Chuan-Ju Wang (王釧茹)

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PARTICULARS

EDUCATION

National Taiwan University — Taipei, Taiwan
Ph.D. in Computer Science and Information Engineering — *April 2011*

National Chiao Tung University — Hsinchu, Taiwan
B.S. in Computer Science and Information Engineering — *June 2006*

RESEARCH INTERESTS

- Data Analytics: financial analysis, text mining, recommender systems, and machine learning
- Financial Computation: lattice models, simulation, derivative pricing, risk management

DISSERTATION

Title: "On the Construction and Complexity of Bivariate Lattices"
Advisor: Prof. Yuh-Dauh Lyuu

My thesis is aimed to propose accurate and efficient lattices to price financial securities. In my thesis, a lattice for the jump-diffusion process is proposed; to my best knowledge, this work is not only the first study to deal with the oscillation problem under the jump-diffusion process, but also the first attempt to reduce the time complexity of the lattice for the jump-diffusion process from earlier works of $O(n^3)$ to $O(n^{2.5})$. Furthermore, the thesis proposes the first bivariate lattice that guarantees valid probabilities even for the interest models that allow rates to go without bounds in magnitude, and the proposed bivariate lattice has been proved to be optimal.

ACADEMIC HONORS

- Runner-up Best Short Paper Award, the 12th ACM Conference on Recommender Systems (RecSys'18), Vancouver, 2018
- Semifinalist for Best Paper Award in Options and Derivatives, the 2018 Annual Meeting of the Financial Management Association (FMA'18), San Diego, 2018
- The project, Financial Unstructured Data Analysis, Understanding, and Applications, was awarded the Project for Excellent Junior Research Investigators, MOST, for 3 years, 2018/8 – 2021/7
  科技部優秀年輕學者研究計畫
- Notable Article of the 21st Annual Best of Computing selected by ACM Computing Reviews, 2017
- The 10th Best S&F Paper Award, 2016
  第十屆證券暨期貨金椽獎–學術組優等獎, 2016
- Best Paper Award in Derivatives Sponsored by Chicago Trading Company, the 2015 Annual Meeting of the Financial Management Association (FMA'15), Orlando, 2015
- MOST Award for Talent Subsidy Incentives by Faculty Members and Researchers, 2014/08 – 2015/07
  103年度國科會補助大專校院獎勵特殊優秀人才審定通過

- MOST Award for Talent Subsidy Incentives by Faculty Members and Researchers, 2013/08 – 2014/07
102年度國科會補助大專校院獎勵特殊優秀人才審定通過
- Best Paper Award, IEEE Conference on Computational Intelligence for Financial Engineering & Economics (CIFEr'12), New York, 2012
- Best Doctoral Dissertation Runner-up Award of Operations Research Society of Taiwan (ORSTW) and Chinese Institute of Decision Sciences (CID), 2011
台灣作業研究學會暨中華決策科學學會碩博士論文競賽博士組第二名
- NSC Predoctoral Research Abroad Award, Taiwan, 2010
中華民國行政院國家科學委員會補助博士生赴國外從事研究獎學金
- Best Paper Award, in the Complexity Session, International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC'10), Orlando, USA, 2010
- Academic Achievement Award, National Chiao Tung University, 2003 – 2006
國立交通大學資訊工程學系書卷獎

RESEARCH EXPERIENCE

- **Assistant Research Fellow**
Research Center of Information Technology Innovation, Academia Sinica, August 2016 – present
- **Visiting Predoctoral Student**
Northwestern University, Evanston, IL, USA, September 2010 – March 2011
Advisor: Prof. Ming-Yang Kao
Research topics: optimization for simulation; prediction market

INDUSTRY EXPERIENCE

- **Research Assistant**
Chinatrust Bank, Taipei, June 2008 – July 2010
Pricing newest derivatives and developing financial software.
- **Student Intern**
Microsoft China Technology Center, Beijing, China, July 2006 – August 2006
Assisting Microsoft in organizing a 200-person workshop on Microsoft China RFID Event and developing RDIF Lab Documents.
Project: To establish the connection between RFID databases and cell phone systems by SMS.

