

穿戴科技與行動照護實驗室 (Wearable Technology and Mobile Healthcare (WTMH))

■ 教師或實驗室學生傑出成果

- 教師

- 林哲偉老師榮獲 110 學年度國立成功大學生物醫學工程學系研究優良教師獎
林哲偉老師榮獲 110 學年度國立成功大學生物醫學工程學系輔導優良教師獎
- 林哲偉老師榮獲 110 學年度國立成功大學醫學院醫學教育暨模擬教案教學榮譽獎
- 林哲偉老師榮獲 110 學年度國立成功大學 90 週年校慶系列活動－工學院研究日－青年學者論文競賽佳作
- 林哲偉老師於 110 年受邀擔任台灣臨床神經生理學學會研習課程講者
<https://twscn.wordpress.com/2021/11/22/%E3%80%90%E6%B4%BB%E5%8B%95%E8%8A%B1%E7%B5%AE%E3%80%91-2021%E5%8F%B0%E7%81%A3%E8%87%A8%E5%BA%8A%E7%A5%9E%E7%B6%93%E7%94%9F%E7%90%86%E5%AD%B8%E5%AD%B8%E6%9C%83%E3%80%8C%E7%A0%94%E7%BF%92%E8%A%B2/>
- 林哲偉老師於 109 年接受 CIO Taiwan IT 經理人雜誌專訪
<https://www.cio.com.tw/interview-lin-cho-wei-assistant-professor-of-department-of-biomedical-engineering-at-national-cheng-kung-university/>
- 林哲偉老師於 109 年受邀至越南胡志明醫藥大學未來醫療創新工作坊擔任 Keynote speaker
<https://university.1111.com.tw/zone/university/discussTopic.asp?cat=University&id=226640>
- 林哲偉老師於 109 年受邀擔任台灣神經醫學會講者
http://www.neuro.org.tw/files/download/N202115161327_2020%E5%A4%A7%E6%9C%83%E6%89%8B%E5%86%8A.pdf
- 林哲偉老師於 109 年接受三立新聞及今周刊報導，於資策會開設的 AI 人才培訓計畫跨國課程
https://www.youtube.com/watch?v=2MUPgGS1_GU&ab_channel=%E4%B8%89%E7%AB%8BiNEWS0406-12_今周刊.pdf
- 林哲偉老師榮獲科技部 108 年度醫工學門優秀年輕學者研究計畫

- PAG

- 林哲偉老師指導團隊以 "Computational AI-based Recognition and Edge computing system for Heart Valve Disease" 主題，參與國際性「2022

the IFMBE Toh Siew Lok Student Design Award」競賽，榮獲第二名佳績



- 林哲偉老師指導團隊以 ”Development of Medical Wearable Device for Screening Arrhythmia and Structural Heart Diseases Based on Pulse Audiogram with Time Frequency Transformation and Deep Learning Classifier” 主題，參與「2021 年生物醫學工程科技研討會－科技部醫學工學門成果發表會暨第三屆國際工程與科技研討會」，榮獲最佳口頭報告獎

[1120 2021 年生物醫學工程科技研討會 最佳口頭報告獎.pdf](#)

- 林哲偉老師指導團隊於 2019 年接受馬來西亞南洋商報全版專訪
<https://www.enanyang.my/%E5%89%AF%E5%88%8A/%E4%B8%93%E5%AE%B6%E6%99%BA%E6%85%A7%E7%BB%93%E5%90%88ai-%E6%91%B8%E8%84%89%E6%90%8F%E7%9B%91%E6%B5%8B%E5%BF%83%E8%84%8F%E7%96%BE%E7%97%85>
- 林哲偉老師指導團隊參與「2019 ARM 設計競賽 ARM Idea+ 實現創意有意思」，榮獲第二名及最佳人氣獎
<https://news-secr.ncku.edu.tw/p/404-1037-200028.php>
- 林哲偉老師指導團隊參與國際性「全球創新醫學工程設計大賽」(EMedic Global 2018)，成大醫工跨領域之 AAAS 跨領域團隊奪下一金一銅佳績
<https://cdd.stust.edu.tw/tc/news/57-15467>

