

Shan He

(She/her/hers)

Postdoc in Martin Jonikas' Lab
Department of Molecular Biology, Princeton University
LTL301, Washington Road, Princeton, NJ 08544
shanhe@princeton.edu

Incoming Assistant Professor
Department of Botany, University of Wisconsin-Madison
B219, Birge Hall, 430 Lincoln Dr, Madison, WI 53706

Employment

Assistant Professor, Department of Botany, University of Wisconsin-Madison, WI	2025-
Postdoctoral fellow, Jonikas lab, HHMI and Princeton University, Princeton, NJ	2016-2024
Lecturer, Princeton University, Princeton, NJ	2019
Postdoctoral fellow in Li-Jia Qu's lab, Peking University, China	2013-2016

Education

Ph.D., Biotechnology (Plant Biology), Li-Jia Qu's Lab, Peking University, China	2007-2013
B.S., Life Science and Biotechnology, Nanjing Agricultural University, China	2003-2007

Awards

Leading Edge Fellow, HHMI-Janelia	2021
Sharon Gray Women's Young Investigator Travel Award, American Society of Plant Biologists	2019
Guanghua Scholarship, Peking University	2012
Outstanding Graduate Student, Peking University	2011
Suzhou Industrial Park Scholarship, Peking University	2008
First Prize: Excellent Thesis for Undergraduate Students, Jiangsu Province, China	2008
First-class National Outstanding Student Scholarship, Nanjing Agricultural University	2004 & 2005

Publications

(Google Scholar Page: <https://scholar.google.com/citations?user=Q13MfpIAAAJ&hl=en>)

Shan He^{*}, Linnea M. Lemma^{*}, Alejandro Martinez-Calvo, Guanhua He, Jessica H. Hennacy, Lianyong Wang, Sabrina Ergun, Colton Wang, Luke Bunday, Angelo K. Kayser-Browne, Quan Wang, Clifford P. Brangwynne, Ned Wingreen, Martin C. Jonikas. A kinase controls number, size, and phase transition of pyrenoid condensates. (*In submission*)

Shan He, Victoria L. Crans, Martin C. Jonikas. (2023) The pyrenoid: the eukaryotic CO₂-concentrating organelle. *Plant Cell*. 35(9):3236-3259. <https://doi.org/10.1093/plcell/koad157>

Shan He, Hui-Ting Chou, Doreen Matthies, Tobias Wunder, Moritz T. Meyer, Nicky Atkinson, Antonio Martinez-Sanchez, Philip D. Jeffrey, Sarah A. Port, Weronika Patena, Guanhua He, Vivian K. Chen, Frederick M. Hughson, Alistair J. McCormick, Oliver Mueller-Cajar, Benjamin D. Engel, Zhiheng Yu, Martin C. Jonikas. (2020) The structural basis of Rubisco phase-separation in the pyrenoid. *Nat Plants*. 6(12):1480-1490. <https://doi.org/10.1038/s41477-020-00811-y> (Cover story)

Moritz T. Meyer, Alan K. Itakura, Weronika Patena, Lianyong Wang, **Shan He**, Tom Emrich-Mills, Chun S. Lau, Gary Yates, Luke C. M. Mackinder, Martin C. Jonikas. (2020). Assembly of the algal CO₂-fixing

organelle, the pyrenoid, is guided by a Rubisco-binding motif. *Sci Adv.* 11;6(46):eabd2408. <https://doi.org/10.1126/sciadv.abd2408>

Yan Sun, Jiaying Huang, Sheng Zhong, Hongya Gu, **Shan He***, Li-Jia Qu*. (2018). Novel DYW-type pentatricopeptide repeat (PPR) protein BLX controls mitochondrial RNA editing and splicing essential for early seed development of *Arabidopsis*. *J Genet Genomics.* 20;45(3):155-168. <https://doi.org/10.1016/j.jgg.2018.01.006> (*Co-corresponding authors)

Shan He, Yan Sun, Xiangyu Zhang, Jingjing Liu, Peng Zhao, Mengxiang Sun, Hongya Gu, and Li-Jia Qu. (2017). A novel imprinted gene *NUWA* controls mitochondria function during early seed development in *Arabidopsis*. *PLoS Genet.* 13(1):e1006553. <https://doi.org/10.1371/journal.pgen.1006553>