TEACHING EXPERIENCE

- **Adjunct Associate Professor**
Department of Computer Science, University of Taipei, August 2016 – July 2017
- **Associate Professor**
Department of Computer Science, University of Taipei, February 2016 – July 2016
- **Assistant Professor**
Department of Computer Science, University of Taipei, August 2011 – January 2016
Course: Probability, System Programming, Web Search and Mining, Social Network and Applications, Advanced Educational Statistics
- **Adjunct Assistant Professor**
Department of Computer Science, National Chengchi University, February 2012 – July 2014
Computer Programming, Department of Mathematical Sciences
Course: Computer Programming

- **Teaching Assistant**
  Principles of Financial Computing (Prof. Yuh-Dauh Lyuu), NTU, Spring 2009, Spring 2010
  Computing Theory (Prof. Yuh-Dauh Lyuu), NTU, Spring 2008, Winter 2008, Winter 2009
  Probability (Prof. Wen-Chin Chen), NTU, Spring 2007
  Linear Algebra (Prof. Wen-Chin Chen), NTU, Winter 2006

- **Instructor**
  Java and JSP Programming, WEB Applications, Database, Information System Training Program of CSIE, NTU, March 2007 – July 2010

SELECTED PUBLICATIONS

- *Journal Papers*
  - Yi-Cheng Tsai, Mu-En Wu, Jia-Hao Syu, Chin-Laung Lei, Chung-Shu Wu, Jan-Ming Ho, **Chuan-Ju Wang***. Assessing the Profitability of Timely Opening Range Breakout on Index Futures Markets. To appear in *IEEE Access*.
  - **Chuan-Ju Wang*** and Tian-Shyr Dai. An Accurate Lattice Model for Pricing Catastrophe Equity Put under the Jump-Diffusion Process. *IEEE Computational Intelligence Magazine* (SCI, 5-year IF:5.000), 13(4), 35–45, 2018.
  - Yi-Cheng Tsai, Chin-Laung Lei, William Cheung, Chung-Shu Wu, Jan-Ming Ho, **Chuan-Ju Wang***. Exploring the Persistent Behavior of Financial Markets. *Finance Research Letters* (SSCI, 5-year IF:1.087), 24:199–220, 2018.
  - Ming-Feng Tsai and **Chuan-Ju Wang***. On the Risk Prediction and Analysis of Soft Information in Finance Reports. *European Journal of Operational Research* (SCI, 5-year IF:3.960), 257(1):243–250, 2017.
  - Ming-Feng Tsai, **Chuan-Ju Wang***, and Po-Chuan Chien. Discovering Finance Keywords via Continuous Space Language Models. *ACM Transactions on Management Information Systems* (EI), 7(3), Article No. 7, 2016. (Notable Article of the 21st Annual Best of Computing selected by ACM Computing Reviews)
  - Liang-Chih Liu, Tian-Shyr Dai, and **Chuan-Ju Wang***, Evaluating Corporate Bonds and Analyzing Claim Holders' Decisions with Complex Debt Structure. *Journal of Banking and Finance* (SSCI, 5-year IF:2.848), 72:151–174, 2016.
  - **Chuan-Ju Wang*** and Ming-Yang Kao. Optimal Search for Parameters in Monte Carlo Simulation for Derivative Pricing. *European Journal of Operational Research* (SCI, 5-year IF:3.960), 249(2):683–690, 2016.
  - **Chuan-Ju Wang**, Tian-Shyr Dai, and Yuh-Dauh Lyuu. Evaluating Corporate Bonds with Complicated Liability Structures and Bond Provisions. *European Journal of Operational Research* (SCI, 5-year IF:3.960), 237(2):749–757, 2014.
  - Tian-Shyr Dai, **Chuan-Ju Wang***, and Yuh-Dauh Lyuu. A Multi-Phase, Flexible, and Accurate Lattice for Pricing Complex Derivatives on Multiple Market Variables. *Journal of Futures Markets* (SSCI, 5-year IF:1.378), 33(9):795–826, 2013.
  - Yuh-Dauh Lyuu and **Chuan-Ju Wang***. On the Construction and Complexity of the Bivariate Lattice with Stochastic Interest Rate Models. *Computers and Mathematics with Applications* (SCI, 5-year IF:2.080), 61(4):1107–1121, 2011. (Authors are listed in alphabetical order.)
  - Chun-Ying Chen, Pei-Ju Chou, Jeff Yu-Shun Hsu, Wisely Po-Hong Liu, Yuh-Dauh Lyuu, and **Chuan-Ju Wang***. A Closed-form Formula for an Option with Discrete and Continuous Barriers. *Communications in Statistics – Theory and Methods* (SCI, 5-year IF:0.470), 40(2):345–357, 2011. (Authors are listed in alphabetical order.)
  - Tian-Shyr Dai, **Chuan-Ju Wang**, Yuh-Dauh Lyuu, and Yen-Chun Liu. An Efficient and Accurate Lattice for Pricing Derivatives under a Jump-Diffusion Process. *Applied Mathematics and Computation* (SCI, 5-year IF:2.108), 217(7):3174–3189, 2010.

