



Dr. Tzu-Chi Chan (Watson)

Dr. Tzu-Chi Chan (Watson) received his Ph.D. degree from National Tsing Hua University in 2012, in Power mechanical engineering and thereafter joined the National Formosa University (NFU), Taiwan. He served at the Precision Machinery Research and Development Center (PMC), a research organization in precision machinery field funded by Republic of China government and several machinery companies. He obtained Ministry of Economic Affairs excellent research personnel in 2003. He also served at the Smart Machinery Promotion Office as the Vice Director. He is currently an Assistant Professor of the Department of mechanical and computer-aided engineering at National Formosa University.

Dr. Tzu-Chi Chan's (Watson) main research interests are in the interrelated areas of machine tool structure analysis, precision machine design, finite element analysis, machine dynamics, metal cutting processes, smart manufacturing system and micro/meso-scale manufacturing. He is a recipient of two Best Paper awards at the IEEE conferences. Furthermore, he received the 12th Chinese Society of Mechanism and Machine Theory (CSMMT) BEST PAPER AWARD and in 2009, the 12th Chinese Society of Mechanism and Machine Theory (CSMMT), Professor Zeng Jinhuan's Commemorative Paper Award. Dr. Tzu-Chi Chan (Watson) is an author of 56 research articles, 1 book, and 15 patents.

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## Degrees

School	Nation	Department	Degree	Date
National Tsing Hua University	Taiwan, R.O.C.	Power Mechanical Engineering	Ph.D.	2006/08~2012/01

## Experience

Organization	Title	Department	Date
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National Formosa University	Assistant Professor	Department of mechanical and computer-aided engineering	2018/08~ Present
Smart Machinery Promotion Office	Vice Director		2017/02~2018/07
Precision Machinery Research and Development Center (PMC)	Director, vice director, engineer	Machine Tool Industry Development division, Project management office, etc..	2000/06~2018/07

## Research Interest

1. Precision Machine Design
2. Finite Element Analysis and Testing
3. Machine Dynamics
4. Smart Manufacturing System

## Patent

Patent	Patent number	Country	Period
針頭處理裝置 (詹炳熾、劉旺林、郭建勳、詹子奇)	新型第 208621 號	Taiwan, R.O.C.	2003/06/21~2014/07/10
超微細研磨與分散裝置 (劉旺林、詹子奇、簡國諭)	新型第 205455 號	Taiwan, R.O.C.	2003/08/11~2014/12/30
離心沉降式之粉粒體粒徑線上量測分析裝置 (張立信、武東星、鍾添淦、詹子奇、簡國諭)	發明第 205407 號	Taiwan, R.O.C.	2004/06/21~2023/08/28
粒子表面電位之線上量測與分析裝置 (鍾添淦、劉旺林、詹子奇)	發明第 I282586 號	Taiwan, R.O.C.	2007/06/21~2024/08/17
黏著性之奈米光觸媒組成物之製備方法，以及由之所生成的產物及其用途 (鍾添淦、張昫揚、劉旺林、陳志豪、詹炳熾、詹子奇)	發明第 I271215 號	Taiwan, R.O.C.	2007/01/21~2024/05/13

製作奈米碳管場效發射顯示器之陰極板及奈米碳管場效發射顯示器的方法 (蔡宜壽 鍾添淦 劉旺林 詹子奇)	發明第 I240295 號	Taiwan, R.O.C.	2005/09/21~2024/04/1 1
	發明第 445603 號	People's Republic of China	2004/11/22~2024/11/2 2
製作奈米碳管場效發射顯示器之陰極板及奈米碳管場效發射顯示器的方法 (蔡宜壽、鍾添淦、劉旺林、詹子奇)	發明第 I248630 號	Taiwan, R.O.C.	2006/02/01~2024/05/1 8
	發明第 455368 號	People's Republic of China	2004/11/22~2024/11/2 2
半開放式珠磨機 (簡國諭、張昀揚、陳志豪、劉旺林、詹子奇)	發明第 I277446 號	Taiwan, R.O.C.	2007/04/01~2024/05/1 2
場發射雙面顯示器、雙面背光模組、多面液晶顯示器、雙面照明設備及其等的製作方法 (蔡宜壽、鍾添淦、易子民、劉旺林、詹子奇)	發明第 I262530 號	Taiwan, R.O.C.	2006/09/21~2025/09/1 1
自動平衡之工具機刀把(詹子奇、伍尚宏、烏克里)	發明第 I688449 號	Taiwan, R.O.C.	2020/03/21~2039/02/1 9
自動平衡之精密螺帽(詹子奇、伍尚宏)	發明第 I674943 號	Taiwan, R.O.C.	2019/10/21~2039/02/1 9
SELF-BALANCING LINE SHAFT OF MACHINE TOOL (TZU-CHI CHAN 、SHANG-HUNG WU)	US 10,953,506 B2	USA	2021/03/23~
工具機主軸診斷方法 (詹子奇、王昱荃)	發明專利 (發明第 I749742 號)	Taiwan, R.O.C.	2021/12/11~2040/08/3 0
環境監視系統 (詹子奇、林欣賢)	發明專利 (發明第 I747390 號)	Taiwan, R.O.C.	2021/11/21~2040/07/2 0

