Hongying Sun

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CURRENT POSITION

University of Rochester Medical Center, Rochester, NY, USA

- Postdoctoral Fellow in Biostatistics — Aug 2020 – Present
  - Advisor: Dr. Matthew N. McCall
  - Research Areas: miRNA data analysis

POST-DEGREE TRAINING

St. Jude Children's Research Hospital, Memphis, TN, USA

- Postdoctoral Research Associate in Biostatistics — Apr 2019 – Jul 2020
  - Advisor: Dr. Tang Li and Dr. Haitao Pan
  - Research Areas: Clinical Trial Designs

EDUCATION

University of Rochester, Rochester, NY, USA

- Ph.D. in Biology with focus on Bioinformatics and Computational Biology — Sep 2013 – Mar 2019
  - Thesis: RNA Nearest Neighbor Parameters Derivation and Secondary Structure Prediction
  - Advisor: Professor David H. Mathews
  - Research areas: Bioinformatics, Computational Biology.
- M.S. in Biology with focus on Bioinformatics and Computational Biology — Sep 2013 – Jun 2015

University of Chinese Academy of Sciences, Beijing, China

- Master of Science (M.S.) in Genomics and Epigenetics — Sep 2010 – Jun 2013
  - Advisor: Professor Xiangdong Fang
  - Thesis: MiR-218 Inhibits Erythroid Differentiation and Alters Iron Metabolism by Targeting ALAS2 in K562 Cells
  - Research Areas: Genomics, Epigenetics

Shandong University at Weihai, Shandong, China

- Bachelor of Science (B.S.) in Biology — Aug 2006 – Jun 2010
  - Thesis: The Regulation of Insulators in Red Blood Cell Development

PROJECTS

Phase I/II Clinical Trials Design

- Consider both efficiency and toxicity;
- Use bayesian adaptive method.

Microbiome Data Analysis

- Develop scoring metrics for micriobiome sequence taxnomology;
- Propose statistics to evaluate the accuracy of micrbiome references.

Derivation of RNA Energy Model

- A dataset of 1545 experimental observations was compiled;
- Multiple linear regression model was bulit;
- AIC stepwise algorithm is used to select features that are statistically important;
- Optimize model until the best model is selected;
- The final model is used to predict the folding stability of RNA, quantified by Gibbs free energy change.

Software RNAstructure Implementation

- RNAstructure, a software package for RNA structure prediction and analysis;
- Over 30,000 distinct users have registered to download RNAstructure;
- I wrote a new program called ProbStemloop, which calculates the probability of an RNA hairpin stem-loop and is implemented in RNAstructure;
- The 2018 RNA energy model, developed by me, is implemented in RNAstructure and has been shown to improve the accuracy of RNA secondary structure more significantly.

PUBLICATIONS

[1] W. Max, H. Sun, A. Datta, M. Wise, and D. Mathews "Parameters for Non-Linear Models of Multi-Loop Free Energy Change," *Bioinformatatics,* pp. 1-6, Mar 2019.

[2] J. Braun, J. Fischer, S. Xu, H. Sun, D. Ghoneim, A. Gimbel, U. Plesssmann, H. Urlab, D. Mathews, and J. Weigand "Identification of New High Affinity Targets for Roquin Based on Structural Conservation," *Nucleic Acid Research,* vol. 46, pp. 12109-12125, Oct 2018.

[3] K. Berger, S. Kennedy, S. Schroeder, B. Znosko, H. Sun, D. Mathews, and D.Turner "Surprising Sequence Effects on GU Closure of Symmetric 2 × 2 Nucleotide RNA Internal Loops," *Biochmistry,* vol. 57, pp. 2121–2131, Mar 2018.

[4] J. Zuber* , H. Sun*, and D. Mathews, "A sensitivity analysis of RNA folding nearest neighbor parameters identifies a subset of free energy parameters with the greatest impact on RNA secondary structure prediction," *Nucleic Acid Research,* vol. 45, pp. 6168-6176, Mar 2017. (* Co-First Authors.)

[5] Y. Liu*, S. Liu*, H. Sun*, and X. Fang, "miR-218 inhibits erythroid differentiation and alters iron metabolism by targeting ALAS2 in K562 cells," *International Journal of Molecular Sciences*, vol. 16, pp. 28156–28168, Nov 2015. (* Co-First Authors.)

[6] Q. Xiong, Z. Zhang, H. Qu, X. Ruan, H. Qi, Y. Li, H. Sun, K. Chang, G. Stamatoyannopoulos, J. Stamatoyannopoulos, and X. Fang, "Deciphering the Cis- and Trans-regulatory Roles of KLF6 in Primitive Hematopoiesis" *Blood*, vol. 120, pp.4730, 2012.

[7] H. Sun, and X. Han, "Studies on antifungal activities of Extracts from pinus sp. needles," *Anhui Agricultural Science*, vol. 37, pp. 227-230, Apr 2009. (In Chinese)

[8] H. Sun, X. Lu, J. Li, and X. Han, "Studies on Antifungal Activities of Extracts from Pinus thunbergii Needles," *Northern Horticulture*, Sep 2009. (In Chinese)

SELECTED ORAL PRESENTATIONS

[1] H. Sun, J. Zuber, and D. Mathews, "RNA Folding Nearest Neighbor Parameter Derivation and RNA Secondary Structure Prediction" *Albany 5th RNA Symposium*, Albany, NY, USA, Mar 2018.

[2] H. Sun, J. Zuber, and D. Mathews, "Improving the Accuracy of RNA Secondary Structure Prediction by Improving RNA Folding Nearest Neighbor Parameters", *Rustbelt RNA Meeting*, 31 West Ohio Street, Indianapolis, IN, 46204, USA, Oct 2017.

[3] H. Sun, J. Zuber, and D. Mathews, "RNA Nearest Neighbor Parameters Derivation and RNA Secondary Structure Prediction", *RNA Society*, Prague Congress Center, Prague, Czech Republic, May 2017.

[4] H. Sun, J. Zuber, and D. Mathews, "RNA Nearest Neighbor Parameters Optimization" in *Toronto RNA Enthusiast Day*, 686 Bay St, Toronto, Canada, Aug 2016.

PROFESSIONAL ORGANIZATIONS

- **American Statistical Association** Apr 2019 – Present
- **American Association of Cancer Research** May 2019 – Present
- **Eastern North American Region** Apr 2019 – Present
- **International Chinese Statistical Association** May 2019 – Present
- **National Postdoc Association** Apr 2019 – Present

REVIEWERS

- **Journal of Statistical Computation and Simulation** Jul 2019 – Present
- **Journal of Clinical Epidemiology** Jun 2019 – Present

SKILLS

Experienced programming in C++, Python, R, and VBA;
Biostatistics;
Bioinformatics;
Source control(Git);
Bayesian statistics;
Model selection;
Linear regression.

[*CV compiled on 2020-08-22*]