Shibai Li, Xiaochen Wang, **Shan He**, Jieru Li, Qingpei Huang, Takato Imaizumi, Leqing Qu, Genji Qin, Li-Jia Qu, Hongya Gu. (2016). CFLAP1 and CFLAP2 are two bHLH transcription factors participating in synergistic regulation of AtCFL1-mediated cuticle development in *Arabidopsis*. *PLoS Genet.* 12(1):e1005744. <https://doi.org/10.1371/journal.pgen.1005744>

Junqing Ye*, Jian Ge*, Xu Zhang, Lin Cheng, Zhengyuan Zhang, **Shan He**, Yuping Wang, Hua Lin, Weifeng Yang, Junfang Liu, Yang Zhao, Hongkui Deng. (2016). Pluripotent stem cells induced from mouse neural stem cells and small intestinal epithelial cells by small molecule compounds. *Cell Res* 26: 34-45. <https://doi.org/10.1038/cr.2015.142>

Renhong Wu, Shibai Li, **Shan He**, Friedrich Waßmann, Caihong Yu, Genji Qin, Lukas Schreiber, Li-Jia Qu and Hongya Gu. (2011). CFL1, a WW domain protein, regulates cuticle development by modulating the function of HDG1, a class IV homeodomain transcription factor, in rice and *Arabidopsis*. *Plant Cell* 23: 3392-3411. <https://doi.org/10.1105/tpc.111.088625>

Invited Talks

"Biogenesis and regulation of the CO ₂ -concentrating organelle, the pyrenoid." Presented at the 2024 Joint MAS-ASPB and UMD Plant Symposium, College Park, MD.	May, 2024
"Structure and regulation of the CO ₂ -concentrating organelle, the pyrenoid." Presentation via Zoom for the graduate research seminar program in the Department of Biomedical Engineering & Science at Florida Institute of Technology, FL.	Feb, 2024
"Kinase KEY1 mediates dissolution of Chlamydomonas pyrenoid during cell division." Presented at the 20th International Conference on the Cell and Molecular Biology of Chlamydomonas (Chlmy2023) in Princeton, NJ. (This talk is available online with this link from 1:30:30 to 1:46:04)	Jun, 2023
"Structural Basis and Regulation of Phase Separation in the CO ₂ -Fixing Pyrenoid." Presented at the "CO ₂ Assimilation in Plants from Genome to Biome" Gordon Research Conference in Lucca (Barga), Italy	May, 2023
"Structure and regulation of the CO ₂ -concentrating organelle, the pyrenoid." (Keynote) Presented as a keynote talk at the Eastern Regional Photosynthesis Conference (ERPC2023) in Woods Hole, MA	Apr, 2023
"Structure and biogenesis of the eukaryotic CO ₂ -concentrating organelle, the pyrenoid." Presented at the "Mitochondria and Chloroplasts" Gordon Research Conference in West Dover, VT.	Aug, 2022

“Structure and biogenesis of the eukaryotic CO ₂ -concentrating organelle, the pyrenoid.” Presented at the 10th International Symposium on Inorganic Carbon Utilization by Aquatic Photosynthetic Organisms (CCM10) in Princeton, NJ.	Jul, 2022
“The structural basis of Rubisco phase separation in the pyrenoid.” Presentation via Zoom at the Leading Edge Symposium 2021. (This talk is available online with this link from 24:14 to 44:08)	Jun, 2021
“The structural basis of Rubisco phase-separation in the pyrenoid.” Presentation via Zoom at the 30th Western Photosynthesis Conference (WPC2021).	Jan, 2021
“The structural basis of Rubisco phase-separation in the pyrenoid.” Presentation via Zoom for the Max Planck Institute for Molecular Plant Physiology in Golm, Germany.	Nov, 2020
“The structural basis of assembly of Rubisco into a phase-separated organelle, the pyrenoid.” Presented at the annual plant biology conference (ASPB 2019) in San Jose, CA.	Aug, 2019

