Dr. Ching-Yun Chen

Assistant Professor of Department of Biomedical Science and Engineering, National Central University, Taiwan.

A. Education

Ph.D., Department of Biomedical Engineering from National Taiwan University, Taiwan.

B. Positions and Scientific Appointments

2025-	Deputy Director, Center of Academia and Industry Collaboration, National Central University, Taiwan
2021-	Adjunct Assistant Researcher, Institute of Biomedical Engineering & Nanomedicine, National Health Research Institutes, Taiwan
2020-	Assistant Professor, Department of Biomedical Sciences & Engineering, National Central University, Taiwan
2017-2020	Postdoc Fellow, Institute of Biomedical Engineering & Nanomedicine, National Health Research Institutes, Taiwan
2019-2020	Adjunct Assistant Professor, Graduate Program of Biotechnology and Pharmaceutical Industries, National Taiwan Normal University, Taiwan

C. Honors

2026	Outstanding Teaching Award of 114 Academic Year, National Central University, Taiwan
2026	Contribution Award for Thesis-Improvement Award, National Central University, Taiwan
2025	Excellent Mentor Award of 113 Academic Year, National Central University, Taiwan
2020-2022	New Faculty Outstanding Award of 109-111 Academic Year, NCU, Taiwan
2020	Excellent Poster Paper Award, “Forming One-step Bone-like Tissues in the Self-designed Bioreactor System for Bone Tissue Engineering,” 2020 NHRI Research Day, Taiwan

2017 13th Tien-Te Lee Distinguished Thesis Awards, “3D Porous Calcium-alginate Scaffolds Cell Culture System Improved Human Osteoblast Cell Clusters for Cell Therapy,” Taiwan

2014 The Honorable Mention of Young Investigator Award, “Forming Bone-like Tissues for Somatic Cell Therapy via 3D Cell Culture Technique,”7th World Congress on Preventive & Regenerative Medicine (WCPRM), Taiwan

D. Selected Publication

1. Yueh-Teng Tsai, Hsin-Chien Chen, Chih-Hung Wang, Yu-Hsuan Ting, Sheng-Wen Chang, Feng-Yuan Chien, Chia-Ching Chang, **Ching-Yun Chen***. “Strontium-crosslinked potassium-alginate beads as coordination-driven ion-exchange biomaterials for regenerative microenvironment engineering,” Journal of Biological Macromolecules, 2026 Sep, 12.5 (2026): 153130.
2. Quốc Cường Nguyễn, Bayu Tri Murti, Guo-Chun Dong, Shih-Min Huang, Athika Darumas Putri, Yu-Hsu Chen, **Ching-Yun Chen***, Po-Kang Yang*. “In-vitro Platforms in Bone Tissue Engineering: From Biological Foundations to Advanced Models”, ACS Biomaterials Science & Engineering, 2026 Mar, 12.5 (2026): 2499-2521.
3. Yu-Ting Li, Ching-Yun Chen, Bing-Siang Wang, Po-Hsuan Hung, Chia-Yu Lin*. “Inner Ear Multiple Primary Cell Type Detection System”, Scientific Data; 2025 Feb, 12(1), 432.
4. Deniz Atila, **Ching-Yun Chen**, Chun-Pin Lin, Yuan-Ling Lee, Vasif Hasirci, Ayşen Tezcaner*, Feng-Huei Lin*. “In Vitro Evaluation of Injectable Tideglusib-loaded Hyaluronic Acid Hydrogels Incorporated with Rg1-loaded Chitosan Microspheres for Vital Pulp Regeneration”, Carbohydrate Polymers; 2022 Feb, 278(15): 118976.
5. **Ching-Yun Chen**, Kuo-Yun Tseng, Yen-Liang Lai, Yo-Shen Chen, Feng-Huei Lin*, Shankung Lin*. “Overexpression of Insulin-Like Growth Factor 1 Enhanced the Osteogenic Capability of Aging Bone Marrow Mesenchymal Stem Cells”, Theranostics; 2017 May, 7(6): 1598–1611.

Engineering Dynamic Human Microphysiological Systems: From Bioreactors and Biomaterials to Organ-on-a-Chip Platforms and Translational Applications

工程化動態人源微生理系統：從生物反應器與生醫材料到器官晶片及轉譯應用

Ching-Yun Chen, Ph.D.

Abstract:

Physiologically relevant *in-vitro* models are essential for bridging the gap between conventional cell culture, animal studies, and clinical translation. This presentation introduces our research on engineering dynamic human microphysiological systems by integrating biomaterials, bioreactors, induced pluripotent stem cells, organoids, and organ-on-a-chip technologies. Rather than treating cells, materials, and devices as separate components, our approach reconstructs tissue-specific biochemical, ionic, mechanical, and cellular microenvironments within controllable experimental platforms. Representative studies include dynamic ion-regulation systems for inner-ear models, endometrial organoid platforms, engineered skin models, and microphysiological systems for bone, joint, and intervertebral disc research. These platforms are designed not only to reproduce tissue structure, but also to evaluate functional responses, disease mechanisms, material-tissue interactions, therapeutic efficacy, and safety. By incorporating dynamic culture conditions and human-derived biological models, they provide a practical foundation for drug screening, biomedical material evaluation, and the development of New Approach Methodologies (NAMs). The research further extends beyond platform development toward translational application through clinical collaboration, intellectual property development, technology transfer, and academia-industry partnerships. Looking forward, the integration of human-relevant models with biosensing, biomedical electronics, imaging, and quantitative analysis will enable more comprehensive and standardized preclinical evaluation. This research framework can complement existing strengths in biomaterials, microfluidics, nanomedicine, medical devices, and biomedical sensing, while providing a shared biological validation pathway for advancing interdisciplinary technologies from laboratory development toward clinical and industrial applications.