

Jian CHEN

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Google Scholar: Profile | LinkedIn: Profile | GitHub: Profile

Research Interests

Trustworthy Financial AI, Regulatory Technology, and Auditable Decision Systems; Evidence-grounded LLM Reasoning, Executable Rule Generation, and AI Evaluation.

Research Summary

My research focuses on trustworthy financial AI, regulatory technology, and auditable decision systems. I study how large language models and AI systems can support financial compliance checking, regulatory consultation, and risk-sensitive decision-making under complex evidence, rules, constraints, and uncertainty. In real-world financial compliance settings, regulatory texts are long and structurally complex, often involving exceptions, counter-exceptions, ambiguous applicability scopes, and incomplete business evidence. Direct LLM-based judgments are therefore difficult to trust unless they are grounded, executable, verifiable, and reviewable.

To address this challenge, my work develops a system-oriented research agenda that begins with financial evidence retrieval and long-form question answering, and extends to normative scope parsing, regulation-to-code generation, verifier-guided code repair, compliant solution routing, and evidence-licensed evaluation. Together, these projects aim to transform complex financial regulatory text, business facts, and user objectives into retrievable, executable, verifiable, and interpretable compliance decision pipelines.

My research is motivated by industry-facing regulatory and financial decision problems, but formulates them as generalizable scientific questions in AI, information retrieval, code generation, evaluation, and decision systems. Through datasets, benchmarks, algorithms, and deployed prototypes, I aim to build trustworthy AI systems that do not merely generate answers, but produce evidence-grounded, constraint-aware, auditable, and actionable decision support for financial regulation and institutional decision-making.

Education

Ph.D. in Artificial Intelligence

Sep. 2024 – Jul. 2027 expected

Artificial Intelligence Thrust, Information Hub, The Hong Kong University of Science and Technology (Guangzhou)

Supervisors: Prof. Hui XIONG and Prof. Zixuan YUAN

Research Interests: Trustworthy Financial AI, Regulatory Technology, and Auditable Decision Systems; Evidence-grounded LLM Reasoning, Executable Rule Generation, and AI Evaluation

Tentative Dissertation Title: *State-space Policy Synthesis from Normative Text for Auditable Financial Objects*

Scholarship: Full Scholarship

M.Phil. in Artificial Intelligence

Sep. 2022 – Jul. 2024

Artificial Intelligence Thrust, Information Hub, The Hong Kong University of Science and Technology (Guangzhou)

Supervisor: Prof. Junwei LIANG

Research Interest: Multimodal Large Language Model Reasoning

Thesis Title: *Vision-language Models Meet Meteorology: Developing Models for Extreme Weather Events Detection with Heatmaps*

Scholarship and Honor: Full Scholarship; Outstanding Master's Graduate Award

Bachelor of Business Administration in Business Analytics

Sep. 2017 – Jul. 2021

School of Business, Macau University of Science and Technology

Publications

Published or Accepted Papers

1. **Jian Chen***, Siyuan Li*, Chucheng Wan, Zixuan Yuan†. *From Statute to Control Flow: Span-Grounded Deontic Trees for Defeasible Scope Parsing*. Accepted to **ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2026)**. To appear. Role: Co-first Author.

2. Siyuan Li*, **Jian Chen***†, Rui Yao, Xuming Hu, Peilin Zhou, Weihua Qiu, Simin Zhang, Chucheng Dong, Zhiyao Li, Qipeng Xie, et al. *Compliance-to-Code: Enhancing Financial Compliance Checking via Code Generation*. **Proceedings of the 32nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2026)**, Vol. 1, pp. 2699–2710. Role: Co-first Author and Co-corresponding Author.
3. **Jian Chen**, Zhenyan Chen, Xuming Hu, Peilin Zhou, Yining Hua, Han Fang, Cissy Hing Yee Choy, Xinmei Ke, Jingfeng Luo, Zixuan Yuan†. *DeKeyNLU: Enhancing Natural Language to SQL Generation through Task Decomposition and Keyword Extraction*. **Findings of the Association for Computational Linguistics: EMNLP 2025**. Role: First Author.
4. **Jian Chen**, Peilin Zhou, Yining Hua, Dading Chong, Meng Cao, Yaowei Li, Wei Chen, Bing Zhu, Junwei Liang†, Zixuan Yuan†. *ClimateIQA: A New Dataset and Benchmark to Advance Vision-Language Models in Meteorology Anomalies Analysis*. **Proceedings of the 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2025)**, Vol. 2, pp. 5322–5333. Oral Presentation. Role: First Author.
5. **Jian Chen**, Peilin Zhou, Yining Hua, Yingxin Loh, Kehui Chen, Ziyuan Li, Bing Zhu, Junwei Liang. *FinTextQA: A Dataset for Long-form Financial Question Answering*. **Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics (ACL 2024), Volume 1: Long Papers**, pp. 6025–6047. Role: First Author.