ENVIRONMENT MONITORING SYSTEM (TZU-CHI CHAN, HSIN-HSIEN LIN)	US 11,216,671 B1	USA	2022/01/04~
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## Publication List

### A. Journal Paper

1. **Tzu-Chi Chan\***, Y. P. Hong, Jia-Hong Yu, Effect of moving structure on the spatial accuracy and compensation of the coordinate measuring machine, *International Journal of Precision Engineering and Manufacturing* 22,1551-1561, 2021. <https://doi.org/10.1007/s12541-021-00560-8>. (SCI 2020 IF 2.106, Rank 67/133)
2. **Tzu-Chi Chan\***, Keng-Chang Chang, Shinn-Liang Chang, Po-Hui Chiang, Simulation modeling and experimental verification of moving column precision grinding machine, *Journal of the Chinese Institute of Engineers*,2021. <https://doi.org/10.1080/02533839.2021.1983464> (SCI 2020 IF 1.15, Rank 72/90)
3. **Tzu-Chi Chan\***, Hsin-Hsien Lin, Sabbella Veera Venkata Satyanarayana Reddy, Prediction model of machining surface roughness for five-axis machine tool based on machine-tool structure performance, *International Journal of Advanced Manufacturing Technology*. 18 (SCI 2020 IF 3.226, Rank 24/50)
4. **Tzu-Chi Chan\***, Ze-Kai Jian, and Yu-Chuan Wang, Study on the Digital Intelligent Diagnosis of Miniature Machine Tools, *Applied Sciences*, 11(18), 8372 2021. <https://doi.org/10.3390/app11188372> (SCI 2020 IF 2.679, Rank 38/90)
5. **Tzu-Chi Chan\***, Yu-Ping Hong, Yu-Chuan Wang and Shang-Hung Wu, Optimization Design of the Composite Structure of Linear Motor Machine Tools, *Journal of Mechanics Engineering and Automation*, Volume 9, Number 7, 2019. DOI: 10.17265/2159-5275/2019.07.001 (國際期刊)
6. Jenn-Yih Chen, **Tzu-Chi Chan\***, Bean-Yin Lee, Chiao-Yun Liang, Prediction Model of Cutting Edge for End Mills Based on Mechanical Material Properties, *The International Journal of Advanced Manufacturing Technology* 107, pp 2939–2951 (2020). (SCI 2020 IF: 3.226, Rank 24/50)
7. 詹子奇, 台日觀點-製造業現場的 IOT 化技術之現況與未來, *Taiwan Machinery Monthly*, February 2019.(國內期刊)
8. C. K. Sung, **T. C. Chan**, Paul C.-P. Chao, and C. H. Lu, Influence of External Excitations on Ball Positioning of an Automatic Balancer, *Mechanism and Machine Theory*, vol. 69, pp. 115-216, 2013. (SCI Publication)
9. **T. C. Chan**, C.-K. Sung and Paul C.-P. Chao, 2012, Friction effect on ball positioning of an automatic balancer in optical disk drives, *Microsystem Technologies*, Vol.18, pp. 1343-1351, 2012. (SCI Publication)
10. **T. C. Chan**, C. K. Sung, Paul C.P. Chao, Non-linear suspension of an automatic ball balancer, *International Journal of Non-Linear Mechanics*, v 46, n 2, p 415-424, 2011. (SCI Publication)

