江支弘 *Chih-Hung Chiang, Chaoyang University of Technology*

Professor Chih-Hung Chiang received his PhD from University of Colorado Boulder in 1994. His research arears include ultrasonics, infrared thermography, and vibration analysis. He is also affiliated with the Center for NDT of CYUT, where he is conducting research on nondestructive testing and evaluation of fiber reinforced polymer composites, AI-assisted vibration analysis, and dynamic monitoring of wind turbines.

Research project 2019~2024: *Nondestructive inspection of composite materials using heat analysis and infrared thermography* 複合材料非破壞檢測之熱學分析與紅外線熱影像法驗證 (108 年度 110~112 年度科技部專題計畫)

Affiliations

朝陽科技大學航空學院 *Dean, College of Aviation, Chaoyang University of Technology*

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Selected Publications

J1. Huang, Y., Chen, C.-L., Chiang, C.-H. (2023) Analyzing a series of thermal infrared images to identify defects using a hybrid approach that combines robust principal component analysis and image segmentation. ***NDT and E International***, 137, art. no. 102818, (DOI: 10.1016/j.ndteint.2023.102818) **(SCI)(Scopus)**

J2. Hidayat, M., Chiang, C.-H.*, Yen, M. (2023) Determination of the defect's size of multi-layer woven CFRP based on its temperature profile. ***International Journal of Applied Science and Engineering*** 20:3 (Scopus) (https://doi.org/10.6703/IJASE.202309_20(3).003)

J3. Prasad, S., Chiang, C.-H., Kumar, D., Kalra, S., Khandelwal, A. (2023) Robust and efficient feature-based method for structural health monitoring of large structures. ***Journal of Civil Structural Health Monitoring***, (DOI: 10.1007/s13349-023-00686-5)

J4. Kumar, D., Chiang, C.-H.*, Lin, Y.-C. (2022) Experimental vibration analysis of large structures using 3D DIC technique with a novel calibration method. ***Journal of Civil Structural Health Monitoring*** 12(2) 391-409. (SCI) (**Scopus**) (https://doi.org/10.1007/s13349-022-00549-5)

J5. Lee, M.-G., Lo, S.-L., Kan, Y.-C., Chiang, C.-H. (2022) Water quenched slag from incinerator ash used as artificial stone. ***Case Studies in Construction Materials*** 16 e00827 (DOI: 10.1016/j.cscm.2021.e00827)

J6. Chih-Hung Chiang*, Hung-Yu Tao, Yung-Chiang Lin (2021) Transient thermal analysis of layered media based on thermal quadrupoles. ***International Journal of Applied Science and Engineering*** 18:3 (Scopus) (DOI: 10.6703/IJASE.202106_18(3).001)

J7. Lin, Y-C., Chiang, C-H., Yu, C-P., Kumar, D., Hsu, K-T. (2021) Application of DIC method to modal vibration study for structure health monitoring of WT tower. ***International Journal of***

Applied Science and Engineering 18:3 (Scopus) (DOI: 10.6703/IJASE.202106_18(3).003)

J8. Yung-Chiang Lin, Chih-Hung Chiang*, Chih-Peng Yu, Keng-Tsang Hsu (2020) Deterministic deterioration modeling of wind turbines toward the failure identification – a modal curvature approach, ***Journal of Structural Integrity and Maintenance***, 5:2, 104-112, (DOI: 10.1080/24705314.2020.1729518)**(Scopus)**

J9. Huang, Y., Shih, P., Hsu, K.-T., Chiang, C.-H. (2020) To identify the defects illustrated on building facades by employing infrared thermography under shadow, ***NDT & E International, 111*** (DOI: 10.1016/j.ndteint.2020.102240) **(SCI)(Scopus)**

J10. Chih-Hung Chiang*, Keng-Tsang Hsu, Chih-Peng Yu, Chia-Chi Cheng, Jie-Zhen Pan (2018) "Remote measurements and vibration analyses of existing wind turbines," ***Journal of Testing and Evaluation*** vol.47 no.3 pp.2193-2206 (DOI: 10.1520/JTE20180025) **(SCI)(Scopus)**

J11. Lee, M.-J., Lee, M.-G., Chiang, C.-H., Liang, Y.-H. (2012) "Durability of strengthening wooden members using CFRP sheets", ***Advanced Materials Research*** vol. 374-377, pp. 1589-1592. **(EI)**

