

## **TEE Chyng Wen**

Lee Kong Chian School of Business  
Singapore Management University (SMU)  
50 Stamford Road  
Singapore 178899

Email: cwtee@smu.edu.sg  
Office Phone: (+65) 68280819



## **Education**

PhD, University of Cambridge, Great Britain, 2006  
Title: Vertically-Coupled Microring Architecture for Large-Scale Active-Passive Integration of Photonic Circuits  
Supervisor: Professor Richard Penty  
Thesis Committee Chair & Internal Examiner: Professor Andrew Flewitt  
External Examiner: Professor Peter G R Smith  
Advisor: Professor Ian White

Bachelor of Engineering, Nanyang Technological University, Singapore, 2003

## **Academic Appointments**

Associate Professor of Quantitative Finance (Practice), Lee Kong Chian School of Business, SMU, Jan 2018 - Present

Assistant Professor of Quantitative Finance (Practice), Lee Kong Chian School of Business, SMU, Jul 2012 - Dec 2017

## **Academic Administrative Positions**

Academic Director, Master of Science in Quantitative Finance, Lee Kong Chian School of Business, SMU, Jan 2016 - Present

## **Awards and Honors**

Dean's Teaching Honor List, Lee Kong Chian School of Business, 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014

Dean's PG Teaching Honor List, Lee Kong Chian School of Business, 2021, 2020, 2019

Research Paper Award, 26th Conference on the Theories & Practices of Securities and Financial Markets, 2018

Dean's Impact Award, Lee Kong Chian School of Business, 2017

Teaching Excellence in Postgraduate Professional Programmes Award, Centre for Teaching Excellence, 2017

Journal of Financial Studies Award (2015), Journal of Financial Studies, 2015

Most Promising Teacher in Teaching Excellence Awards 2014, Centre for Teaching Excellence, 2014

Cambridge Commonwealth Scholar, Cambridge Commonwealth Trust, University of Cambridge, 2004

## RESEARCH

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### Research Interests

Efficient Derivative Pricing Models  
 Risk Management & Hedging Strategies  
 Quantitative High Frequency Trading Algorithms  
 Machine Learning & Financial Applications

### Publications

#### Journal Articles [Refereed]

- A Black-Scholes user's guide to the Bachelier model, by CHOI, Jaehyuk; KWAK, Minsuk; TEE, Chyng Wen; WANG, Yumeng. (2022). *Journal of Futures Markets*, 42 (5), 959-980. <https://doi.org/10.1002/fut.22315> (Published)
- Volatility timing under low-volatility strategy, by NEO, Poh Ling; TEE, Chyng Wen. (2021). *Journal of Portfolio Management*, 48 (1), 1-14. (Published)
- A unified market model for swaptions and constant maturity swaps, by TEE, Chyng Wen; KERKHOF, Jeroen. (2021). *International Journal of Theoretical and Applied Finance*, 24 (4), 1-31. (Published)
- Swaption portfolio risk management: Optimal model selection in different interest rate regimes, by NEO, Poh Ling; TEE, Chyng Wen. (2019). *Journal of Derivatives*, 27 (2), 81-107. <https://doi.org/10.3905/jod.2019.1.083> (Published)
- Volume information in Nikkei and TOPIX futures transactions, by TEE, Chyng Wen; TING, Christopher. (2017). *Journal of Financial Studies*, 25 (4), 1-42. [https://doi.org/10.6545/JFS.2017.25\(4\).1](https://doi.org/10.6545/JFS.2017.25(4).1) (Published)
- Variance risk premiums of commodity ETFs, by TEE, Chyng Wen; TING, Christopher. (2017). *Journal of Futures Markets*, 37 (5), 452-472. <https://doi.org/10.1002/fut.21802> (Published)
- Performance control and risk calibration in the Black-Litterman model, by TEE, Chyng Wen; HUANG, Shirley; LIM, Kian Guan. (2017). *Journal of Portfolio Management*, 43 (3), 126-135. <https://doi.org/10.3905/jpm.2017.43.3.126> (Published)
- A novel intra-cavity lens design for compact high efficiency tapered laser diodes, by Lau, F. K.; TEE, Chyng Wen; Penty, R. V.; White, I. H.; Michel, N.; Krakowski, M.. (2007). *IEEE Photonics Technology Letters*, 19 (4), 203-205. <https://doi.org/10.1109/LPT.2006.890105> (Published)
- Non-critical waveguide alignment for vertically-coupled microring using a mode-expanded bus architecture, by TEE, Chyng Wen; Williams, K. A.; Penty, R. V.; White, I. H.. (2006). *IEEE Photonics Technology Letters*, 18 (20), 2129-2131. <https://doi.org/10.1109/LPT.2006.883199> (Published)
- Fabrication-tolerant active-passive integration scheme for vertically-coupled microring resonators, by TEE, Chyng Wen; WILLIWAMS, Kevin A.; PENTY, Richard V.; WHITE, Ian H.. (2006). *IEEE Journal of Selected Topics in Quantum Electronics*, 12 (1), 108-116. <https://doi.org/10.1109/JSTQE.2005.862947> (Published)
- Transient response of ARROW VCSELs, by TEE, Chyng Wen; Yu, S. F.; Penty, R. V.; White, I. H.. (2005). *IEEE Journal of Quantum Electronics*, 41 (2), 140-147. <https://doi.org/10.1109/JQE.2004.839713> (Published)
- Transverse-leaky-mode characteristics of ARROW VCSELs, by TEE, Chyng Wen; Yu, S. F.; Chen, N. S.. (2004). *Journal of Lightwave Technology*, 22 (7), 1797-1804. <https://doi.org/10.1109/JLT.2004.831091> (Published)