- *Conference Papers*

- Chi-Han Du, Ming-Feng Tsai, and **Chuan-Ju Wang**. Beyond Word-level to Sentence-level Sentiment Analysis for Financial Reports. To appear in *Proceedings the 44th IEEE International Conference on Acoustics, Speech, and Signal Processing* (ICASSP'19), 2019.
- Chih-Ming Chen, **Chuan-Ju Wang**, Ming-Feng Tsai, and Yi-Hsuan Yang. Collaborative Similarity Embedding for Recommender Systems. To appear in *Proceedings of The Web Conference* (formerly known as WWW), 2019. (top conference in information engineering, short paper, acceptance rate: 20%).
- Zhe-Li Lin and **Chuan-Ju Wang**. Keyword Extraction with Character-level Convolutional Neural Tensor Networks. To appear in *Proceedings of the 23rd Pacific-Asia Conference on Knowledge Discovery and Data Mining Conference on Artificial Intelligence* (PAKDD'19), 2019. (full paper, acceptance rate: 24.7%)
- Chun-Hsiang Wang, Kang-Chun Fan, **Chuan-Ju Wang**, and Ming-Feng Tsai. UGSD: User Generated Sentiment Dictionaries from Online Customer Reviews. To appear in *Proceedings of the 33rd AAAI Conference on Artificial Intelligence* (AAAI'19), 2019. (top conference in artificial intelligence, full paper, acceptance rate: 16.2%)
- Chi-Han Du, Yi-Shyuan Chiang*, Kun-Che Tsai*, Liang-Chih Liu, Ming-Feng Tsai, and **Chuan-Ju Wang**. FRIDAYS: A Financial Risk Information Detecting and Analyzing System. To appear in *Proceedings of the 33rd AAAI Conference on Artificial Intelligence* (AAAI'19), 2019. (top conference in artificial intelligence, demo paper, * indicates equal contributions, `https://cfda.csie.org/FRIDAYS/`)
- Kwei-Herng Lai, Chih-Ming Chen, Ming-Feng Tsai, and **Chuan-Ju Wang**. NavWalker: Information Augmented Network Embedding. To appear in *Proceedings of the 2018 IEEE/WIC/ACM International Conference on Web Intelligence* (WI'18), 2018. (full paper)
- Jheng-Hong Yang, Chih-Ming Chen, **Chuan-Ju Wang**, and Ming-Feng Tsai. HOP-Rec: High-Order Proximity for Implicit Recommendation. In *Proceedings of the 12th ACM Conference on Recommender Systems* (Recsys'18), 2018, pp. 140–144. (top conference in recommender systems, short paper, oral presentation, acceptance rate: 25%, **best short paper runner up**)
- **Chuan-Ju Wang** and Tian-Shyr Dai. An Accurate Lattice Model For Pricing Catastrophe Equity Put Under the Jump-Diffusion Process. *The 2018 Annual Meeting of the Financial Management Association* (FMA'18), 2018. (top conference in finance, **semifinalist for best paper award**)
- Yu-Wen Liu, Liang-Chih Liu, **Chuan-Ju Wang**, and Ming-Feng Tsai, RiskFinder: A Sentence-level Risk Detector for Financial Reports. In *Proceedings of the 16th Annual Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies* (NAACL'18), 2018, pp. 81–85. (top conference in computational linguistic, demo paper, `https://cfda.csie.org/RiskFinder/`)
- Chih-Yu Chao*, Yi-Fan Chu*, Hsiu-Wei Yang, **Chuan-Ju Wang**, and Ming-Feng Tsai. Text Embedding for Sub-Entity Ranking from User Reviews. In *Proceedings of the 26th ACM International Conference on Information and Knowledge Management* (CIKM'17), 2017, pp. 2011–2014. (top conference in data science, short paper, acceptance rate: 30%, * indicates equal contributions, `https://cfda.csie.org/tripadvisor/`))
- **Chuan-Ju Wang**, Ting-Hsiang Wang*, Hsiu-Wei Yang*, Bo-Sin Chang, and Ming-Feng Tsai. ICE: Item Concept Embedding via Textual Information. In *Proceedings of the 40th International ACM SIGIR Conference on Research and Development in Information Retrieval* (SIGIR'17), 2017, pp. 85–94. (top conference in information retrieval, full paper, acceptance rate: 22%, * indicates equal contributions, `https://github.com/cnclabs/ICE`)
- Yu-Wen Liu, Liang-Chih Liu, **Chuan-Ju Wang**, and Ming-Feng Tsai. FIN10K: A Web-based Information System for Financial Report Analysis and Visualization. In *Proceedings of the 25th ACM Conference on Information and Knowledge Management* (CIKM'16), 2016, pp. 2441–2444. (top conference in data science, demo paper, acceptance rate: 34.5%, `https://cfda.csie.org/10K/`)
- **Chuan-Ju Wang**, Tian-Shyr Dai, and Jr-Yan Wang. Pricing Convertible Bonds under the First-Passage Credit Risk Model. *The 2016 Annual Meeting of the Financial Management Association* (FMA'16), 2016. (top conference in finance)

