, City College of New York, NY	2021
Department of Biochemistry, University of Colorado Boulder, CO	2021
Department of Biophysics and Biophysical Chemistry, Johns Hopkins University, Baltimore, MD	2021
Fragile Nucleosome webinar	2021
Cold Spring Harbor Lab Meeting: “Mechanisms of Eukaryotic Transcription”, New York	2021
Department of Molecular and Cellular Oncology, MD Anderson Cancer Center, Houston, TX	2021
Department of Biological Chemistry, University of Michigan, Ann Arbor, MI	2021
Department of BCMP, Harvard Medical School, Boston, MA	2020
Department of Biochemistry and Molecular Biophysics, Washington University in St. Louis, MO	2020
Department of Biochemistry and Molecular Biology, University of Chicago, Chicago, IL	2020
17th Annual CBC Symposium: “Epigenetics and Disease”, Chicago, IL	2020
The American Society for Biochemistry and Molecular Biology Conference, Snowbird, UT	2020
Keystone Symposium: “Cryo-EM for Health Science”, Stockholm, Sweden	2020
Keystone Symposium: “Gene Regulation: From Mechanisms to Disease”, Keystone, CO	2020
Van Andel Institute Symposium on Structural Biology, Grand Rapids, MI	2019
Eppley Institute for research in Cancer, University of Nebraska Medical Center, Omaha, NE	2018
2018 Purdue Cryo-EM Symposium, Purdue University, Lafayette, IN	2018
26th Conference on Intelligent Systems for Molecular Biology, Chicago, IL	2018
American Crystallography Association Transactions Symposium, New Orleans, LA	2017
Department of Biochemistry and Molecular Genetics, University of Illinois at Chicago, Chicago, IL	2017
Department of Chemistry, University of Illinois at Chicago, Chicago, IL	2017
Third Coast Workshop on Biological Cryo-EM, Chicago, IL	2017
Department of Biochemistry and Molecular Genetics, Northwestern University, Chicago, IL	2017
Division of Life Science, The Hong Kong University of Science and Technology, China	2016
Department of Chemistry, Georgia State University, Atlanta, GA	2016
Fusion: Dynamic DNA and RNA Structures in Damage Responses & Cancer, Cancun, Mexico	2016
FASEB Science Research Conferences: “Machines on Genes”, Snowmass, Colorado	2014
Plexxikon, Berkeley, CA	2014
UCSF ACSS “Great People and Science” Seminar, San Francisco, California	2013

Gordon Research Conference: “Mammalian DNA Repair”, Ventura, California 2011

CONFERENCE POSTER PRESENTATION

HHMI Scientific Meeting, Ashburn, VA 2013
Cold Spring Harbor Lab Meeting: “Mechanisms of Eukaryotic Transcription”, New York 2013
Gordon Research Conference: “Three Dimensional Electron Microscopy”, New London, NH 2013
The American Society for Biochemistry and Molecular Biology Meeting, Snowbird, UT 2012
Annual Structural Cell Biology of DNA Repair Machines Workshop, Berkeley, CA 2008 - 2013
Cold Spring Harbor Lab Meeting: “Mechanisms of Eukaryotic Transcription”, New York 2007
Keystone Symposium: “Frontiers of NMR in Molecular Biology”, Banff, Canada 2005

TEACHING AND MENTORSHIP

Classroom Teaching:

Instructor, Biophysics (BIOL SCI 363) Spring 2022
overall instructor evaluation: 5.71 out of 6
overall course rating: 5.5 out of 6
Instructor, Biophysics (BIOL SCI 363) Spring 2021
overall instructor evaluation: 5.5 out of 6
overall course rating: 5.17 out of 6
Instructor, Biophysics (BIOL SCI 363) Spring 2020
overall instructor evaluation: 5.78 out of 6
overall course rating: 5.6 out of 6
Instructor, Biophysics (BIOL SCI 363) Spring 2019
overall instructor evaluation: 5.36 out of 6
overall course rating: 5.2 out of 6
Co-Instructor, Biochemistry (IGP 401) Fall 2019
Co-Instructor, Biophysical Methods for Macromolecular Analysis (IBIS 409) Fall 2019
Special Topics, Frontiers on Transcription Regulation (IBIS 455) Winter 2019
overall instructor evaluation: 4.67 out of 6
overall course rating: 4.42 out of 6
Co-Instructor, Biochemistry (IGP 401) Fall 2018
Instructor, Biophysics (BIOL SCI 363) Spring 2018
overall instructor evaluation: 5.0 out of 6
overall course rating: 4.9 out of 6
Co-Instructor, Biochemistry (IGP 401) Fall 2017
Co-Instructor, Biophysical Methods for Macromolecular Analysis (IBIS 409) Fall 2017
Instructor, Biophysics (BIOL SCI 363) Spring 2017
overall instructor evaluation: 4.93 out of 6
overall course rating: 4.93 out of 6
Co-Instructor, Biophysical Methods for Macromolecular Analysis (IBIS 409) Winter 2016