Suppression of polarization switching in birefringent antiresonant reflecting optical waveguide vertical-cavity surface-emitting lasers, by Chen, N. S.; Yu, S. F.; TEE, Chyng Wen. (2004). *IEEE Photonics Technology Letters*, 16 (3), 711-713. <https://doi.org/10.1109/LPT.2004.823748> (Published)

Design and analysis of cylindrical antiresonant reflecting optical waveguide, by TEE, Chyng Wen; Yu, S. F.. (2003). *Journal of Lightwave Technology*, 21 (12), 3379-3386. <https://doi.org/10.1109/JLT.2003.820040> (Published)

Design of antiresonant-reflecting optical waveguide-type vertical-coupled surface-emitting lasers using transfer matrix method, by TEE, Chyng Wen; Tan, C. C.; Yu, S. F.. (2003). *IEEE Photonics Technology Letters*, 15 (9), 1231-1233. <https://doi.org/10.1109/LPT.2003.816116> (Published)

### Book Chapters

Understanding the quantitative finance industry in Asia, by TEE, Chyng Wen; TING, Christopher Hian Ann. (2012). In Katie Petito (Ed.), *QuantNet 2013-2014: International Guide to Programs in Financial Engineering* (pp. 49-52) New York: QuantNet.com. <http://d36av5f9zaworl.cloudfront.net/QuantNetGuide.pdf> (Published)

### Conference Proceedings

Biclustering via mixtures of regression models, by VELU, Raja P.; ZHOU, Zhaoque; TEE, Chyng Wen. (2019.0). *19th International Conference on Computational Science, ICCS 2019, Faro, Portugal, 2019 June 12-14*, (pp. 533-549) Faro, Portugal: Springer Verlag. [https://doi.org/10.1007/978-3-030-22741-8\\_38](https://doi.org/10.1007/978-3-030-22741-8_38) (Published)

Managing swaption portfolio risk under different interest rate regimes, by NEO, Poh Ling; TEE, Chyng Wen. (2018.0). *SFM 2018: Conference on the Theories and Practices of Securities and Financial Markets, December 7-8*, (pp. 1-31) Kaohsiung, Taiwan: SFM. (Published)

Commonality: A longitudinal study, by VELU, Raja; ZHOU, Zhaoque; TEE, Chyng Wen. (2018.0). *SFM 2018: Proceedings of the 26th Conference on the Theories and Practices of Securities and Financial Markets, December 7-8*, (pp. 1-34) Kaohsiung, Taiwan: SFM. (Published)

Volume information in Nikkei and TOPIX futures transactions, by TEE, Chyng Wen; TING, Christopher. (2015.0). *SFM 2015: Conference on the Theories and Practices of Securities and Financial Markets, December 11-12*, (pp. 1-40) Kaohsiung, Taiwan: SFM. (Published)

Wafer-bonded active/passive vertically coupled microring lasers, by Hamacher, M.; Heidrich, H.; Troppenz, U.; Syvridis, D.; Alexandropoulos, D.; Mikroulis, S.; Kapsalis, A.; TEE, Chyng Wen; Williams, K. A.; Dragoi, A.; Alexe, M.; Cristea, D.; Kusko, M. (2008.0). *Proceedings of SPIE: Integrated Optoelectronic Devices 2008, San Jose*, (pp. 1-8) Bellingham, WA: SPIE. <https://doi.org/10.1117/12.762507> (Published)