- Tian-Shyr Dai, **Chuan-Ju Wang**, and Liang-Chih Liu. Evaluating Corporate Bonds and Analyzing Market Participants Behaviors with Complex Debt Structure. *The 2015 Annual Meeting of the Financial Management Association* (FMA'15), 2015. (top conference in finance, **best paper award**)
- Ming-Feng Tsai and **Chuan-Ju Wang**. Financial Keyword Expansion via Continuous Word Vector Representations. In *Proceedings of Conference on Empirical Methods in Natural Language Processing* (EMNLP'14), 2014, pp. 1453–1458. (top conference in computational linguistic, short paper, acceptance rate: 28%).
- Tian-Shyr Dai, **Chuan-Ju Wang**, and Liang-Chih Liu. Evaluating Corporate Bonds with Complex Debt Structure. *The 23rd European Financial Management Association Conference* (EFMA'14), 2014. (top conference in finance)
- **Chuan-Ju Wang and** Ming-Yang Kao. Optimal Search for Parameters in Monte Carlo Simulation for Derivative Pricing. In *Proceedings of the IEEE Conference on Computational Intelligence for Financial Engineering & Economics* (CIFEr'14), 2014, pp. 384–390. (full paper)
- **Chuan-Ju Wang**, Ming-Feng Tsai, Tse Liu, and Chin-Ting Chang. Financial Sentiment Analysis for Risk Prediction. In *Proceedings of the 6th International Joint Conference on Natural Language Processing* (IJCNLP'13), 2013, pp. 802–808. (short paper, acceptance rate: 38%)
- Ming-Feng Tsai and **Chuan-Ju Wang**. Risk Ranking from Financial Reports. In *Proceedings of the 35th annual European Conference on Information Retrieval* (ECIR'13), 2013, pp. 804–807. (short paper, acceptance rate: 30%)
- Ming-Feng Tsai and **Chuan-Ju Wang**. Visualization on Financial Terms via Risk Ranking from Financial Reports. In *Proceedings of the 24th International Conference on Computational linguistics* (Coling'12), 2012, pp. 447–452. (demo paper)
- **Chuan-Ju Wang**, Tian-Shyr Dai, and Yuh-Dauh Lyuu. A Multi-Phase, Flexible, and Accurate Lattice for Pricing Complex Derivatives on Multiple Market Variables. In *Proceedings of the IEEE Conference on Computational Intelligence for Financial Engineering & Economics* (CIFEr'12), 2012, pp. 1–8. (full paper, **best paper award**)
- Tian-Shyr Dai, **Chuan-Ju Wang**, Yuh-Dauh Lyuu. Evaluating Corporate Bonds with General Liability Structures and Bond Covenants under the Jump-Diffusion. *The 2011 Financial Management Association Annual Meeting* (FMA'11), 2011. (top conference in finance)
- **Chuan-Ju Wang**, Tian-Shyr Dai, Yuh-Dauh Lyuu, and Yen-Chun Liu. An Efficient and Accurate Lattice for Pricing Derivatives under a Jump-Diffusion Process. *The 2009 Financial Management Association European Conference* (FMA Euro'09), 2009. (top conference in finance)
- **Chuan-Ju Wang**, Tian-Shyr Dai, Yuh-Dauh Lyuu, and Yen-Chun Liu. An Efficient and Accurate Lattice for Pricing Derivatives under a Jump-Diffusion Process. In *Proceedings of the 24th annual ACM Symposium on Applied Computing* (SAC'09), 2009, pp. 428–432. (full paper, acceptance rate: 29%)

