Linna An 安琳娜, Ph.D in Chemistry
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EDUCATION

Ph.D. in Chemistry**, University of Illinois at Urbana-Champaign (UIUC), U.S.A.* ***8/2014–12/2019
Dissertation title: The biosynthesis and discovery of lanthipeptides
Committee: Wilfred A. van der Donk (Chair), Paul J. Hergenrother, Satish K. Nair, Douglas A. Mitchell)

***B.S. in Chemistry**, University of Science and Technology of China (USTC), China*
09/2010–05/2014

RESEARCH EXPERIENCE

Tenure-track Assistant Professor,** BioScience Dept, Rice University* ***01/2026–present
Affiliated Faculty**, Bioengineering Dept, Rice University* ***04/2026–present
Affiliated Faculty**, Chemistry Dept, Rice University* ***04/2026–present
Members of Ken Kennedy Institute,** Rice University* ***03/2026–present
Members of Rice Synthetic Biology Institute,** Rice University* ***04/2026–present
Adjunct Tenure-track Assistant Faculty,** BioScience Dept, Rice University* ***08/2025–12/2025
Postdoctoral Scholar** for Prof. **David Baker**, University of Washington* ***01/2020–12/2025

- Project completed: Hallucination of closed repeat proteins containing central pockets
- Project completed: De novo protein design for binding and sensing small molecules
- Project completed: Protein design for enzyme specificity engineering
- Project completed: Machine learning models for small molecule-protein binding affinity ranking

Graduate Research Assistant** for Prof. **Wilfred A. van der Donk**, UIUC* ***08/2014–12/2019

- Project completed: Target-guided discovery of new lanthipeptide with novel mode of action
- Project completed: Substrate-assisted enzymatic formation of lysinoalanine in duramycin
- Project completed: The mode of action of lipid II targeting two-component lantibiotics

***Visiting Scholar** with Prof. **N. I. Martin**, Utrecht University, the Netherlands*
10/2015–12/2015

- Achieved isothermal calorimetry titration on lipid II-lantibiotic systems in collaboration with Dr. P. 't Hart, Dr. N. I. Martin, and Dr. E. J. Breukink.

Research Assistant** for Prof. **Gaolin Liang**, USTC* ***11/2011-06/2014

- Independent Project: A new facile method for the fabrication of a 3D gold nanoparticle array with excellent surface-enhanced Raman scattering (SERS) performance
- Compound preparations and manuscript preparations for multiple molecular imaging projects

Team Member** of team USTC_China, MIT iGEM 2011* ***10/2010-11/2011

- Project: Self-organizing Bacteria

- Individual contribution: Designing and constructing a system that is able to drive one bacterial colony into two groups based on chemotaxis. Project received Gold Award in iGEM World Jamboree at MIT

PATENT

- D. Baker, **L. An**, S. Majumder, M. Said and L. Tran, 2023, DE NOVO DESIGNED SMALL MOLECULE BINDERS VIA EXTENSIVE SHAPE COMPLIMENTARY SAMPLING, 63/610,726.

PUBLICATIONS (#: equal contribution, *:correspondence)