11. Jiann-Cherng Su, Steven Y. Liang, Wang Lin Liu, **Tzu Chi Jan (T.C. Chan)**, Ceramic micro/nanoparticle size evolution in wet grinding in stirred ball mill, ASME Journal of Manufacturing Science and Engineering, 126, pp.779-786, Feb 2005. (SCI)
12. **詹子奇**, 智慧機械產業發展現況與展望, 證卷服務 666 期, pp.96-98, 2018 年 8 月。
13. **詹子奇**, 精密機械產業之現況與展望, 證卷服務 649 期, pp.100-101, 2016 年 5 月 15 日。
14. **詹子奇**, 工具機切削技術應用與發展, 機械月刊 486 期, pp.6-16, 2016 年 1 月。
15. **詹子奇**, 彰顯特色引領潮流--臺灣工具機產業轉型升級途徑之五, 機械月刊 459 期, pp. 84-95, 2013 年 10 月。
16. **詹子奇**, 太陽能製程設備產業之機會與挑戰, 工具機與零組件月刊, pp.38-42. Sep., 2009 NO.13
17. 劉旺林、**詹子奇**, 奈米粉體材料球磨設備開發技術, 產業奈米技術應用資訊園地, 2003 年 10 月。
18. 李怡蒼、吳彥達、**詹子奇**、郭建勳, 產業機械技術升級之應用介紹, 2002 機械&自動化工業年鑑, pp.219~227。
19. 張金隆、黃韋倫、**詹子奇**, 人造花崗岩技術 機械市場強心劑, 2001 年機械五金產業年鑑, pp.236~242。
20. 吳政憲、陳明飛、**詹子奇**、謝銘雄、張雅惠, PCB 成型機結構分析及改善研究, 大葉學報, 第 8 卷 第 1 期, pp.57~68, 1999 年 6 月。
21. 吳政憲、**詹子奇**、王焜潔, 高速化工具機結構靜動剛性分析與測試, 機械月刊 284 期, pp. 466-475, 1999 年 3 月。

## B. Conference Paper

1. **T.C. Chan**, The Development of Smart Manufacturing and Cases Study in Taiwan, IEEE INTERNATIONAL CONFERENCE ON ADVANCED MANUFACTURING, Yunlin, Taiwan on November 16~18, 2018. (EI)
2. **T.C. Chan**, Shang-Hong Wu, You-Ze Lin, Jenn-Yih Chen and B.-Y. Lee, Structural Analysis and Dynamic Testing of Mini Five-Axis Machine Tools, The 15th IFToMM World Congress June 30 – July 4, 2019, Krakow, Poland. (EI)
3. **Tzu-Chi Chan**, Keng- Chang Chang, Shinn- Liang Chang and Che-Ming Hu, Thermal Analysis and Experimental Verification of Moving Column High-precision Grinding Machine, The 8th International Conference of Asian Society for Precision Engineering and Nanotechnology (ASPEN 2019), November 12-15, 2019.
4. **Tzu-Chi Chan**, Yu-Ping Hong, Jyun-Sian Yang and Jia-Hong Yu, Static and Dynamic Performance Analysis of Horizontal Machine Tool Structure, The 8th International Conference of Asian Society for Precision Engineering and Nanotechnology (ASPEN 2019), November 12-15, 2019.
5. **Tzu-Chi Chan**, Shang-Hung Wu, Jyun-Sian Yang, Yu-Chuan Wang and Hsin-Hsien Lin, Machining Performance Prediction Technology of Five-Axis Machine Tools, 2019 IEEE Eurasia Conference on IOT, Communication and Engineering (IEEE ECICE 2019), October 3~6, 2019, Yunlin, Taiwan.
6. **詹子奇**、曾文璟、顧哲郢、劉建宏、黃宇陞、陳家宏, 小型加工機性能研究與智慧診斷應用, 中國機械工程學會第 36 屆全國學術研討會, 2019 年 12 月 7、8 日。
7. **Tzu Chi Chan**, Jyun Sian Yang, Optimized Design and Performance Study of High Speed