J12. Cheng, C.-C., Cheng, T.-M., Chiang, C.-H.* (2008) "Defect detection of concrete structures using both infrared thermography and elastic waves", ***Automation in Construction*** vol. 18 pp.87-92. **(SCI) (EI)**

J13. Tsai C-L. and Chiang C-H. (2002) "Pneumatic strains in woven glass/epoxy composite laminate induced by fluctuating air pressure", **Composites Science and Technology** vol. 62 pp.451-456. **(SCI) (EI)**

J14. Chiang C-H., Tsai C-L., and Kan Y-C. (2000) "Acoustic inspection of bond strength of steel-reinforced mortar after exposure to elevated temperatures", **Ultrasonics** vol. 38 pp. 534-536. **(SCI) (EI)** (Refereed and accepted to publish in the Proceedings of Ultrasonics International 1999 joint with 1999 World Congress on Ultrasonics)

J15. Tsai C-L. and Chiang C-H. (2000) "Characterization of hygric behavior of single fiber", **Composites Science and Technology** vol. 60 pp.2725-2729. **(SCI) (EI)**

J16. Bond L.J., Chiang C.H. and Fortunko C.M. (1992) "Absorption of ultrasonic waves in air at high frequencies (10-20MHz)", **J. Acoust. Soc. Am.** vol. 92 pp. 2006-2015. **(SCI)**

J17. Chiang, C.-H., Cheng, C.-C., and Hsu, K.-T. "Inspection of deteriorated coastal embankments using radar, thermography and impact-echo", ***Nondestructive Testing of Materials and Structures***. RILEM Book series vol. 6, pp.927-933. edited by Oral **Büyüköztürk.** Springer, Dordrecht, the Netherlands (2013)

J18. 江支弘『紅外線法』收錄於***橋梁檢測方法與應用***，頁 4-96 至 4-101，中國土木水利工程學會非破壞檢測委員會編著，台北市，2010 年

J19. 江支弘『熱感應』收錄於***橋梁檢測基本理論***，頁 10-31 至 10-41，中國土木水利工程學會非破壞檢測委員會編著，台北市，2013 年

C1. Chiang, C.-H., Jahan, K., Hidayat, M., Kumar, D., Cheng, C.-C. (2023) "Evaluation of mechanical properties and damage sensing performance of functionalized carbon nanotube modified epoxy-carbon fiber", Proceedings of SPIE - The International Society for Optical Engineering, 12487, art. no.124870H (DOI: 10.1117/12.2660954)

C2. Huang, Y., Yang, Q.-Y., Chiang, C.-H. (2023) "Applying the Modified Adaptive Window Sizes

into the Image Segmentation to Identify Defects from Thermal Infrared Images Covered with Intensity Inhomogeneity", Proceedings of SPIE - The International Society for Optical Engineering, 12486, art. no.124861P (DOI: 10.1117/12.2657617)

C3. Kumar, D., Chiang, C.-H., Prasad, S. (2022) "Integrating robust feature detection methodology with in-house DIC for identification and correlation of natural patterns on large structures", Proceedings of SPIE - The International Society for Optical Engineering, 12047, art. no. 120470C (DOI: 10.1117/12.2612758)

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C6. Chiang, C.-H., Hidayat, M., Kumar, D. (2022) "Simulated thermal image based on finite element models for a layered composite structures", Materials Today: Proceedings (DOI: 10.1016/j.matpr.2022.02.539)

C7. Chiang, C.-H., Hidayat, M., Liao, K.-C. (2022) "Performance Proofing of A 3D Printed Specimen Rig Through Actual Testing in The Laboratory", AASRC2022 Conference 航太學會學術研討會。

C8. 江支弘、陶宏育、林永強(2022) "關於週期荷載與疊層結構之熱學分析的可能應用" 第 21 屆非破壞檢測技術研討會暨財團法人台灣非破壞檢測協會年會 2022 CNDT，日月潭，2022 年 10 月 27-28 日。

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C10. 曾靖皓、江支弘、鄭家齊、林永强、鄭柏鈞 (2021) "數位影像相關方法應用於短跨度橋梁振動分析",台灣混凝土學會 2021 年混凝土工程研討會，高雄， 110 年 11 月 18-19 日。

C11. 鄭柏鈞、江支弘、林永强 (2021) "風機自然頻率與螺栓應力狀態之關聯分析",第 26 屆電子計算機於土木水利工程應用研討會，中央大學，桃園， 110 年 8 月 30-31 日。

