GTR
Transformative Chem-Bio Research
Nagoya University

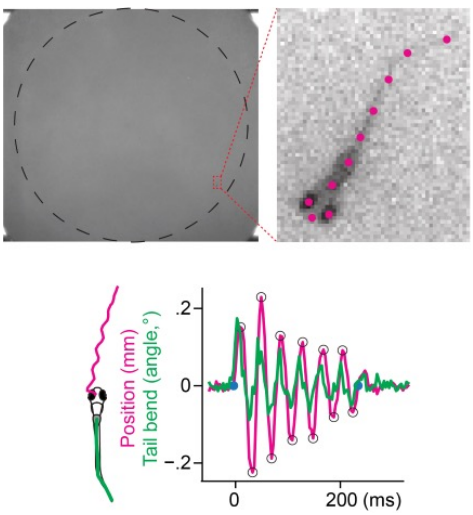
# アドバンス生命理学特論
# Advance Bioscience Seminar

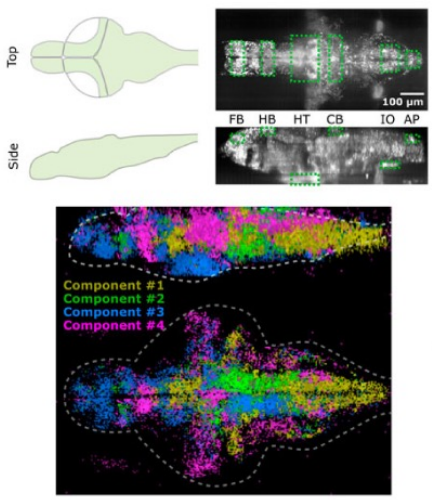
## 川島 尚之, Ph.D.
## Dr. Takashi Kawashima

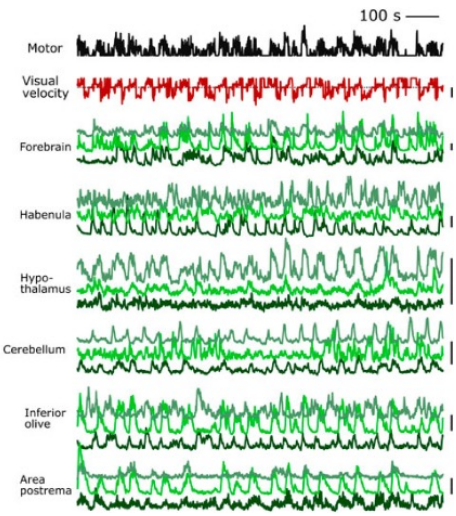
Assistant Professor
Weizmann Institute of Science, Israel

## Bimodal control of natural motor adaptation by the brainstem circuit

Animals have an innate ability to adapt their motor actions based on the resulting sensory outcomes. Past insights on neural mechanisms for motor adaptation have been mainly obtained by artificially controlled behavioral experiments. It remains primarily elusive how motor adaptation occurs in naturally behaving animals. Here we demonstrate that freely swimming zebrafish show bimodal motor adaptation, switching between low and high beating amplitudes during swimming, depending on varying drag force. Such bimodality was conserved for spinal motor outputs for head-fixed motor adaptation in virtual reality. The serotonergic system critically regulates this bimodal control, as its ablation results in biasing the bimodality toward a high state. Whole-brain neural activity imaging of the ablated fish and computational modeling of neuromodulatory interactions indicated that serotonergic neurons affect the activity of a specific hindbrain locomotor nucleus, which can modulate reticulospinal pathways. These results suggest that this bimodal adaptation machinery in the brainstem governs animals' movements in various behavioral contexts.




# Date: 2022.08.12(Fri) 16:00 ~ 17:30
# Place: E131

**For online participation, please register via https://forms.gle/ZbtjF9LCwJXQBaRZ8.**

Contact: 日比正彦 (hibi.masahiko.s7@f.mail.nagoya-u.ac.jp)