Graduate Students:

Weifeng Lu 2022 - present
Jinkang Qing 2021 - present
Alex Vogt 2021 - present
Weifeng Lu 2020 - 2021
Anna Talyzina 2020 - present
Siyu Chen 2017 - 2022

Alexis Reyes	2016 - 2022
Luis Schachner (as secondary mentor for this CLP trainee)	2016 - 2021
Ryan Abdella	2015 - 2021

Graduate Rotation Students:

Young Jun Kim	Fall 2022
Weifeng Lu	Spring 2022
Ryan McKeown	Winter 2022
Tonatiuh Ocampo	Fall 2021
Jinkang Qing	Summer 2021
Alex Vogt	Spring 2021
Elias Guan	Winter 2021
Frank Tucci	Spring 2020
Reyvin Reyes	Spring 2020
David Bushhouse	Winter 2020
Anna Talyzina	Fall 2019
Alexander Lee	Summer 2019
Ziyu Zhao	Winter 2019
Joy Nyaanga	Fall 2018
Amy Neely	Fall 2017
Bethany Sump	Spring 2017
Siyu Chen	Fall 2016
Kevin Gallagher	Spring 2016
Alexis Reyes	Winter 2016
Christopher Koo	Fall 2015
Ryan Abdella	Spring 2015

Undergraduate Student Researchers:

Ethan Less	Fall 2022 - present
Andrew Kearney	Fall 2022 - present
Adele Javal	Summer 2022
Robert Luca	Summer 2021 - present
Maria Fernandez Davila Pastor	Summer 2021
Annie Wang (Undergraduate Summer Research Grant Recipient)	Spring 2019 – Summer 2021
Eugenie Bang (Undergraduate Summer Research Grant Recipient)	Spring 2018 – Summer 2020
Sara Malik (Undergraduate Summer Research Grant Recipient)	Spring 2018 - Winter2020
Srijit Paul (BIOL SCI 398)	Spring 2017

Postdoctoral fellows:

Noah Bradley	Fall 2022 – present
Moustafa Saleh	Summer 2022 – present
Jingfei Xu	Spring 2022 – present
Avinash Patel	Fall 2020 – present
Ryan Marcum	Fall 2019 – Fall 2020
Yan Han	Summer 2015 – Fall 2019

Research Technicians:

Oliver Vickman	Summer 2021 – Winter 2021
Susan Fishbain	Winter 2015 - present

Qualifying Exams and Thesis Defense Committees:

Brooke Angell, Qualifying Exam and Thesis Committee	2021 - present
Alexandra Karagiaridi, Qualifying Exam and Thesis Committee	2021 - present
Elijah Taylor, Qualifying Exam and Thesis Committee	2020 - present
Frank Tucci, Qualifying Exam and Thesis Committee	2020 - present
Bin Zheng, Qualifying Exam and Thesis Committee	2020 - present
Jake VanBelzen, Qualifying Exam and Thesis Committee	2019 - present
Luyi Cheng, Qualifying Exam and Thesis Committee	2018 - 2022
Michael Schamber, Qualifying Exam and Thesis Committee	2018 - present
Katherine Berman, Qualifying Exam and Thesis Committee	2017 - present
Peter Doubleday, Thesis Committee	2017 - 2021
Ronald Biggs, Qualifying Exam and Thesis Committee	2016 - 2021
Christopher Koo, Qualifying Exam and Thesis Committee	2016 - present
Katarzyna Soczek, Thesis Committee and Thesis Defense Committee	2016 - 2019
Arnold Huang, Masters Defense Committee	2015 - 2016
Amy Nilles, Masters Defense Committee	2015 - 2016

Other Teaching Related Activities:

IBIS 519 Ethics Refresher	Spring 2022
IBIS 423 Ethics in Biological Research, session on peer review process	2017 - present
Guest lecture in IBIS Structural Biology Workshop	2015 - present

SERVICE

Departmental/Graduate Program/University Service:

