Minli Ruan, M.Sc.

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Summary

Passionate and self-driven RNA biologist with 8+ years of experience in RNA/gene regulation, bioinformatics, and medicinal chemistry. Skilled in integrating wet-lab and computational approaches, with expertise in nanopore direct RNA sequencing, genetic manipulation, and small molecule development. Proven track record of scientific contributions, including 3 publications, 1 patent, and 4 awarded research/fellowship grants ($70,000+). Effective communicator with multiple oral (5+ conferences) and poster presentations. Strong leadership and collaborative skills, demonstrated through interdisciplinary teamwork and mentoring roles.

Education

Doctor of Philosophy in Biological Chemistry **2021.07 – Present**

Master's Degree of Science in Bioinformatics (Dual Degree)

-*University of Michigan at Ann Arbor, Advisors*: Prof. Kristin S. Koutmou

Master's Degree of Science in Medicinal Chemistry **2017.09 – 2020.06**

-*Fudan University, Advisors: Prof. Qian Zhang*

Bachelor's Degree of Science in Pharmaceutics **2013.09 – 2017.06**

-*Shenyang Pharmaceutical University*

Skills

- *RNA Biology: m*RNA extraction, rRNA depletion, Polysome profiling, Ribosome profiling.
- *Sequencing Library Development:* Linker ligation assay, Sample multiplexing with barcodes, Reverse transcription.
- *Bioinformatics & Data Analysis:* Custom scripting for question-driven research (Translation fidelity analysis influenced by RNA modifications, Global ribosome pausing behavior analysis at RNA modification sites), Nanopore direct sequencing data analysis, Short-read sequencing data analysis.
- *Quality Control & Analytical Techniques*: SDS-PAGE, Western blotting, LC-MS/MS, HPLC.
- *Molecular Biology:* Primer and plasmid design, Gene cloning: restriction enzyme cloning, Gibson assembly, Gateway cloning, Protein tagging (GST, His, FLAG) for localization and activity studies, Site-directed mutagenesis, PCR, RT-qPCR, SPR assay, enzyme activity assay, MTT assay, MIC50 determination, Competitive fitness and spot plating assays.
- *Laboratory Techniques*: immunofluorescence microscopy. *Saccharomyces cerevisiae*, mammalian and clinical cells physiology, Microplate reader operation.
- *Software & Tools:* RStudio, Python, MATLAB, GraphPad Prism, SnapGene, ImageJ, Illustrator, Photoshop, Microsoft Office, Zotero, PsiNanopore,

Relevant Courses

CSHL Advanced Sequencing Technologies & Bioinformatics Analysis, New York, Nov, 2024

LCMS SQ Operation Training (Agilent Technologies, Shanghai, Jan 22nd - Jan 26th, 2018)

Research Experience

University of Michigan Ann Arbor, MI

Graduate Research Assistant, Department of Biological Chemistry. Dr. Kristin S. Koutmou Lab **2021-Present**

- Determined that one of the principal enzymes responsible for adding Ψ to mRNAs, pseudouridine synthase 7 (PUS7), accumulates in the cytoplasm under a variety of stress conditions in Saccharomyces cerevisiae and BEAS-2B human epithelial lung cells.
- Identified that the localization of PUS7 to the cytoplasm promotes Ψ-incorporation into hundreds of different mRNA sequences and increases cellular fitness under ROS and divalent metal ion stress.
- Evaluated that ~31% of the mRNAs modified when PUS7 is cytoplasmically localized encode proteins present in divalent metal metabolism and ROS stress pathways, with many newly identified Ψ-sites lying within portions of the mRNA important for post-transcriptional control—coding regions and 3' UTRs.
- Determined that shifts in the cellular post-transcriptional modification landscape upon PUS7 relocalization reshapes the proteome and ribosome pausing by quantitative proteomics and ribosome profiling.

- Secured funding for dissertation research through the Rackham Graduate Student Research Grant ($1,500 + $3,000) and American Heart Association Predoctoral Fellowship ($68,000).

Fudan University Shanghai, China

Graduate Research Assistant, Department of Medicinal Chemistry. Dr. Qian Zhang Lab **2017 - 2020**

Part 1: Design and Synthesize of probes for detecting DNA Methyltransferase 1 (DNMT1).