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- ENose

- 林哲偉老師團隊以”運用電子鼻建立菌株氣味資料庫及自動辨識演算法開發” 論文主題，榮獲台灣醫事檢驗學會 110 年度 Sysmex 優秀壁報論文獎

[1106 社團法人台灣醫事檢驗學會 110 年會 sysmex 優秀壁報論文獎.pdf](#)

- 林哲偉老師團隊以”An AI System for Colorectal Cancer Screening Test Based on Urinalysis and Electronic Nose”主題，參與「110 中央大學無限次元智慧醫療競賽」，榮獲第二名佳績
[1224_110年度無限次元智慧醫療競賽_第二名.pdf](#)
- 林哲偉老師團隊以”用於細菌和上呼吸道感染的人工智慧電子鼻篩檢裝置”主題，參與「110 國立成功大學創新圓夢計畫」，榮獲研發果組第一名佳績
[0801_2021國立成功大學創新圓夢計畫_研發成果組第一名.pdf](#)
https://drive.google.com/file/d/1tmNsfCpW9_3AUaG5Hv-eciG_4V9PeoxJ/view?usp=sharing
- 林哲偉老師團隊於 2021 年接受科學月刊專訪，報導電子鼻結合深度學習方式對抗新冠肺炎疫情
<https://www.scimonth.com.tw/archives/5011>
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- Sleep
- VR
 - 林哲偉老師指導專題學生以”結合震動刺激之虛擬鏡像治療系統應用於中風後偏癱治療”主題，參與「2022 年中原大學醫工日 創新醫材競賽」，榮獲第三名佳績
[0514_2022_中原大學醫工日創新醫材競賽醫工電子實作競賽_第二名.pdf](#)
 - 林哲偉老師團隊以”Development of a Virtual Reality Mirror Therapy for Hemiplegia Rehabilitation”主題，參與國際性「2020 Global Student Innovation Challenge - Rehabilitation Engineering and Assistive Technology (gSIC-REAT)」，榮獲第二名佳績
<https://www.techlife.com.tw/Article/39295>
 - 林哲偉老師團隊於 2020 接受科技部報導，成大 VRMT 跨域團隊虛擬實境鏡像治療系統獲世界肯定
<https://gase.most.ntu.edu.tw/focus/901?locale=zh-TW>
 - 林哲偉老師指導團隊參與「2020 全國醫學工程創意競賽」，榮獲第一名佳績
<https://sbme.tmu.edu.tw/front/Gallery/gallery.php?ID=dG11X3NibWUmR2FsbGVyeQ==&Sn=16>
 -
- 其他
 - 林哲偉老師指導專題學生以”基於人工智慧校正樣本溫度量測與產物螢光亮度量測的核酸儀設計”主題，參與「2022 年中原大學醫工日 創新醫材競賽」，榮獲第一名佳績

[0514_2022_中原大學醫工日創新醫材競賽醫工電子實作競賽第一名.pdf](#)

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- 林哲偉老師指導團隊參與「2020 國研盃儀器科技創新獎」，榮獲第二名佳績
- 林哲偉老師指導團隊參與「成大醫院 109 年教學創新與教學成果發表競賽」，榮獲第一名佳績
- 林哲偉老師指導團隊參與「2020 無限次元智慧醫療競賽」，榮獲第一名佳績
- 林哲偉老師指導團隊參與「2018 無限次元智慧醫療競賽」，榮獲第二名佳績
- 林哲偉老師指導團隊參與「2018 科技部大專學生研究創作獎」，榮獲大專學生研究創作獎
- 林哲偉老師指導團隊參與「2018 Taiwan AI × Robotics Accelerator (TAIRA)」，榮獲優選
- 林哲偉老師指導團隊參與「新一代設計產學合作專案獎」競賽，榮獲金獎
- 林哲偉老師指導團隊參與「Acer 2016 創星智造大賽」，榮獲最佳人氣獎
- 林哲偉老師指導團隊以「有效降低糖尿病患截肢風險，成大智慧分析鞋幫「腳」控溫」主題，參與國際性「2016 全球創新醫學工程設計大賽」，榮獲銅牌及最佳報告獎
<https://www.ettoday.net/news/20160826/763297.htm>