- Five Axis Machine Tools, Proceedings of the ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC/CIE 2020 August 16-19, 2020 , St. Louis, MO, USA.(EI)
8. 詹子奇、曾茵嶺、鄭創鍵、蔡宗宏、許勝豪、連冠歲、柯力綸，工具機聯網與智慧診斷技術，中國機械工程學會第三十七屆全國學術研討會論文集，中華民國一百零九年十一月二十日、十一月二十一日。
  9. 余佳虹、詹子奇，高階臥式車銑複合工具機靜動態設計分析，第 23 屆全國機構與機器設計學術研討會(CSMMT 2020)，中華民國 109 年 11 月 13 日。
  10. Tzu-Chi Chan, Hsin-Hsien Lin, Yu-Chuan Wang, Chia-Chuan Chang, Han-Huel Lin, Intelligent Diagnosis for Cutting Processes, 2nd IEEE Eurasia Conference on IOT, Communication and Engineering 2020 (IEEE ECICE 2020), October 23~25, 2020, Yunlin, Taiwan. (EI)
  11. Tzu-Chi Chan, Cheng-Hsiung Chen, Sinn-Liang Chang, Ukris Saragih, Design and Analysis of Novel High-Pressure Coolant External Turning Tool, 2nd IEEE Eurasia Conference on IOT, Communication and Engineering 2020 (IEEE ECICE 2020), October 23~25, 2020, Yunlin, Taiwan. (EI)
  12. 詹子奇、林翰暉、張家銓,LED 測試機之機電設計與虛實整合系統開發,中國機械工程學會第三十八屆全國學術研討會,2021/12/03~2021/12/04。
  13. 詹子奇、張家銓、林翰暉,工具機虛實設計分析與性能研究,中國機械工程學會第三十八屆全國學術研討會, 2021/12/03~2021/12/04。
  14. Tzu-Chi Chan; Chia - Chuan Chang; Han-Huei Lin, Augmented Reality intelligent interactive machine tool monitoring system,2021 International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS),2021/11/16~2021/11/19。
  15. 詹子奇;余佳虹,車銑複合工具機結構特性與空間精度研究,第 24 屆全國機構與機器設計學術研討會(CSMMT 2021),2021/10/29~2021/10/29。
  16. Tzu-Chi Chan; Jyun-De Li; Yi-Fan Su;Yi-Hao Chen; Zhong-Rui Chang; Teng-Chieh Chang; Chen-Yang Hung ;Chui-Chan Chiu; Arindam Dutta, Study on Desktop Smart Production Line and Diagnosis Technology, 3rd IEEE Eurasia Conference on IOT, Communication and Engineering 2021 (IEEE ECICE 2021),2021/10/29~2021/10/31.
  17. Tzu-Chi Chan, Bo-Hao Huang, Research on Cyber-Physical System of Machine Tool, 3rd IEEE Eurasia Conference on IOT, Communication and Engineering 2021 (IEEE ECICE 2021),2021/10/29~2021/10/31.
  18. Tzu-Chi Chan; Sai Vijay.M; Hsin-Hsien Lin; Jia-Hong Yu; Yu-Chuan Wang; Ukris Saragih; Study on Structure Characteristic of 3d Printing Machine, 2021 International Mechanical Engineering Congress & Exposition, Virtual Conference: November 1 – 5, 2021.
  19. Sung, C.K., Lu, C.H., Chan, T.C., Influence of external excitations on ball positioning of an automatic balancer, 19th International Congress on Sound and Vibration July 8-12, 2012, Vilnius, Lithuania, p 2408-2415. (國際研討會)