Manuscripts under Review

6. **Jian Chen**, Zixuan Yuan. *Learning Costs, Not Routes: An Exact-Feasibility Contract for Learned Multigraph Routing*. Manuscript under review, 2026. Role: First Author.
7. **Jian Chen**, Zixuan Yuan. *Scores Are Not Claims: SCOPE-ROUTING for Evidence-Licensed Evaluation of Learned Multigraph Routing*. Manuscript under review, 2026. Role: First Author.
8. Xiaofeng Gu*, **Jian Chen***†, Siyuan Li, Kaichen Zhang, Zixuan Yuan†. *HARMONICBENCH: Fixed-Target Counterfactual Evaluation of Helpful, Corrupted, and Format-Dependent Plans*. Manuscript under review, 2026. Role: Co-first Author and Co-corresponding Author.

Manuscript in Preparation

9. **Jian Chen**, Chuhan Hu, Zixuan Yuan†. *RepoTrace: Structured Verifier Evidence for Repository-Level Code Generation and Repair*. Manuscript in preparation, 2026. Role: First Author.

Note: * denotes equal contribution; † denotes corresponding author.

Selected Research Projects

Financial Regulatory Intelligence and Auditable Compliance Automation Jun. 2023 – Present

Role: Project Lead; System Lead

Advisor: Prof. Zixuan Yuan

- Led a continuous research agenda on financial regulatory intelligence and compliance automation, covering financial evidence retrieval, normative scope parsing, regulation-to-code generation, compliance checking, audit-report generation, and compliant solution routing.
- Built the evidence-retrieval foundation through FinTextQA, leading the dataset and RAG system design, organizing team annotation and quality control, and constructing 1,262 source-grounded question-answer pairs with long-document contexts.
- Led or deeply contributed to NormBench / SG-DT, representing normative provisions as Span-Grounded Deontic Trees to parse subjects, conditions, constraints, exceptions, counter-exceptions, and rule applicability scopes.
- Led the system design of Compliance-to-Code / FinCheck, translating 361 Chinese financial regulations, 1,159 regulatory provisions, and 307 executable checking tasks into executable and traceable compliance-checking logic and audit reports.
- Proposed and applied RECODE / SCOPE-Routing to model regulatory constraints, user objectives, evidence conditions, and risk boundaries as feasible-path search and evidence-licensed decision problems, enabling auditable compliant solution routes for regulatory consultation. Part of the methodology has been deployed in the team's product.

Structured Code Generation from Natural Language, Regulatory Text, and Verifier Evidence Mar. 2024 – Present

Role: Project Lead; First Author / Co-first Author

Advisor: Prof. Zixuan Yuan

- Led a research agenda on structured code generation, progressing from natural-language-to-SQL generation, to executable code generation from complex regulatory text, and further to verifier-guided repair for low-resource and repository-level code generation.
- Led the DeKeyNLU / DeKeySQL project, designing a pipeline for task decomposition, keyword extraction, entity retrieval, and SQL generation to improve complex natural-language-to-SQL generation and structured data retrieval.
- Constructed the 1,500-sample DeKeyNLU dataset and evaluated how task decomposition and keyword extraction improve NL2SQL execution accuracy on benchmarks such as BIRD and Spider.
- Extended structured code generation to regulatory text in Compliance-to-Code, decomposing regulatory provisions into subjects, conditions, constraints, contexts, exceptions, and evidence requirements before generating executable compliance-checking code.
- Led RepoTrace, structuring compiler, build, dependency, API-version, and test-failure evidence into gates, source spans, traces, and metadata for low-resource, repository-level code generation and repair.

Institutional Reasoning and Counterfactual Decision Forecasting Mar. 2026 – Present

Role: Project Lead; Co-first Author / Co-corresponding Author

Advisor: Prof. Zixuan Yuan

- Led a research project on modeling human and institutional reasoning processes under complex evidence, objectives, constraints, and uncertainty.
- Designed the overall research framework for evaluating whether models genuinely benefit from external reasoning plans, or merely rely on rigid formatting, inherit corrupted scaffolds, or produce superficial performance gains.
- Led the initial development of HARMONICBENCH, a fixed-target counterfactual evaluation framework that compares helpful, corrupted, and format-dependent plans under the same task, evidence, and scoring target.
- Built evaluation tasks from a stratified public source-selection pool and fixed-target condition families, enabling auditable measurement of plan amplification, corrupted-content inheritance or resistance, and soft-format retention.
- Designed the system architecture, experimental protocol, evaluation pipeline, and analysis framework, and led the manuscript writing.