Vertically coupled GalnAsP/InP microring lasers fabricated by using full wafer bonding, by Heidrich, H.; Hamacher, M.; Troppenz, U.; Syvridis, D.; Alexandropoulos, D.; Mikroulis, S.; TEE, Chyng Wen. (2007.0). *2007 33rd European Conference and Exhibition of Optical Communication ECOC: Berlin, September 16-20: Proceedings*, (pp. 1-2) Piscataway, NJ: IEEE. (Published)

Vertically coupled microring laser devices based on InP using BCB waferbonding, by Hamacher, M.; Troppenz, U.; Heidrich, H.; Dragoi, V.; Kapsalis, A.; Syvridis, D.; TEE, Chyng Wen. (2007.0). *2007 European Conference on Lasers and Electro-Optics and the International Quantum Electronics Conference, Munich, Germany, June 17-22: Proceedings*, (pp. 1-8) Piscataway, NJ: IEEE. <https://doi.org/10.1109/CLEOE-IQEC.2007.4385912> (Published)

Integrated 10th Order Fresnel lens design for beam quality enhancement in tapered laser diode, by Lau, F. K.; TEE, Chyng Wen; Kwok, C. H.; Pentz, R. V.; White, I. H.; Michel, N.; Krakowski, M.. (2007.0). *Conference on Lasers and Electro-Optics, CLEO 2007: Baltimore, Maryland, May 6-11: Proceedings*, (pp. 1-2) Washington, DC: Optical Society of America. <https://doi.org/10.1109/CLEO.2007.4452688> (Published)

Vertically-coupled microring laser array for dual-wavelength generation, by TEE, Chyng Wen; Williams, K. A.; Pentz, R. V.; White, I. H.; Hamacher, M.; Troppenz, U.; Heidrich, H. (2007.0). *2007 Conference on Lasers and Electro-Optics CLEO: Baltimore, Maryland, May 6-11: Proceedings*, (pp. 1-2) Washington, DC: Optical Society of America. <https://doi.org/10.1109/CLEO.2007.4452687> (Published)