■實驗室國際交流事蹟

- PAG
 - 2019 年 7 月 5 號 林哲偉副教授受馬來西亞拉曼大學邀約，赴馬來西亞雙龍溪演講，題目為 " Development of an AI-based Non-invasive Pulse AudioGram (PAG) Monitoring Device for Arrhythmia Screening "
- ENose
 - 林哲偉副教授團隊與日本太陽誘電株式會社於 2018 年至今進行長期合作，研究電子鼻於醫學領域的應用，感謝太陽誘電株式會社多年的合作，共同推進醫學科技的進步。
 - 應用太陽誘電電子鼻及人工智慧於毒品/細菌氣味/新冠肺炎氣味偵測
 - 電子鼻細菌氣味與人體傷口氣味實驗收集及機械學習研究

- 醫療器材樣機委託開發
 - 機能可行性研究用機委託案
 - 太陽誘電壓力感測器與心電圖關連性比對之研究
- Sleep
 - 2021年7月28日 林哲偉副教授參與馬來西亞吉隆坡 6th Kuala Lumpur International Conference on Biomedical Engineering，演講題目為 "Development and Testing of a motion monitoring and rehabilitation device by using the Virtual Reality Mirror Therapy System for the Sensorimotor Performance of Upper Extremity "
 - 2019年7月4日 林哲偉副教授參與馬來西亞雙龍溪 2nd Biennial Medical & Health Sciences Conference 2019，演講題目為 "Development of a Time-frequency Transformation Convolutional Neural Network and Its Application in Cardiology and Sleep Medicine "VR
- 其他:
 - 2021年越南胡志明醫學大學與成功大學共同研究計畫專案 - 全孝行海外基地 UMP NCKU 共研計畫
 - 2019年7月5日 林哲偉副教授受馬來西亞成大校友會會所邀約，參與 "人工智慧好好玩: 從人工智慧看生物醫學工程的新改變 " 座談會

■ 研討會論文發表

- PAG
 - 博士班 You-Liang Xie 與碩士班 Xin-Rong Lin, Yu- Hsiu Yen, Tzu-Chien Wen, Yin-Chen Lee, YuCheng Ko, Yung Chang 於 2021 年生物醫學工程科技研討會－科技部醫工學門成果發表會暨第三屆國際工程與科技研討會 口頭發表論文 "Development of Medical Wearable Device for Screening Arrhythmia and Structural Heart Diseases Based on Pulse Audiogram with Time Frequency Transformation and Deep Learning Classifier"，獲最佳口頭報告肯定
 - 碩士班 Yung Chang 於 2018 International Conference on Applied System Innovation (ICASI) 口頭發表論文 "Development of an Atrial fibrillation (AFib) detection algorithm based on machine learning algorithms and time-frequency transformation of pulse audiogram (PAG)"
 - 博士班 You-Liang Xie 於 2018 International Conference on Applied System Innovation (ICASI) 口頭發表論文 "Development a AI-based Non-invasive Pulse AudioGram Monitoring Device for VPC/APC classification by Using AlexNet with Convolutional Neural Network"