Poster Presentations

“Structural basis and regulatory mechanism of Rubisco phase separation in the pyrenoid.” Presented at the HHMI Science meeting at HHMI headquarters in Chevy Chase, MD. (This iPoster is available online with this link)	Sep, 2022
“Structure and biogenesis of the eukaryotic CO ₂ -concentrating organelle, the pyrenoid.” Presented at the Mitochondria and Chloroplasts Gordon Research Conference in West Dover, VT.	Aug, 2022
“The structural basis of assembly of Rubisco into a phase-separated organelle, the pyrenoid.” Presented at the annual Plant Biology conference (ASPB 2019) in San Jose, CA.	Aug, 2019
“A novel imprinted gene <i>NUWA</i> controls mitochondria function during early seed development in <i>Arabidopsis</i> .” Presented at the 24 th International Conference on Sexual Plant Reproduction in Tucson, AZ.	Mar, 2016
“Maternal control of <i>Arabidopsis</i> early embryo and endosperm development by the imprinted PPR protein coding gene <i>NUWA</i> .” Presented at the 23 rd International Conference on Sexual Plant Reproduction in Porto, Portugal.	Jul, 2014
“A mitochondria localized protein regulates early embryogenesis and endosperm development in <i>Arabidopsis</i> .” Presented at the 23 rd International Conference on Arabidopsis Research (ICAR) in Vienna, Austria.	Jul, 2012
“A mitochondria localized PPR protein is required for embryogenesis in <i>Arabidopsis</i> .” Presented at the 22 nd International Conference on Arabidopsis Research (ICAR) in Madison, WI.	Jun, 2011

Teaching Experience

Teaching Assistant, From DNA to Human Complexity, Undergraduate Course, Princeton University.	2019
Teaching Assistant, Electron Microscope Technique in Biology, Graduate Course, Peking University.	2010
Teaching Assistant, Modern Biotechnology, Undergrad Course, Peking University.	2009

Mentoring Experience

Colton Wang, Undergraduate Student in the Jonikas laboratory, Princeton University. He has received his Bachelor's degree at Princeton University.	2022-2024
Luke Bunday, Undergraduate Student in the Jonikas laboratory, Princeton University. He has received his Bachelor's degree at Princeton University.	2022
Guanhua He, Graduate Student in the Jonikas laboratory, Princeton University. He has received his Ph.D. at Princeton University.	2017
Tingting Lu, Graduate Student in the Qu laboratory, Peking University. She has received her Ph.D. at Peking University.	2013
Yan Sun, Graduate Student in the Qu laboratory, Peking University. She has received her Ph.D. at Peking University.	2012
Xiangyu Zhang, Undergraduate Student in the Qu laboratory, Peking University. She has received her Ph.D. at Massachusetts Institute of Technology.	2011-2013

Academic Training in Teaching and Mentoring

Inclusive Teaching & Mentorship workshop, taught by the Learning Programs of the McGraw Center for Teaching and Learning at Princeton University	2023
"Learning Mentoring" cohort for STEM grad students and postdocs, taught by the Learning Programs of the McGraw Center for Teaching and Learning at Princeton University	2022

Academic Training in Writing and Presenting

"Lab Tales" workshop on science storytelling, by Council on Science and Technology at Princeton University	2022
Scientific writing course: Writing an Effective Scientific Research Article, by the Writing Program of Princeton University	2021
Scientific writing course: Writing a Persuasive Proposal in Quantitative Disciplines, by the Writing Program of Princeton University	2021

Academic Service

Reviewed for *New Phytologist*, *PLoS Genetics*.
Co-reviewed for *Nature*.

Diversity Service

Member, D&I committee, Department of Molecular Biology, Princeton University	2023-Now
--	----------

Synergistic Activities

Member, American Society of Plant Biologists	2018-Now
Member, Biophysical Society	2018-2019
Member, International Association of Sexual Plant Reproduction Research	2014-2015

Referees

- Postdoc Advisor Martin C. Jonikas
HHMI Investigator, Associate Professor, Princeton University
- 303 Lewis Thomas Laboratory, Washington Road, Princeton, NJ 08544
 - (609) 258-5981
 - mjonikas@princeton.edu
- Ph.D. Advisor Li-Jia Qu
Chong Kong Scholar, Professor, Peking University
- No.5 Yiheyuan Road, Haidian District, Beijing, 100871, China
 - 011-86-10-62753018
 - qulj@pku.edu.cn
- Collaborator Ned Wingreen
Fellow of the AAAS and the APS, Howard A. Prior Professor, Princeton University
- 243 Icahn Laboratory, South Drive, Princeton, NJ 08544
 - (609) 258-8476
 - wingreen@princeton.edu
- Collaborator Oliver Mueller-Cajar
Associate Professor, Nanyang Technological University
- SBS-02S-61, 60 Nanyang Dr, Singapore 637551
 - (65) 6592 3184
 - cajar@ntu.edu.sg
- Colleague Cornelia Spetea Wiklund
Professor of Plant Cell Physiology, University of Gothenburg
- Carl Skottbergs gata 22 B, Box 461, SE 405 30 Gothenburg, Sweden
 - +46 31-786 93 32
 - cornelia.spetea.wiklund@bioenv.gu.se