Huang, Xiang **University of Illinois Springfield**

CONTACT INFORMATION

Department of Computer Science
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CURRENT POSITION

Assistant Professor, University of Illinois Springfield, Springfield, IL, USA (August 2020 to present).

PERSONAL WEBSITE

xianghuang.org

RESEARCH INTERESTS

Algorithmic Information Theory, Analog Computing, DNA/Molecular Programming, Normal numbers, and Theoretical Computer Science in general.

VISITING POSITIONS

Visiting Associate, California Institute of Technology (August 2024 – December 2024, hosted by Erik Winfree).
Visiting Assistant Professor, Le Moyne College, Syracuse, NY (September 2019 – June 2020).

EDUCATION

Iowa State University, IA, USA

Ph.D. in Computer Science, 2020.

- Thesis: *Chemical Reaction Networks: Computability, Complexity, and Randomness.*
- Advisor: Jack H. Lutz.

Institute of Software, Chinese Academy of Sciences, Beijing, China

Computer Science, September 2009 – June 2012.

- Topic: *Model Checking, Formal Methods, Automata Theory.*

Nanjing University, Nanjing, China

B.E. in Software Engineering, September 2005 – June 2009.

GRANT SUPPORT

External Support:

1. Principal investigator: *Towards A Hierarchy of Real Numbers Computable by CRN*, $400,000, Department of Energy EXPRESS grant, 2023–2026.

JOURNAL PUBLICATIONS

2. Xiang Huang, Jack H. Lutz, Elvira Mayordomo, and Donald M. Stull, "Asymptotic divergences and strong dichotomy," *IEEE Transactions on Information Theory* 67 (2021), pp. 6296–6305.

1. Xiang Huang, Titus H. Klinge, James I. Lathrop, Xiaoyuan Li and Jack H. Lutz, "Real-Time Computability of Real Numbers by Chemical Reaction Networks," *Natural Computing* 18(1) (2019), pp. 63–73 **(invited paper)**.

Conference Publications

(Supervised students are underlined.)

8. Nicholas Haisler, Xiang Huang, Andrei N Migunov, Khalid Mohammed, and Garrett Provence. "A Selective Dual-Railing Technique for General Purpose Analog Computers " *In Proceedings of the 22nd International Conference on Unconventional Computation and Natural Computation (UCNC 2025), Sep 2025*

7. Xiang Huang and Andrei N. Migunov, "A General Purpose Analog Computer to Population Protocol Compiler," *In Proceedings of the 21st ACM International Conference on Computing Frontiers Workshops and Special Sessions (CF '24 Companion)*, May 2024.

6. Xiang Huang and Rachel Huls, "Computing Real Numbers with Large-Population Protocols Having a Continuum of Equilibria," *The 28th International Conference on DNA Computing and Molecular Programming* (DNA 28, Albuquerque, NM, August 8–12, 2022).

5. Xiang Huang, Jack H. Lutz, Elvira Mayordomo, and Donald M. Stull, "Asymptotic divergences and strong dichotomy," *Proceedings of the Thirty-seventh Symposium on Theoretical Aspects of Computer Science* (STACS 2020, Montpellier, France, March 10–13, 2020).

4. Xiang Huang, Jack H. Lutz, and Andrei N. Migunov, "Algorithmic Randomness in Continuous-Time Markov Chains," *Proceedings of the 57th Annual Allerton Conference on Communication, Control, and Computing* (2019).

3. Xiang Huang, Titus H. Klinge, and James I. Lathrop, "Real-Time Equivalence of Chemical Reaction Networks and Analog Computers," *DNA Computing and Molecular Programming* (DNA 2019), Lecture Notes in Computer Science, vol. 11648, Springer, Cham.

2. Xiang Huang, Titus H. Klinge, James I. Lathrop, Xiaoyuan Li, and Jack H. Lutz, "Real-Time Computability of Real Numbers by Chemical Reaction Networks," *Proceedings of the 16th International Conference on Unconventional Computation and Natural Computation* (UCNC 2017), pp. 29–40.

1. Xiang Huang and Donald M. Stull, "Polynomial Space Randomness in Analysis," *Proceedings of the 41st International Symposium on Mathematical Foundations of Computer Science* (MFCS 2016), 86:1–86:13.

Peer-Reviewed Extended Abstract/Posters

1. Ho-Lin Chen, Xiang Huang, and Andrei N. Migunov, "The Russian Doll Scheme: Simulating Stochastic CRNs via Termolecular Population Protocols". *the 31st International Conference on DNA Computing and Molecular Programming (DNA3)*, August 2025.

Book Chapter

1. Xiang Huang, "Deterministic Chemical Reaction Network," completed chapter for *The Art of Molecular Programming*. Part of a DNA/molecular programming community initiative to create a comprehensive molecular programming textbook (molecularprogrammers.org).

Submitted or In preparation

2. Xiang Huang, Jack H. Lutz, Neil Lutz, and Andrei N. Migunov. "Algorithmic Randomness in Continuous-Time Markov Chains." Submitted to *Information and Computation* (Elsevier).

1. Xiang Huang, Xiaoyuan Li, Jack Lutz, and Neil Lutz. *Multihead Dimension.* In preparation.

Awards

2. The International Society for Nanoscale Science, Computation and Engineering (ISNSCE) Best Student Presentation Award, at 25th International Conference on DNA Computing and Molecular Programming (DNA25), August 2019.

1. Teaching Excellence Award, Iowa State University, 2017.

Undergraduate Student Research Supervision

Selected undergraduate student research projects (Complete list at xianghuang.org):

- Rachel Huls (2021–2022): Research on large-population protocols computability, resulting in publication at DNA 28.
- Anish Sinha (2022–2023): Concurrent B-Link-Trees. Winner of Best Research Product Award, UIS STARS 2023.
- Jonathan Miller (2023): Survey on Large Integer Multiplication Algorithms. Survey paper completed.

Total: 11 undergraduate students mentored (2021–present) in theoretical computer science research.