

# BDR SEMINAR (Kobe & online hybrid)

Mechanobiology Seminar Series presents

## Chen-Hui Chen

Institute of Cellular and Organismic Biology,  
Academia Sinica, Taiwan

**Wednesday, May 28, 2025**

15:00-16:00

8F Hall, Integrated Innovation Building (IIB) / Broadcast online via Zoom

\*This seminar is open only for BDR members.

Please contact the seminar host for participation.

## What can we learn from monitoring every single cell in a living fish?

### Summary

Development and regeneration of complex tissues involve highly coordinated control of many cells and diverse cell types on a large scale. However, capturing collective cell behaviors and dissecting their regulatory mechanisms at the whole-organism level remain technically challenging in any vertebrate models. Using zebrafish as a model system, my laboratory is focused on developing multicolor cell barcoding tools, live imaging platforms, and high-content quantitative analyses for capturing cell dynamism at millimeter scales and in three-dimensional space. I will present our latest works, based on in toto imaging of skin and muscle cells, to showcase intricate cell dynamics and mechanisms that may only become evident when monitoring each and every cell over extended time periods in a living animal. Additionally, I will highlight the unique opportunities our models and findings may offer to researchers excited about collective control of cell behaviors across scales.

### References:

- 1: Chan KY, Yan CCS, Roan HY, Hsu SC, Tseng TL, Hsiao CD, Hsu CP, Chen CH\*. "Skin cells undergo asynthetic fission to expand body surfaces in zebrafish" *Nature* 605(7908): 119-125 (2022).
- 2: De Leon MP, Wen FL, Paylaga GJ, Wang YT, Roan HY, Wang CH, Hsiao CD, Lin KH\*, Chen CH\*. "Mechanical waves identify the amputation position during wound healing in the amputated zebrafish tailfin" *Nature Physics* <https://doi.org/10.1038/s41567-023-02103-6> (2023).
- 3: Kumar U, Fang CY, Roan HY, Hsu SC, Wang CH, Chen CH\*. "Whole-body replacement of larval myofibers generates permanent adult myofibers in zebrafish" *EMBO J* 43: 3090-3115 (2024).
- 4: Santoso F, De Leon MP, Kao WC, Chu WC, Roan HY, Lee GH, Tang MJ, Cheng JY, Chen CH\*. "Appendage-resident epithelial cells expedite wound healing response in adult zebrafish." *Current Biology* 34(16):3603-3615.e4 (2024).



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**Host: Yu-Chiun Wang**

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