- Compact vertically-coupled microring laser array dual-wavelength source for Terahertz mode beating, by TEE, Chyng Wen; WILLIAMS, K. A.; PENTY, R. V.; WHITE, I. H.; HAMACHER, M.; TROPPEZ, U.; HEIDRICH, H.; et al. (2007.0). *European Conference on Integrated Optics 2007, April 24-26, Ghent, Belgium: Proceedings*, (pp. 1-4) Ghent: ECIO. (Published)
- Mode-expanded bus architecture for non-sensitive waveguide alignment in vertically-coupled microring, by TEE, Chyng Wen; Williams, K. A.; Penty, R. V.; White, I. H.; Hamacher, M.; Troppenz, U.; Heidrich, H. (2006.0). *2006 European Conference of Optics Communications ECOC: Cannes, September 24-28: Proceedings*, (pp. 1-2) Piscataway, NJ: IEEE. <https://doi.org/10.1109/ECOC.2006.4801189> (Published)
- Beam profiling of quantum dot VCSEL for 10Gb/s data transmission, by CHU, Y.; Thompson, M. G.; Ingham, J. D.; TEE, Chyng Wen; Lau, F. K.; Penty, R. V.; White, I. H. (2006.0). *2006 European Conference of Optical Communications ECOC: 24-28 September, Cannes: Proceedings*, (pp. 1-2) Piscataway, NJ: IEEE. <https://doi.org/10.1109/ECOC.2006.4801268> (Published)
- Focused-ion-beam post-processing technology for active devices, by TEE, Chyng Wen; Lau, F. K.; Zhao, X.; Penty, R. V.; White, I. H.. (2006.0). *Proceedings of SPIE: Asia-Pacific Optical Communications, 2006, Gwangju, South Korea*, (pp. 1-12) Bellingham, WA: SPIE. <https://doi.org/10.1117/12.691640> (Published)
- Reduced risk of catastrophic optical mirror damage in high power tapered lasers using intracavity diverging lens, by TEE, Chyng Wen; LAU, F. K.; Zhao, X.; Penty, R. V.; White, I. H.; Calligaro, M.; Parillaud; Michel, N.; Krawowski, M.. (2006.0). *Proceedings of SPIE: Photonics Europe 2006, Strasbourg, France*, Bellingham, WA: SPIE. <https://doi.org/10.1117/12.662653> (Published)
- Phase correcting element for intra-cavity laser beam control, by Lau, F. K.; TEE, Chyng Wen; ZHAO, X.; Penty, R. V.; White, I. H.; Michel, N.; Krakowski, M. (2006.0). *OFC/NFOEC 2006: Optical Fiber Communication Conference, National Fiber Optic Engineers Conference: Anaheim, March 5-11: Proceedings*, Piscataway, NJ: IEEE. <https://doi.org/10.1109/OFC.2006.215564> (Published)
- Monolithic integration of collimating Fresnel lens for beam quality enhancement in tapered high power laser diode, by Lau, F. K.; TEE, Chyng Wen; Zhao, X.; Williams, K. A.; Penty, R. V.; White, I. H.; Calligaro, M.; Lecomte, M.; Parillaud, O.; Michel, N.; Krakowski, M. (2006.0). *Proceedings of SPIE: Lasers and Applications in Science and Engineering 2006, San Jose*, (pp. 1-8) Bellingham, WA: SPIE. <https://doi.org/10.1117/12.648047> (Published)
- A novel monolithic beam steering high power transmitter for low cost free space optical wireless links, by Lau, F. K.; Zhao, X.; TEE, Chyng Wen; Penty, R. V.; White, I. H.; Calligaro, M.; Lecomte, M.; Parillaud, O.; Michel, N.; Krakowski, M.. (2006.0). *Proceedings of SPIE: Lasers and Applications in Science and Engineering 2006, San Jose*, (pp. 1-8) Bellingham, WA: SPIE. <https://doi.org/10.1117/12.648058> (Published)
- Numerical analysis of microring resonator obtained by wafer-bonding technology, by Kusko, M.; Alexandropoulos, D.; TEE, Chyng Wen; Kapsalis, A.; Cristea, D.; Syvridis, D. (2005.0). *Proceedings of SPIE: Congress on Optics and Optoelectronics 2005, Warsaw, Poland*, (pp. 349-360) Bellingham, WA: SPIE. <https://doi.org/10.1117/12.623000> (Published)
- Focusing effect in multimode vertical cavity surface emitting lasers by parallel trenches surface profiling, by TEE, Chyng Wen; Zhao, X.; Ingham, J. D.; Penty, R. V.; White, I. H.. (2005.0). *2005 Pacific Rim Conference on Lasers and Electro-Optics: Tokyo, Japan, 30 July - 2 August: Proceedings*, (pp. 286-288) Piscataway, NJ: IEEE. <https://doi.org/10.1109/CLEOPR.2005.1569420> (Published)
- Novel regrowth-free vertical active-passive integration scheme with improved fabrication tolerance, by TEE, Chyng Wen; Williams, K. A.; Penty, R. V.; White, I. H.; Troppenz, U.; Hamacher, M.; Heidrich, H. (2005.0). *2005 Quantum Electronics and Laser Science Conference QELS: May 22-27, Baltimore: Proceedings*, (pp. 948-950) Washington, DC: Optical Society of America. <https://doi.org/10.1109/QELS.2005.1548992> (Published)
- All-optical multi wavelength bypass-exchange switching using a hybrid-integrated Mach-Zehnder switch, by Yow, C. K.; Chai, Y. J.; TEE, Chyng Wen; McDougall, R.; Penty, R. V.; White, I. H. (2004.0). *ECOC 2004: 30th European Conference on Optical Communication: September 5-9, Stockholm, Sweden: Proceedings*, Stockholm: Kista Photonics Research Center. (Published)
- Polarization mode beating and self-sustained pulsation in optically pumped birefringent vertical cavity surface emitting lasers, by TEE, Chyng Wen; Yu, S. F.; Penty, R. V.; White, I. H.. (2004.0). *NUSOD '04: Proceedings of the 4th International Conference on Numerical Simulation of Optoelectronic Devices: 24-26 August, 2004, Santa Barbara*, (pp. 61-62) Piscataway, NJ: IEEE.