1. Design of Orthogonal Far-Red, Orange and Green Fluorophore-binding Proteins for Multiplex Imaging, L. Tran#, S. Klein#, S. Sharma, D. Jurgens, J. Decarreau, B. Liu, Y. Wang, A. Bera, A. Kang, J. Woods, E. Joyce, D. Vafeados, N. Roullier, W. Chen, G. Lee, L. Lavis, J. Mahamid*, **L. An***, D. Baker*. 2026, ***Science***, doi: https://doi.org/10.1101/2025.08.03.668343. (Preprint link)
2. I. Anishchenko, Y. Kipnis, I. Kalvet, G. Zhou, R. Krishna, S.J. Pellock, A. Lauko, G.R. Lee, **L. An**, J. Dauparas, F. DiMaio, & D. Baker, Modeling protein–small molecule conformational ensembles with PLACER, 2025 ***Proc. Natl. Acad. Sci. U.S.A.*** 122 (45) e2427161122. (Link)
3. G. Li#*, **L. An**#, W. Yang#, L. Yang, T. Wei, J. Shi, J. Wang, J. Doonan, K. Xie, A. R. Fernie, E. S. Lagudah, R. A. Wing, C. Gao*. Integrated biotechnological and AI innovations for crop improvement, 2025, ***Nature***, 643, 925. (Link)
4. J. Dauparas, G. Lee, R. Pecoraro, **L. An**, I. Anishchenko, C. Glasscock, D. Baker*, Atomic context-conditioned protein sequence design using LigandMPNN, 2025, ***Nature Methods***, Accepted, https://doi.org/10.1038/s41592-025-02626-1. (Link)
5. **L. An***, M. Seid, L. Tran, S. Majumder, I. Goreshnik, G. Lee, J. Dauparas, I. Anishchenko, B. Coventry, A. Bera, A. Kang, P. M. Levine, V. Alvarez, A. Pillai, C. Norn, D. Feldman, D. Zorine, D. R. Hicks, X. Li, M. G. Sanchez, D. K. Vafeados, P. J. Salveson, A. A. Vorobieva, and D. Baker*. Binding and sensing diverse small molecules using shape complementary pseudocycles, 2024, ***Science***, 385, 276. (link).
6. **L. An**#*, D. Hicks#, D. Zorine#, J. Dauparas, B. Wicky, L. Milles, A. Courbet, A. Bera, H. Nguyen, A. Kang, L. Carter, D. Baker*. Hallucination of closed repeat proteins containing central pockets, ***Nat. Struct. Mol. Biol.***, 2023, 30, 1755. (Link)
7. **L. An**#, D. Cogan#, C. Navo, G. Jiménez-Osés, S. K. Nair, and W. A. van der Donk*, Substrate-assisted enzymatic formation of lysinoalanine in duramycin, ***Nat. Chem. Biol.*** 2018, 10, 928. (Link)
8. **L. An**#* and G. R. Lee#*, De novo protein design using the blueprint builder in Rosetta, *Current Protocols in Protein Science*, 2020, 102,1, e116. (Link)