C12. Chih-Hung Chiang*, Muhamad Hidayat, Hung-Yu Tao (2021) "Simulated surface temperature distribution of layered structures for TNDT", AASRC2021 航太學會學術研討會論文集。(MOST110-2211-E-324-006）

C13. Chan, C. C-K., Kumar, D., Chiang, C-H. (2021) "Coarse and fine localized CNN classifier for intelligent DIC preprocessing in large structure health monitoring sample", Proceedings of SPIE - The International Society for Optical Engineering, 11592, art. no. 115920L (DOI: 10.1117/12.2584023)

C14. Kumar, D., Chiang, C-H.*, Lin, Y-C. (2021) "Identification and correlation of natural patterns using a hybrid BRISK-DIC method", Proceedings of SPIE - The International Society for Optical Engineering, 11592, art. no. 115920K (DOI: 10.1117/12.2584776)

C15. Chih-Hung Chiang*, Hung-Yu Tao, Jean-Shyan Wang (2020) "Progressive Damage to CFRP Specimens Due to Tensile Loading – Thermal Modeling and Experimental Analysis",中國機械工程學會第三十七屆全國學術研討會。國立虎尾科技大學，2020 年 11 月 20-21 日。(MOST108-2211-E-324-004）

C16. 江支弘*、陶宏育、王正賢、林永強 (2020) "複合材料中缺陷造成之暫態熱影像分析",第 20 屆非破壞檢測技術研討會暨財團法人台灣非破壞檢測協會年會 2020 CNDT. 高雄，2020 年 10 月 22-23 日。

C17. Huang, Y., Yang, Q.-Y., Hsu, K.-T., Chiang, C.-H. (2020) "Building cracks identification by employing image segmentation", Proceedings of SPIE - The International Society for Optical Engineering, 11381, art. no. 113811Y (DOI: 10.1117/12.2558335)(Scopus)

C18. Kumar, D., Chiang, C.-H., Lin, Y.-C., Hsu, K.-T. (2020) "3D vibration studies of large structures using DIC", Proceedings of SPIE - The International Society for Optical Engineering, 11381, art. no. 1138124 (DOI: 10.1117/12.2557007)(Scopus)

C19. Lau, E.M., Kumar, D., Chiang, C.-H., Zhang, J.-D., Huang, W.-X., Khare, V. (2020) "Pressure distribution of a deformable composite flapping wing", Proceedings of SPIE - The International Society for Optical Engineering, 11379, art. no. 113790M (DOI: 10.1117/12.2558461)(Scopus)

C20. Lin, Y.-C., Cheng, C.-C., Chiang, C.-H., Hsu, K.-T. (2019) "Quantitative assessment of interfacial condition of cold joint using surface wave group velocity profile",IOP Conference Series: Materials Science and Engineering, 615 (1) (DOI: 10.1088/1757-899X/615/1/012010) (Scopus)

C21. Hsu, K.-T., Cheng, C.-C., Chiang, C.-H., Ke, Y.-T., Cheng, J.-S. (2019) "Long-term monitoring of spillway using various NDT techniques-case studies", IOP Conference Series: Materials Science and Engineering, 615 (1)(DOI: 10.1088/1757-899X/615/1/012035) (Scopus)

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C23. Yishuo Huang, Chih-Hung Chiang, Keng-Tsang Hsu (2018) "Combining the 3D model generated from point clouds and thermography to identify the defects presented on the facades of a building," Proc. SPIE.10599, 105990G (Scopus) DOI: 10.1117/12.2297656

TR1. 江支弘 (2022) 複合材料非破壞檢測之熱學分析與紅外線熱影像法驗證(II)，科技部專題研究報告。

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TR3. 江支弘、鄭家齊、余志鵬、黃怡碩、鄭文昌、張家濟、賴俊仁、徐松圻 (2017) 結合 NDT 的自動化檢測技術在土木結構健康診斷之應用，科技部專題研究報告。

TR4. 江支弘 (2013) 熱影像法非破壞檢測量化分析技術之研究，國科會專題研究報告。

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TR6. 江支弘 (2011) 結構材料性質老劣化之非破壞快速檢測技術開發-子計畫三：紅外線熱影像與光學影像法於大型結構檢測之應用(II)，國科會專題研究報告。

TR7. 江支弘 (2010) 結構材料性質老劣化之非破壞快速檢測技術開發-子計畫三：紅外線熱影像與光學影像法於大型結構檢測之應用(I) ，國科會專題研究報告。