RESEARCH PROJECTS

- Financial Unstructured Data Analysis, Understanding, and Applications, MOST Research Project (MOST 107-2628-E-001-006-MY3), 2018/08/01-2021/07/31. [PI]
- A Unified Framework for Processing and Understanding Heterogeneous Data for Intelligent Recommendation, MOST Research Project (MOST 106-3114-E-002-007-, 107-2218-E-002-061-), 2017/06/01-2019/05/31. [Co-PI]
- Intelligent OTC Trading and Robo-advising System using Multimodal Big-data Analytics and Distributed Blockchain Computation, MOST Research Project (MOST 106-3114-E-009-011-, 107-2218-E-009-052-), 2017/06/01-2019/05/31. [Co-PI]
- Path-Dependent Financial Instruments Evaluation and Analysis on the Nonlinearity/Approximation Errors (II), MOST Research Project (MOST 106-2221-E-001-003-), 2017/08/01-2018/07/31. [PI]
- Heterogeneous Big Data Embedding for Recommender Systems, MOST Research Project (MOST 106-2221-E-004-009-MY2), 2017/08/01-2019/07/31. [Co-PI]

- Path-Dependent Financial Instruments Evaluation and Analysis on the Nonlinearity/Approximation Errors, MOST Research Project (MOST 105-2221-E-001-035-), 2016/08/01-2017/07/31. [PI]
- Word Sentiment Analysis and Lexicon Expansion via Deep Learning for Financial Risk Predictions, MOST Research Project (MOST 104-2221-E-004-010-), 2015/08/01-2016/07/31. [Co-PI]
- Optimal Search for Parameters in Monte Carlo Simulation with Applications in Finance, MOST Research Project (MOST 102-2221-E-133-001-MY3), 2013/08/01-2016/07/31. [PI]
- Multivariate Lattice Construction and Its Applications, NSC Research Project (NSC 100-2218-E-133-001-MY2), 2011/09/01-2013/10/31. [PI]

INDUSTRIAL PROJECTS

- On the Construction of the Embedding Space of Titles, Text, and the Meta Data from Crawled Corpus, KKStream, 2018/12-2019/08. [PI]
  電視劇與其評論情緒字詞及後設資料之表示式空間建構，香港商科科串流股份有限公司台灣分公司。
- Product Recommendation and Customer Status Prediction Using Customer Profile Data, Cathay Financial Holding Co. Ltd, 2017/08/01-2018/10/31. [PI]
  基於客户歷程資料之產品推薦及客户未來狀態預測，國泰金控。
- Valuation of zero coupon callable bonds, Taipei Exchange, 2016/10/01-2017/07/31. [Co-PI]
  建立美元零息可贖回國際債券公平價格評價模型，財團法人中華民國證券櫃檯買賣中心。
- User Topic Modeling Based on Web Browsing Logs, Appier, 2016/08/01-2017/01/31. [PI]
  基於使用者瀏覽網頁資料之文字探勘主題模型，沛星互動科技股份有限公司。

PROFESSIONAL SERVICE

- Editorial Board Member: Frontiers in Big Data, Journal of Finance Research, and Financial Forum
- Sponsor Chair: TAAI'17
- Preparation Committee: ICGA'18
- Session Chair: CIFEr'14
- Program Committee Member: IJCAI'19, SIGIR'19, ECONLP'19, AAAI'18, AAAI-demo'18, ICDM-GRLA'18, IJCAI-ECAI'18, ACL-ECONLP'18, NLPCC'17
- Reviewers: Frontiers in Big Data, Knowledge-Based Systems, Algorithms, European Journal of Operational Research, Computers and Electronics in Agriculture, Finance Research Letters, IEEE Computational Intelligence Magazine, Data, Intelligent Systems in Accounting, Finance and Management, Applied Economics Letters, ICASSP'19, ECONLP'19, AAAI-demo'18, AAAI'18, ACL-ECONLP'18, IJCAI-ECAI'18, NLPCC'17, CIKM'16, WINE'14

REFERENCES

Prof. Yuh-Dauh Lyuu
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Prof. Ming-Yang Kao
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