- Designed and synthesized 6 fluorescent probes for detecting DNMT1 with Schrodinger Prediction, LC-MS/MS, HRMS, 600 MHz spectrometer, chromatograms, UV-Vis spectrophotometer.
- Determined the affinity between synthesized probes and DNMT1 through SPR Analysis using Biacore T200
- Tested the detection ability of synthesized probes in wild type HeLa cells and DNMT1 overexpressed HeLa cells using confocal imaging.

Part 2: Application of synthesized probes to detect level of cytopathic effect in clinical cervical cells.

- Developed probe **8a** showing 7- and 13-times differences in FL intensity between normal cervical cells with LSIL and HSIL cells, exhibiting potential ability of **8a** being developed as a detection kit to monitor the level of cytopathic effect in cervical cells.

Part 3: Synthesis and Evaluation of Analogues of RG108 as Inhibitors of DNMT1.

- Synthesized 42 RG108 analogues and tested their inhibition rates toward DNMT1 using ^{3}H-SAM detection, with one compound **4A53** showing 35 times higher inhibition rate compared to positive control RG108 (the current DNMT1 inhibitor).

Part 4: Synthesis and Biological Evaluation of Derivatives of Sodium Tanshinone IIA Sulfonic Acid for Cardiovascular diseases.

-Synthesized derivatives of Sodium Tanshinone IIA sulfonic acid and separating the enantiomers using ad-rh, with the compound treated mice with hemangioma showing reduced the vessel diameter of the tumor by 23%.

Working Experience

Developing DTC (Direct to consumer) genetic test kit **Shanghai GeneX Biotech Co.,Ltd** **2020**

- My responsibilities include conducting scientific research and quality control for genetic test kits. This involves adding more SNP sites by searching related papers to enhance the product's sensitivity.

- Successfully improved the accuracy of allergy and immunity test kits by 8.6%. Additionally, I developed a new testing product for chronic diseases, identifying potential gene targets for the test.

Publications and Patents

1. **Minli Ruan**, Sean M. Engels, Matthew R. Burroughs, Dylan Bloch, Oleksandra Fanari, Stuart Akeson, Daniel E. Eyler, Xiaoyan Li, Chase A. Weidmann, Sara Rouhanifard, Miten Jain, Lydia M. Contreras, Kristin S. Koutmou*. PUS7 cytoplasmic localization directs a pseudouridine-mediated cellular stress response. *Nat. Commun.* (under revision)

2. Jingyi Liu, **Minli Ruan**, Yueqin Liu a, Xiaoqian Hong a, Lijun Zhang b, Qian Zhang*. Identification of 3-(9H-carbazol-9-yl)-2-(1,3-dioxoisoindolin-2-yl)propanoic acids as promising DNMT1 inhibitors. *European Journal of Medicinal Chemistry*. **2024**, 274, 116538. https://doi.org/10.1016/j.ejmech.2024.

3.. Hong Xiaoqian, Cheng Qunxian.; **Ruan Minli**, Yang Baohua, Liu Jingyi, Xu Ling*, Zhang Qian*. Determination of DNA Methyltransferase 1 in Cells Using a RG108-Fluorescein Conjugate to Monitor the Fluorescent Ratio with a Microplate Reader. *Anal. Lett*. 2022, 0 (0), 1–15. https://doi.org/10.1080/00032719.2022.2139836.

4.. **Ruan Minli**, Cheng Qunxian, Gong Chaochao, Cao Zhonglian, Xu Ling*, Zhang Qian*. Development of a Kind of RG108-Fluorescein Conjugates for Detection of DNA Methyltransferase 1 (DNMT1) in Living Cells. *Anal. Biochem.* **2020**, *607*, 113823. https://doi.org/10.1016/j.ab.2020.113823.

5. **Ruan Minli**, Zhang Qian. A kind of fluorescent probe for DNA methyltransferase 1 (DNMT1) and its medical uses, Chinese Patent Number: 201910750081.X

Selected Presentations

Topic: PUS7 cytoplasmic localization directs a pseudouridine-mediated cellular stress response.