20. T. C. Chan, C. K. Sung, Paul C.P. Chao, Friction Effect on Ball Positioning of an Automatic Balancer in Optical Disk Drives, ASME Information Storage and Processing Systems Conference, Santa Clara, CA, USA, June 13-14, 2011. (EI Publication)
21. C. K. Sung, **T. C. Chan**, C. H. Lu, Paul C.P. Chao, Effects of external forces on ball positioning of an automatic ball balancer, The First IFToMM Asian Conference on Mechanism and Machine Science, October 21 - 25, 2010, Taipei, Taiwan. (國際研討會)
22. **T. C. Chan**, C. K. Sung, Paul C.P. Chao, and Y. M. Hung, Effects of rolling friction on ball positioning for an automatic ball balancer, International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC), San Diego, California, USA, Aug. 30 - Sep. 2, 2009. (國際研討會)
23. Wang Lin Liu, Chin E. Lin, Hsueh hung Wang, and **Tzu Chi Jan (T.C. Chan)**, Manufacturing processes for nano-particle milling system in wet grinding machine, Proceeding of Automation 2005 The Eighth International Conference on Automation Technology Taichung, Taiwan, May 5-6, 2005. (國際研討會)
24. Tung-Hsu (Tony) Hou , Chi-Hung Su, Hsu-Yang Chang, **Watson Chan(T.C. Chan)**, and Wan-Lin Liu, Setting the optimal parameters for a nano-particle milling process , IIE Annual Conference (IERC 2005) , May 14-18, 2005, Atlanta, USA. (國際研討會)
25. C. K. Sung, **T. C. Chan**, Survey of Investigations into the Dynamic Behavior of Automatic Ball Balancer, 第 16 屆中華民國全國機構與機器設計學術研討會, Nov. 1, 2013. (國內研討會)
26. **詹子奇**, 宋震國, 呂呈祥, Influence of External Forces on Ball Positioning of an Automatic Balancer, 第 14 屆中華民國全國機構與機器設計學術研討會, Nov. 4, 2011. (國內研討會)
27. **T. C. Chan**, C. K. Sung, Paul C.P. Chao, Precision ball positioning of an automatic balancer system, 第 12 屆中華民國全國機構與機器設計學術研討會, Nov. 6, 2009. (國內研討會)
28. **T. C. Chan**, C. K. Sung, Chang-Po Chao and Chun-Lung Huang, A study on the performance of ABB influenced by rolling friction, China Society for Mechanical Engineering 25th Conference, Taiwan, R.O.C., Nov. 22-23, 2008. (國內研討會)
29. 陳俊男、曾文甲、張昫揚、鍾添淦、**詹子奇**, 以單軸向臥式球磨法促進水系二氧化鈦懸浮體之分散, 2004 年中國材料科學學會論文, 2004 年 11 月。(國內研討會)
30. 張昫揚、劉旺林、陳志豪、**詹子奇**, 奈米微粒之研磨與分散製程參數研究, 中國工業工程學會九十二年度年會暨學術研討會論文, 2003 年 12 月。(國內研討會)
31. **詹子奇**、劉旺林、鍾添淦、簡國諭、張昫揚、陳志豪、劉廷芳, 奈米粉體材料球磨技術與粉體特性探討, 2003 年中國材料科學學會論文, 2003 年 11 月。(國內研討會)
32. 鍾添淦、劉旺林、**詹子奇**, 奈米級粉體之離心萃取分析, 2003 年中國材料科學學會論文, 2003 年 11 月。(國內研討會)
33. **詹子奇**、吳政憲, The application of finite element method in machine design and analysis, 2002 Taiwan Ansys User Conference, pp.133~139。(國內研討會)

34. 吳政憲、詹子奇、張雅惠,1999 年 12 月, ”工具機結構肋厚影響與性能改善分析”, 第二十二屆全國力學會議論文集, pp.528-535 (國內研討會)
35. 吳政憲、詹子奇、莊賀喬、王焜潔, 1999 年 7 月, ”高速化工具機結構剛性分析與設計改善”, 第十一屆全國自動化科技研討會論文集, pp.1043~1050。(國內研討會)

### **C. Book**

1. 詹子奇, 智慧機械產業發展與關鍵策略-臺灣智慧工具機技術與產業發展之盤點, 財團法人中技社專題報告 2017-08, pp.3-27~pp.3-38, 2017 年 12 月。

### **D. Honors & Awards**

1. 2003 Ministry of Economic Affairs excellent research people.
2. 2009 The 12th Chinese Society of Mechanism and Machine Theory (CSMMT), BEST PAPER AWARD.
3. 2009 The 12th Chinese Society of Mechanism and Machine Theory (CSMMT), Professor Zeng Jinhuan's Commemorative Paper Award
4. 2018 IEEE INTERNATIONAL CONFERENCE ON ADVANCED MANUFACTURING, BEST PAPER AWARD.
5. 2019 IEEE Eurasia Conference on IOT, Communication and Engineering, BEST PAPER AWARD.
6. 2021 3rd IEEE Eurasia Conference on IOT, Communication and Engineering 2021 (IEEE ECICE 2021), BEST CONFERENCE PAPER AWARD.

### **E. Service**

1. Reviewer for IEEE/ASME Transactions on Mechatronics.
2. Reviewer for Journal of Microsystem Technologies.
3. Reviewer for Journal of Mechanical Science and Technology
4. Technical Committee for Micromachines, International Federation for the Promotion of Mechanism and Machine Science.