Stanford

# Vanessa W.Y. Kan

Postdoctoral Scholar, Neurosurgery

## Bio

### BIO

I am a second-year postdoctoral researcher in Irene Llorente's laboratory at the Department of Neurosurgery. I completed my Ph.D. at the Graduate School of Systemic Neurosciences GSN-LMU in Munich, Germany, where I was trained as a circuit neuroscientist. During my doctoral work, I focused on dissecting the circuit mechanisms underlying cortical hyperexcitability in ALS, uncovering the pathophysiological role of hyper-responsive layer 2⁄3 neurons (one of the main inputs to layer 5) in the disease course. Currently, my research bridges circuit neuroscience, stem cell biology, and bioinformatics to explore mechanisms of neural repair and regeneration. I utilize advanced experimental and computational tools, including in vivo calcium imaging in awake, freely behaving rodents; machine learning-based motion sequencing (MoSeq); anterograde and retrograde viral tracing techniques; and transplantation of iPSC-derived glial-enriched progenitors and cortical interneurons. In parallel, I apply spatial transcriptomics and single-cell RNA sequencing to map cell-type–specific interactions and molecular signatures during neural circuit remodeling.

My research focuses on understanding the circuit mechanisms underlying neurological conditions such as stroke and identifying how cell-based therapies mediate repair. The ultimate goal of my work is to uncover molecular and cellular processes that promote graft–host integration and functional recovery, paving the way for next-generation regenerative therapies for the injured brain.

In addition to translational research, I am also passionate about scientific education and outreach. I mentor community college students twice a year through the Stanford Science Small Group, in which I share my own experience in research and guide them through the research process. To expand my outreach efforts, in the past summer, I collaborated with Invent Your Own Future as well as The Hong Kong Polytechnic University and organized a summer camp on Neuroscience x AI research for over 20 high school students in Hong Kong.

### STANFORD ADVISORS

- Irene Lorenzo Llorente, Postdoctoral Faculty Sponsor

## Publications

### PUBLICATIONS

- **Advances in Cell Therapy for Neural Repair.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
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- **Cortical hyperexcitability in mouse models and patients with amyotrophic lateral sclerosis is linked to noradrenaline deficiency.** *Science translational medicine*

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- **Distinct molecular profiles of skull bone marrow in health and neurological disorders.** *Cell*

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  2023; 186 (17): 3706-3725.e29

- **Selective plasticity of callosal neurons in the adult contralesional cortex following murine traumatic brain injury.** *Nature communications*

  Empl, L., Chovsepian, A., Chahin, M., Kan, W. Y., Fourneau, J., Van Steenbergen, V., Weidinger, S., Marcantoni, M., Ghanem, A., Bradley, P., Conzelmann, K. K., Cai, R., Ghasemigharagoz, et al

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- **Cortical Hyperexcitability in the Driver's Seat in ALS** *CLINICAL AND TRANSLATIONAL NEUROSCIENCE*

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  Steffens, H., Mott, A. C., Li, S., Wegner, W., Švehla, P., Kan, V. W., Wolf, F., Liebscher, S., Willig, K. I.

  2021; 7 (24)

- **Cytoplasmic FUS triggers early behavioral alterations linked to cortical neuronal hyperactivity and inhibitory synaptic defects.** *Nature communications*

  Scekic-Zahirovic, J., Sanjuan-Ruiz, I., Kan, V., Megat, S., De Rossi, P., Dieterlé, S., Cassel, R., Jamet, M., Kessler, P., Wiesner, D., Tzeplaeff, L., Demais, V., Sahadevan, et al

  2021; 12 (1): 3028

- **Exciting Complexity: The Role of Motor Circuit Elements in ALS Pathophysiology.** *Frontiers in neuroscience*

  Gunes, Z. I., Kan, V. W., Ye, X., Liebscher, S.

  2020; 14: 573