9. **L. An**, and W. A. van der Donk*, Recent progress in lanthipeptide biosynthesis, discovery, and engineering, *Comprehensive Natural Products III.* 2019, 2, 119. (Link)
10. **L. An**, M. Rehan H. Shah Gilani, G. L. Liang*, Peptide-based nanostructures for cancer diagnosis and therapy, *Curr. Med. Chem.* 2014, 21, 2453. (Link)
11. J. Acedo, I. Bothwell, **L. An**, A. Trouth, C. Frazier, W. A. van der Donk*, O-Methyltransferase-mediated Incorporation of a β-Amino Acid in Lanthipeptides, *J. Am. Chem. Soc.* 2019, 141, 42, 16790. (Link)
12. **L. An**, "iGEM: Get & Give (& Share)", *Microbiology Today*, Web. 15 May 2018. (Link)
13. Y. Liu#, Q. Miao#, P. Zou, L. Liu, X. Wang, **L. An**, X. Zhang, X. Qian, S. Luo, and G. Liang*. Enzyme-controlled intracellular self-assembly of 18F nanoparticles for enhanced microPET imaging of tumor. *Theranostics.* 2015, 5, 1058. (Link)
14. Y. Yuan#, L. Wang#, W. Du, Z. Ding, J. Zhang, T. Han, **L. An**, H. Zhang, and G. Liang*. Intracellular self-assembly of taxol nanoparticles for overcoming multi-drug resistance. *Angew. Chem. Int. Ed*. 2015, 54, 9700. (Link)
15. Y. Yuan, J. Zhang, Q. Cao, **L. An**, G. Liang*. Intracellular disassembly of self-quenched nanoparticles turns NIR fluorescence on for sensing furin activity in cells and in tumors. *Anal. Chem*. 2015, 87, 6180. (Link)
16. Y. Yuan, S. Ge, H. Sun, X. Dong, H. Zhao, **L. An**, J. Zhang, J. Wang, B. Hu, G. Liang*. Intracellular self-assembly and disassembly of 19F nanoparticles confer respective "Off" and "On" 19F NMR/MRI signals for legumain activity detection in zebrafish. *ACS Nano*. 2015, 9, 5117-5124. (Link)
17. Y. Yuan#, H. Sun#, S. Ge#, M. Wang, H. Zhao, L. Wang, **L. An**, J. Zhang, H. Zhang, B. Hu, J. Wang, G. Liang*. Controlled intracellular self-assembly and disassembly of 19F nanoparticles for MR imaging of caspase 3/7 in zebrafish. ACS Nano. 2015, 9, 761. (Link)
18. W. Wang#, J. Qian#, A. Tang#, **L. An**, K. Zhong, G. Liang*. Using magnetic resonance imaging to study enzymatic hydrogelation. Anal. Chem. 2014, 86, 5955-5961. (Link)
19. Y. Yuan, J. Zhang, **L. An**, Q. Cao, Y Deng, G. Liang*. Oligomeric nanoparticles functionalized with NIR-emitting CdTe/CdS QDs and folate for tumor-targeted imaging. Biomaterials. 2014, 35, 7881. (Link)
20. Y. Yuan, S. Jiang, Q. Miao, J. Zhang, M. Wang, **L. An**, Q. Cao, Y. Guan, Q. Zhang, G. Liang*, Fluorescent switch for fast and selective detection of mercury (II) ions in vitro and in living cells and a simple device for its removal. Talanta. 2014, 125, 204. (Link)
21. B. You*, P. Yin, and **L. An**. (2014), Multifunctional Electroactive Heteroatom-Doped Carbon Aerogels. Small, 10: 4352-4361. (Link)
22. Y. Deng, Y. Luo, **L. An**, Y. Yue, M. Rehan H. Shah Gilani, G. Liang*. Covalently conjugating fluorescence probes to nanoparticles for signal enhancement, Chem. Lett. 2013, 42, 10, 130424. (Link)
23. Y. Yuan., X. Wang, B. Mei, D. Zhang, **L. An**, X. He, J. Jiang, G. Liang*, Labeling thiols on proteins, living cells, and tissues with enhanced emission induced by FRET, Sci. Rep. 2013, 3, 3523 (Link)

AWARD & FUNDING

1. CPRIT - Recruitment of First-Time, Tenure-Track Faculty Members (RFT) award, 2025/08 - 2029/08
2. Rice University BioSciences CARE Initiative Small Grants Program, 2026/01
3. Rice University Creative Ventures Fund: Conference and Workshop Development, 2026/04

HONORS & PRESENTATIONS

4. 2024 Rising Stars in Biological Engineering, Princeton University, Omenn-Darling Bioengineering Institute, Princeton University, 09/2024
5. 2024 Rising Star in Engineering in Health, co-hosted by Boston University, Johns Hopkins University, Cornell University, Columbia University, 09/2024
6. 2024 UT Austin MBS Trailblazers of Tomorrow National Postdoctoral Symposium, 05/2024
7. New Frontiers Scholar Award, Corteva, Inc. 08/2019
8. Fuson Travel Award, University of Illinois at Urbana-Champaign, 07/2018

SELECTED Presentations

1. 2024 Workshop on Neutrons in Structural Biology, 06/2024
- Invited talk: De Novo Small Molecule Binder and Sensor Design
2. RosettaCon, 08/2023
- Presentation: De Novo Small Molecule Binder Design with Shape Complimentary Sampling
3. Biosynthesis, Biocatalysis, and New Methods in Enzymology, Gordon Research Seminar & Gordon Research Conference, 07/2023
- Presentation & Poster: De Novo Small Molecule Binder Design with Shape Complimentary Sampling
4. MRSEC seminar, invited seminar. Brandeis University 06/2023
9. Rosetta Conference, Seattle (*Invited conference, supported by RosettaCon travel grant*) 08/2022
- Poster: De novo design of small molecule binder using pseudocyclic proteins
10. Foresight's Molecular Machines Workshop, San Francisco (Invited conference) 07/2022
- Invited Talk: De novo design of small molecule binding proteins
11. New Frontiers in Natural Products Discovery conference (*Supported by New Frontiers Scholar Award),* Corteva, Inc. 08/2019
- Selected poster: A proof of concept target-guided lanthipeptide mining strategy
12. Natural Products and Bioactive Compounds Gordon Research Seminar & Gordon Research Conference *(Supported by Fuson Travel Award),* 07/2018
- Talk & poster: Substrate-assisted enzymatic formation of lysinoalanine in duramycin
13. Midwest Enzyme Chemistry Conference, Loyola University, 10/2017