Work Experience

HSBC, AI Consultant Specialist

Aug. 2024 – Aug. 2025

Global Payments Solutions, China

- Led Payment AutoPilot, a cross-border payment routing and optimization system addressing path selection, cost-time trade-offs, reachability, and prediction for historically unobserved payment routes.
- Designed the end-to-end algorithmic framework, integrating graph modeling, routing optimization, time-series forecasting, cost prediction, reinforcement learning, LLMs, and RAG for multi-objective payment-route recommendation.
- Developed the core research and system design, transforming historical payment records, route features, cost signals, and business constraints into model-ready inputs for route prediction and optimization.
- Delivered a production-deployed system adopted by business teams to support cross-border payment routing decisions, improving cost efficiency, timeliness, and route coverage.
- Received the HSBC RISE Award, ranking among the top 0.1% of HSBC technology staff.

HSBC, AI Research Scientist

Apr. 2022 – Aug. 2024

HSBC Innovation and Venture Lab, China

- Contributed to financial and business data analytics through DeKeySQL / DeKeyNLU, designing algorithms that decompose complex natural-language queries into task understanding, keyword extraction, entity retrieval, and SQL generation for faster retrieval and comparison over macroeconomic, policy, and business databases.
- Developed AIfred, a document intelligence and question-answering system, by designing and optimizing RAG pipelines with long-document retrieval, reranking, and generation, improving question-answering accuracy to 87%.
- Contributed to FX Prompt by designing core algorithms for text classification, signal extraction, and predictive modeling in foreign-exchange business scenarios, achieving 99.8% model

accuracy.

- Supported FX business analytics and decision-making workflows, contributing to USD 23.9M in FX business revenue in 2023, representing 94% year-over-year growth.

Awards and Honors

HSBC RISE Award 2025
Recognized among the top 0.1% of HSBC technology staff.

Outstanding Master's Graduate Award 2024
The Hong Kong University of Science and Technology (Guangzhou)

Teaching, Mentoring, and Academic Service

Teaching Assistantships

Teaching Assistant, Machine Learning and Artificial Intelligence Fall 2025–2026
The Hong Kong University of Science and Technology (Guangzhou); Instructor: Prof. Zixuan Yuan;
Enrollment: approximately 40 master's and Ph.D. students

- Graded assignments and provided feedback to support students' understanding of machine learning, artificial intelligence, and model applications.
- Delivered selected teaching content and supported classroom instruction and student Q&A.

Teaching Assistant, Technology and Innovation: Social and Business Perspectives Spring 2025–2026

The Hong Kong University of Science and Technology (Guangzhou); Instructor: Prof. Jiao Guo;
Enrollment: approximately 30 undergraduate students

- Graded assignments and provided feedback on topics related to the social and business implications of technology and innovation.
- Delivered selected teaching content and supported classroom discussions and student learning.

Research Mentoring

Mentored and supported junior researchers and students, including Chucheng Wan, Siyuan Li, and Xiaofeng Gu, in AI, financial technology, regulatory technology, and LLM evaluation research. Mentoring activities included experimental design, system implementation, result analysis, paper writing, and research-thinking development. Related outputs include *Compliance-to-Code*, *From Statute to Control Flow: Span-Grounded Deontic Trees*, and *HARMONICBENCH*.

Academic Service

Reviewer for KDD 2025, KDD 2026, and NeurIPS 2026.

Presentations, Posters, and Media Coverage

Oral Presentations and Talks

ClimateIQA: A New Dataset and Benchmark to Advance Vision-Language Models in Meteorology Anomalies Analysis Aug. 17, 2025
ACM SIGKDD Conference on Knowledge Discovery and Data Mining, KDD 2025, Toronto, Canada;
Oral Presentation; Presenter: Jian Chen

ClimateIQA / Vision-Language Models Meet Meteorology Sep. 12, 2025
The 13th CCF Big Data Conference, Session I: Datasets and Evaluation Benchmarks; Presenter: Jian Chen

Poster Presentations

- *FinTextQA: A Dataset for Long-form Financial Question Answering*, ACL 2024 Main Conference, Long Papers.
- *ClimateIQA: A New Dataset and Benchmark to Advance Vision-Language Models in Meteorology Anomalies Analysis*, KDD 2025, Toronto, Canada.
- *DeKeyNLU: Enhancing Natural Language to SQL Generation through Task Decomposition and Keyword Extraction*, Findings of EMNLP 2025.
- *Compliance-to-Code: Enhancing Financial Compliance Checking via Code Generation*, KDD 2026, forthcoming.

- *From Statute to Control Flow: Span-Grounded Deontic Trees for Defeasible Scope Parsing*, KDD 2026, forthcoming.

Media Coverage

Breaking the Three-Difficulty Bottleneck in NL2SQL: HKUST(GZ) Team Proposes a Deep Understanding First Paradigm, MIT Technology Review China, Nov. 28, 2025.