Molecular Biosciences faculty search committee	2022 - 2023
Weinberg College of Arts and Sciences ad hoc tenure committee	2022 - 2023
Molecular Biosciences DEI committee	2021 - present
Associate Director of Structural Biology Facility	2021 - present
IBiS Graduate Program Admissions Committee	2021 - 2022
IBiS Graduate Program 1st year student advisor	2020 - present
HHMI Gilliam Fellowship Northwestern Nominating Committee	2020
Poster Judge for the Annual Biophysics Symposium, Evanston, IL	2020
IBiS curriculum Committee	2019 - present
PBS curriculum Committee	2019 - present
Molecular Biophysics Training Program Steering Committee	2019 - present
Judge for the Northwestern University Undergraduate Research and Arts Exposition	2019
Judge for the Chicago Area Undergraduate Research Symposium	2019
Poster Judge for the Annual Biophysics Symposium, Evanston, IL	2019
IBiS Graduate Program Admissions Committee	2018 - 2019
Poster Judge for the Annual Biophysics Symposium, Evanston, IL	2018
Co-organizer of the IBiS Graduate Program Annual Retreat	2018
MSTP Admissions Committee	2017 - present
IBiS Graduate Program Admissions Committee	2017 - 2018
QSB Master's Program Admissions Committee	2017 - present
Poster Judge for the Annual Biophysics Symposium, Evanston, IL	2017
Structural Biology Core Facility Advisory Committee	2016 - present
Department of Molecular Biosciences Vision Committee	2016 - present
IBiS Graduate Program Admissions Committee	2016 - 2017
Poster Judge for the Annual Biophysics Symposium, Evanston, IL	2016

Poster Judge for the Annual Biophysics Symposium, Evanston, IL 2015

Manuscripts reviewed for the following journals:
Nature, Science, Nature Structure & Molecular Biology, Nature Communication, Elife, Cell Reports, Molecular Cell, Proc Natl Acad Sci USA, Journal of Structural Biology, Structure, Biochemistry, Transcription, Epigenetics & Chromatin, Journal of Nanomaterials

RESEARCH SUPORT

Ongoing Research Support:
R01 (He)
Structure and Mechanism of Eukaryotic Transcription Regulation
Agency: NIGMS
The goal of this study is to dissect the mechanism of eukaryotic transcription regulation by both RNA polymerase II and III using the single particle cryo-EM approach.
Total Direct Costs: $1,024,500
Time Period: 04/01/2022 – 03/31/2026

R01 (He)
Structure and Mechanism of Non-Homologous End Joining
Agency: NIGMS
The goal of this study is to dissect the mechanism of non-homologous end joining using the single particle cryo-EM approach.
Total Direct Costs: $ 1,170,400
Time Period: 02/11/2020 – 01/31/2025

P01 CA092584 (Tainer) (He, subaward PI)
Structural Cell Biology of DNA Repair Machines (SBDR)
Agency: LBNL (NIH/NCI, Originating Sponsor)
SBDR will identify fundamental structural principles for repair proteins, and provide the framework for understanding DNA repair. The He lab will carry out cryo-EM studies of double strand break repair complexes.
Total Direct Costs: $225,000
Time Period: 09/01/2021 – 08/31/2026

U54CA231638 (Kadoch, Shilatifard) (He, subaward)
The Center for Synovial Sarcoma Biology and Therapeutics
Agency: DANA-FARBER CANCER INST (NIH/NCI, Originating Sponsor)
The overarching goal for the center is to develop and execute a comprehensive, multidisciplinary set of approaches rooted in protein biochemistry and structural biology to define the mechanistic underpinnings of synovial sarcoma and unmask opportunities for therapeutic development. The He lab will carry out cryo-EM studies of human SWI/SNF complex in both wild type and cancer relevant mutant forms.
Total Direct Costs: $34,929
Time Period: 09/10/2021 – 06/30/2023

Completed Research Support:
PSOC Pilot project award (He)
Molecular mechanism of the SWI/SNF complex in regulating chromatin structure and gene transcription
Agency: NCI
The goal of this study is to dissect the mechanism of chromatin remodeling by SWI/SNF using the single particle cryo-EM approach.
Time Period: 05/01/2019 – 04/30/2020

IRG-15-173-21 (He)
Structural Basis of Human Transcription Promoter Proximal Pausing
Agency: American Cancer Society
The goal of this study is to dissect the mechanism of transcription promoter proximal pausing using the single particle cryo-EM approach.
Time Period: 01/01/2016 – 12/31/2017

C-064 Catalyst Award (He)
Toward the Visualization of Spliceosomal Intermediates
Agency: Chicago Biomedical Consortium
The goal of this study is to determine structures of spliceosome complexes trapped at various splicing intermediate states using single particle cryo-EM approach.
Time Period: 02/01/2016 – 01/31/2018

Cornew Innovation Award (He, Co-PI)
Toward elucidating RNA co-transcriptional folding pathways from RNA polymerase II
Agency: The Chemistry of Life Processes Institute at Northwestern University
The goal of this study is to dissect the mechanism of RNA polymerase II directed mRNA co-transcriptional folding using the single particle cryo-EM approach.
Time Period: 01/01/2017 – 12/31/2017

PROFESSIONAL MEMBERSHIPS

Member, American Society for Biochemistry and Molecular Biology
Member, Biophysical Society
Member, Robert H. Lurie Comprehensive Cancer Center at Northwestern University
Member, The Chemistry of Life Processes Institute at Northwestern University

Date of CV preparation: 12/9/2022