1. *RNA Society Annual Meeting*, California, May 2025 (Oral Presentation)
2. *RNA Symposium*, MI, March 2025. (Oral Presentation)

3. *CSHL Translational Control*, New York, Sep 2024. (Oral Presentation)
4. *Stowers Research Conferences*, MO, April 2024. (Oral Presentation, tandem talk with PI)
5. *American Society for Biochemistry and Molecular Biology (ASBMB)*, TX, March 2024. (Poster Presentation)
6. *RNA Symposium*, MI, March 2024. (Lighting talk and Poster Presentation)
7. *2023 Rustbelt RNA meeting*, East Lansing, MI, 2023. (Oral Presentation)
8. *Merck Symposium*, MI, Aug 2023. (Oral Presentation)
9. *2023 RNA Editing Gordon Research Conference,* Ventura, CA, 2023. (Poster Presentation)
10. *2022 Rustbelt RNA meeting*, Cleveland, Ohio, 2022. (Poster Presentation)

Topic: A kind of RG108-Fluorescein Conjugates as DNA Methyltransferase 1 (DNMT1) Probes in living Cells.

11. *Yangtze River Delta Medicinal Chemistry Symposium*, Suzhou University, 2019. (Oral Presentation)

Teaching Experience

University of Michigan at Ann Arbor — Ann Arbor, MI

Teaching Admin for Fundamentals of Biochemistry — **Jan.2023 – May.2023**

- Evaluating and grading students' exams and quizzes and answer students' questions.

Fudan University — Shanghai, China

Teaching Assistant for courses in Organic Chemistry — **2018 - 2019**

- Assisting procedures of courses, checking and grading students' coursework for 150 students.

Teaching Assistant for courses in Experiments of Organic Chemistry — **2017 - 2018**

- Assisting 30 graduate students to gain the ability to run their experiments and analyze collected data

Grants and Awards

American Heart Association Predoctoral Fellowship ($68,000), **Jan.2024-Dec.2025**

RNA Society Research Presentation Fellowship, May 2025

Rackham Graduate Student Research Grant for Candidate ($3000), **Sep. 2024**

CSHL fellowship ($2200), Sep. 2024

ASBMB 2024 Graduate Student or Postdoctoral Researcher Award, Mar. 2024

Outstanding Talk Award for Rustbelt RNA Meeting, **Oct. 2023**

Rackham Graduate Student Research Grant for Precandidate ($1500), **Sep. 2022**

***LiXin* Scholarship** (¥ 6000, top 1.0%), **Oct. 2019**

First Class Academic Scholarship (¥ 4000, top 5.0%), **Oct. 2019**

Winner of the 2rd *Bikai* Genius Innovation Scholarship (¥ 4000, top 1%)

for students who have talents in making attractive and profound presentations in their unfamiliar fields, **May 2019**

Outstanding Students of Fudan University, **May 2019**

Outstanding Group Cadres of Fudan University, **Oct. 2018**

Outstanding Graduate Assistant of Fudan University, **Oct. 2018**

First Class Academic Scholarship (¥ 800, top 5%), **Dec. 2016**

The 56th Outstanding Students Scholarship (¥ 18000, top 0.07%)

10/15459, the highest scholarship for students with good performance in academic, sports and leadership, **Dec. 2015**

Outstanding Students of Shenyang Pharmaceutical University, Dec. 2015

Outreach & Leadership

American Heart Association Membership — **2023.08- Present**

The American Society for Biochemistry and Molecular Biology (ASBMB) Membership — **2023.09- Present**

RNA Society Membership (Member Number: 7292) — **2023.10- Present**

miLEAD Consulting member — **2023**

A nonprofit organization provides market analysis and value propositions to help clients make impactful change.

- Completed consulting case: VMX International EV Battery Repurposing — **2023.09 - 2023.11**

Fundraising of "Sunshine Hut" for children with Leukemia (Work as the Project manager**)** **2018.10 - 2018.12**

- Manager to raise donations sum up to ￥1802 for children with leukemia.

Promotion of Rational Use of Antibiotics (Work as the Project manager**)** **2018.10 - 2018.12**

- Carrying out in 4 local communities with 18 members, performing this project with questionnaires and ppt
- Awarded with *Excellent Project of Daily Practice of Postgraduate Students in Fudan University*

Chair of Graduate Student Union of Fudan University, Pharmaceutical department **2018.09 - 2019.06**

NDiSTEM SACNAS conference 2024, Oct, Phoenix, Arizona 2024.10

Annual Biomedical Research Conference for Minoritized Scientists (**ABRCMS**) 2023 Phoenix, Arizona 2023.10