- 碩士班 Yung Chang 於 2018 International Conference on Applied System Innovation (ICASI) 口頭發表論文 “Development of CNN-based Structural Heart Diseases Detection based on Pulse Audiogram (PAG)”
- 碩士班 Yung Chang 於 2017 IEEE Healthcare Innovations and Point of Care Technologies (HI-POCT) 口頭發表論文 “Development of an AI-based non-invasive Pulse AudioGram monitoring device for arrhythmia screening”
- ENose
 - 博士班 You-Liang Xie 於 ICSS 2021 國際智慧感測器研討會 口頭發表論文 “Development of an AI-based Bacteria Odor Recognition System using Electronic Nose and Machine Learning”
 - 博士班 You-Liang Xie 於 ICSS 2021 國際智慧感測器研討會 口頭發表論文 “Chronic Wound Stage Classification Based on Machine Learning and Electronic Nose”
- Sleep
 - 博士班 Febryan Setiawan 於 The 18th International Conference on Electronics, Information, and Communication 口頭發表論文 “Development of a Convolutional Neural Network (CNN) Detection Algorithm for Neuro-Degenerative Diseases (NDDs) based on Time-Frequency Spectrogram of Gait Force Signal Development of a Convolutional Neural Network (CNN) Detection Algorithm for Neuro-Degenerative Diseases (NDDs) based on Time-Frequency Spectrogram of Gait Force Signal”
 - 碩士班 Yi-Wen Wang 於 2018 International Conference on Applied System Innovation (ICASI) 口頭發表論文 “Development an AI-based Sleep Apnea Detection Algorithm based on Time-Frequency Spectrogram of ECG Signal”
- VR
 - 碩士班 劉尚銘、Luthfan Fauza、李芳瑜、施又嘉 於 109 年度會員(代表)大會暨學術發表會 口頭發表論文 『運用自行開發虛擬實境教學軟體於臨床病毒高階檢驗認知與實作技能訓練』
 - 碩士班 吳宜臻 於 2019 台灣復健醫學會年會 口頭發表論文 『利用虛擬實境復健減少長照機構長者肌少症-前驅計畫』
 - 碩士班 鍾愛、周保廷 於 2017 生物醫學工程科技研討會口頭發表論文 『基於機械學習演算法之個人化刷牙區域自動辨識的智慧牙刷開發』
- Other

■ SCI 期刊論文發表

- 1. Ke-Wei Chen, Laura Bear, and **Che-Wei Lin**^{*}, “Solving Inverse Electrocardiographic Mapping Using Machine Learning and Deep Learning Frameworks,” *Sensors*, vol.22, pp.2331. (Impact Factor 3.576 (2020)), 2022.
- 2. Febryan Setiawan, An-Bang Liu, and **Che-Wei Lin**^{*}, Development of Neuro-Degenerative Diseases’ Gait Classification Algorithm using Convolutional Neural Network and Wavelet Coherence Spectrogram of Gait Synchronization, *IEEE Access*, vol. 10, pp. 28137-38153, (Impact Factor 3.367 (2020)), 2022.
- 3. Hsiu-Yun Hsu, Li-Chieh Kuo, Yu-Ching Lin, Fong-Chin Su, Tai-Hua Yang, and **Che-Wei Lin**^{*}, “Effects of a Virtual Reality–Based Mirror Therapy Program on Improving Sensorimotor Function of Hands in Chronic Stroke Patients: A Randomized Controlled Trial,” *Neurorehabilitation and Neural Repair*, vol. 36, no. 6, (Impact Factor 3.919 (2020)), 2022.
- 4. Cheng-Yu Lin, Yi-Wen Wang, Febryan Setiawan, Nguyen Thi Hoang Trang, and **Che-Wei Lin**^{*}, “Sleep Apnea Classification Algorithm Development using Machine Learning Framework and Bag-of-Features derived from Electrocardiogram Spectrogram,” *Journal of Clinical Medicine* (Impact Factor 4.241 (2020)), vol. 11, no. 1, pp. 192, 2021.
- 5. Hsiu-Yun Hsu, **Che-Wei Lin**, Yu-Ching Lin, Po-Ting Wu, Hirokazu Kato, Fong-Chin Su, and Li-Chieh Kuo^{*}, “Effects of vibrotactile-enhanced music-based intervention on sensorimotor control capacity in the hand of an aging brain: a pilot feasibility randomized crossover trial,” *BMC Geriatrics* (Impact Factor 3.74 (2020)), vol. 21, pp. 660, 2021.
- 6. **Che-Wei Lin**, Po-Wei Chen, Wei-Min Liu, Jin-Yi Hsu, Yu-Lun Huang, Yu Cheng, and An-Bang Liu^{*}, “Dynamic Changes and Temporal Association with Ambient Temperatures: Nonlinear Analyses of Stroke Events from a National Health Insurance Database,” *Journal of Clinical Medicine* (Impact Factor 4.241 (2020)), vol. 10, no. 21, pp. 5041, 2021.
- 7. Guan-Bo Chen, **Che-Wei Lin**, Hung-Ya Huang, Yi-Jhen Wu, Hung-Tzu Su, Shu-Fen Sun, and Sheng-Hui Tuan^{*}, “Using Virtual Reality–Based Rehabilitation in Sarcopenic Older Adults in Rural Health Care Facilities—A Quasi-Experimental Study,” *Journal of Aging and Physical Activity* (Impact Factor 1.961 (2020)), vol. 29, no. 5, pp. 866-877, 2021.
- 8. S.-M. Samuel Wang, Yi-Jing Huang, Jia-Jin Jason Chen, Chun-Wei Wu, Chien-An Chen, **Che-Wei Lin**, Van-Truong Nguyen, and Chih-Wei Peng^{*}, “Designing and pilot testing a novel high-definition transcranial burst electrostimulation device for neurorehabilitation,” *Journal of Neural Engineering* (Impact Factor 5.379 (2020)), vol. 18, no. 5, pp. 056030, 2021.
- 9. Febryan Setiawan and **Che-Wei Lin**^{*}, “Implementation of a Deep Learning Algorithm based on Vertical Ground Reaction Force Time–Frequency Features for the Detection and Severity Classification of Parkinson’s Disease,” *Sensors* (Impact Factor 3.576 (2020)), vol. 21, no. 15, pp. 5207, 2021.
- 10. Febryan Setiawan and **Che-Wei Lin**^{*}, “Identification of Neurodegenerative Diseases Based on Vertical Ground Reaction Force Classification Using Time–