<https://doi.org/10.1109/NUSOD.2004.1345153> (Published)

### Conference Papers

Volatility timing under low-volatility strategy, by NEO, Poh Ling; TEE, Chyng Wen. (2019.0). *UBS Quant Conference, Shanghai, China, 2019 September 20-21*, Shanghai, China. (Presented)

Euro swaptions and constant maturity swaps: Trading opportunities in Euro swaption market revamp, by TEE, Chyng Wen. (2018.0). *UBS China Singapore Quant Conference 2018, October 10*, Beijing. (Presented)

A payoff consistent approach to cash-settled swaptions and CMS replication, by TEE, Chyng Wen; KERKHOF, Jeroen. (2014.0). *Bachelier Finance Society 8th World Congress 2014, June 2-6*, Brussels, Belgium. (Presented)

Vertically coupled and wafer-bonded microring resonators on InP, by Hamacher, M.; Troppenz, U.; Heidrich, H.; Dragoi, V.; Kapsalis, A.; Syvridis, D.; TEE, Chyng Wen. (2007.0). *European Semiconductor Laser Workshop 2007, September 14-15*, Berlin. (Presented)

Ion beam post processing of high power gain-guided tapered laser for beam quality enhancement, by TEE, Chyng Wen; Lau, F. K.; Zhao, X.; Wonfor, A.; Williams, K. A.; Penty, RV; White, IH. (2005.0). *European Semiconductor Laser Workshop, 2005 September*, Glasgow, UK. (Presented)

Application of surface-relief technique to low-cost, gain-guided VCSELs for enhanced transverse mode control, by TEE, Chyng Wen; Zhao, X.; Ingham, J. D.; Penty, R. V.; White, I. H. (2005.0). *European Conference on Integrated Optics 12th ECIO 2005, April 6-8*, Grenoble, France. (Presented)

Ion beam post processing of low cost 850nm VCSELs for transverse mode control, by TEE, Chyng Wen; Zhao, X.; Ingham, J. D.; Penty, R. V.; White, I. H.. (2005.0). *Semiconductor and Integrated Optoelectronics Conference 19th SIOE 2005, March*, Cardiff, UK. (Presented)

### Magazine Articles

A review of HFT & flash crashes, by TING, Christopher; TEE, Chyng Wen. (2014, January). *CISI Securities and Investment Review*, (1), (Published)

### **Working Papers**

*Why commonality persists?*, by VELU, Raja; ZHOU, Zhaoque; TEE, Chyng Wen. (2020). SSRN. <http://doi.org/10.2139/ssrn.3536015> (Published)

*Mini Flash Crashes in S&P 500 Equities*, by TEE, Chyng Wen; TING, Christopher Hian Ann. (2014). (Published)

*Model-Free Single-Name Volatility Indices of Stocks and Their Volatility Term Structures*, by TEE, Chyng Wen; TING, Christopher Hian Ann. (2013). (Published)

*A Payoff Consistent Approach to Cash-Settled Swaptions and Constant Maturity Swaps Replication*, by TEE, Chyng Wen; Kerkhof, Jeroen. (2013). (Published)

### **Research Grants**

#### Singapore Management University

Investigation of High-Speed Trading and Market Dynamics using Big Data, SMU Internal Grant, Ministry of Education (MOE) Tier 1 , PI (Project Level): TEE Chyng Wen , Co-PI (Project Level): Christopher TING Hian Ann, 2015, S\$36,000

### Other Institutions

High Frequency Trading and Flash Crashes, Sim Kee Boon Institute for Financial Economics Research Grant, Sim Kee Boon Institute PI (Project Level): TEE Chyng Wen, 2014, SGD20,000

## TEACHING

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### Courses Taught

#### Singapore Management University

##### Undergraduate Programmes :

- Investment Statistics
- Probability and Finance Theory
- Stochastic Calculus and Finance Theory
- Stochastic Finance
- Structured Finance
- Structured Products Sales and Trading

##### Postgraduate Professional Programmes :

- Advanced Stochastic Modelling
- Analysis and Applications of Derivatives
- Econometrics of Financial Markets
- Fixed Income Securities
- Machine Learning
- Mathematics for Quantitative Professionals
- Numerical Methods
- Quantitative Methods & Statistics
- Quantitative Trading
- Research Methods for Quantitative Professionals
- Risk Analysis
- Simulation Techniques and Financial Modelling
- Stochastic Modelling in Finance

## OTHER ACADEMIC AND PROFESSIONAL ACTIVITIES

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### Media Contributions and Citations

Wanted: Finance graduates with AI and programming skills, Financial Times, 17 Jun 2019  
<https://www.ft.com/content/6918ff26-70e3-11e9-bf5c-6eeb837566c5>

**UNIVERSITY SERVICE**

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**Singapore Management University**

Committee Member, Faculty Advisory Committee (Teaching and Learning), Jan 2018 - Dec 2021