- Selected talk: Substrate-assisted enzymatic formation of lysinoalanine in duramycin

11. Enzymes Coenzymes and Metabolic Pathways Gordon Research Seminar & Gordon Research Conference, 07/2017
- Poster: Mechanistic details of duramycin biosynthesis

12. Midwest Enzyme Chemistry Conference, University of Illinois at Chicago, 10/2016
- Poster: Mode of action studies for the two-peptide lantibiotic haloduracin

13. The 3rd National Chemistry Majors Scientific Activity Exchange *(Supported by the Department Travel Award)* Sichuan University, 12/2013

TEACHING & MENTORING

Mentor for undergraduate, Fiona Wong, Audrey Zhang, Rice, 01/2026-present
Mentor for high school student, Andrew Man, Rice, 01/2026-present
Mentor for postdoc, Wenbo Ning (Chemistry), Rice, 02/2026-present
Mentor for graduate students, Hayden Stagell (BCB), Yanapat Janathan (SSPB), Rice, 01/2026-present
Mentor for rotation students, Haotian(Odin) Zhang (computer science), UW, fall/2024-1/2025
Mentor for graduate students, Shajesh Sharma (bioengineering), UW, winter/2023-12/2025
Mentor for rotation students, Valentina Alvarez (biochemistry), UW, summer/2023
Mentor for graduate students, Long Tran (chemical engineering), UW, winter/2022-12/2025
Mentor for rotation student, Emma Mackey (biochemistry), UW, summer 2021
Mentor for graduate student, Chunyu Wu(biochemistry), UIUC, 09/2018-2019
Teaching Assistant for Enzymatic Reaction Mechanisms (graduate level) for Prof. J. A. Gerlt, UIUC, 01-05/2016
Teaching Assistant for General Chemistry (leading discussion and lab sessions) for Dr. K. Marville, and Dr. J. A. Martinez, UIUC, 01-05/2016, 01-06/2014, 08-12/2014
Graduate Mentor for Women Chemists Committee (WCC), UIUC, 2017

COMMITTEE

SERVICES

ML4BioChem Club, Co-founder and organizer, Houston, 01/2026-present
Women in Biology, Seattle chapter, 2022- present
Jupyter Summer Internship preparation committee, Institute for Protein Design, 2022
Women in Science, Institute for Protein Design, 2020- present
Conference Committee , Allerton Conference, UIUC, 2017
Women Chemists Committee, 2016 & 2015 Women Welcome Retreat, UIUC, 2016 & 2015
Women Chemists Committee, Stoesser Lecture, UIUC, 2016 & 2015

SKILLSETS

Computational skills: python (fluent), bash scripts, Fine tune of machine learning models, RosettaScripts (fluent), PyRosetta (fluent), machine learning-based protein design scripts (fluent), python-based data analysis (fluent).

Chemistry/Biochemistry related skills:

1. High throughput assay developments;
2. Peptide/Protein expression and purification using biological system or chemical methods;
3. Analytical methods development and use of HPLC, UV-vis, LC-HRMS (Q-TOF), GC-MS, MALDI, SEC;
4. Natural product discovery using bioinformatics & genome mining, semi-synthesis and purification, and structure elucidation using NMR and LC-MS^n;
5. Plasmid construction and gene manipulation for *Escherichia coli* and *Bacillus subtilis*.

Others:

1. Accomplished user of Illustrator, Photoshop, Autodesk 3D Max, Endnote, ChemDraw, html language;
2. Open water scuba diving;
3. Bouldering.