Frequency Spectrogram and Deep Learning Neural Network Features,” *Brain Sciences* (Impact Factor 3.394 (2020)), vol. 11, no. 7, pp. 902, 2021.

- 11. **Che-Wei Lin**, Li-Chieh Kuo, Yu-Ching Lin, Fong-Chin Su, Yu-An Lin, and Hsiu-Yun Hsu*, “Development and Testing of a Virtual Reality Mirror Therapy System for the Sensorimotor Performance of Upper Extremity: A Pilot Randomized Controlled Trial,” *IEEE Access* (Impact Factor 3.745 (2019)), vol. 9, pp. 14725-14734, Jan. 2021.
- 12. Nam Nguyen, Quoc Duy, An-Bang Liu, and **Che-Wei Lin***, “Development of a Neurodegenerative Disease Gait Classification Algorithm Using Multiscale Sample Entropy and Machine Learning Classifiers,” *Entropy* (Impact Factor 2.494 (2019)), vol. 22, no. 12.1340, pp. 1-18, Dec. 2020. (SCI)
- 13. **Che-Wei Lin***, Tzu-Chien Wen, and Febryan Setiawan, “Evaluation of Vertical Ground Reaction Forces Pattern Visualization in Neurodegenerative Diseases Identification Using Deep Learning and Recurrence Plot Image Feature Extraction,” *Sensors* (Impact Factor 3.275 (2019)), vol. 20, no. 14, pp. 38-57, Jul. 2020. (SCI)
- 14. An-Bang Liu and **Che-Wei Lin***, “Multiscale Approximate Entropy for Gait Analysis in Patients with Neurodegenerative Diseases,” *Entropy* (Impact Factor 2.494 (2019)), vol. 21, no. 10, pp. 934-944, Sep. 2019. (SCI)
- 15. Ju-Yi Chen, Chou-Ching K. Lin, **Che-Wei Lin**, Fan-Ming Yu, Kuang-Jung Li, Liang-Miin Tsai*, “Development of Radial Artery Pulse Audiogram Sensing System for Fast Detection of Atrial Fibrillation and Pulse Amplitude Variation,” *IEEE Access* (Impact Factor 4.098 (2018)), vol. 8, pp. 178770-178781, Sep. 2020. (SCI)
- 16. Morandi GN, Lin S-H*, **Lin C-W**, Yeh TL, Chu C-L, Lee IH, Chi MH, Chen KC, Chen PS, Yang YK, “Heart Rate Variability is Associated with Memory in Females,” *Applied Psychophysiology and Biofeedback* (Impact Factor 1.347 (2017)), vol. 44, no. 2, pp. 177-122, Jun. 2019. (SSCI)
-