



NEURO GLOBAL Lecture

●Neuro Globalプログラム生 (Neuro Global Program Students)
【選択科目「脳科学講義Ⅴ」, 選択科目「先進脳科学講義Ⅴ」】
【"Elective, "Brain Science Lecture Ⅴ" Elective, "Advanced Brain Science Lecture Ⅴ"】

Date

Thursday, August 6, 2026

①13:45 – 15:15 ②15:30 – 17:00

Friday, August 7, 2026

①13:45 – 15:15 ②15:30 – 17:00

Speaker

Ken Berglund, PhD

Assistant Professor, Neurosurgery, Emory University



Title

Techniques in Neuroscience: Optogenetics and Chemogenetics

Venue

Lecture Room, Graduate School of Life Sciences, / Life Sciences Project Research Laboratory

[D04] 1F, Katahira Campus

生命科学研究科講義室 (生命科学プロジェクト総合研究棟[D04] 1F 片平キャンパス)

【MAP】 https://www.tohoku.ac.jp/map/ja/?f=KH_D04

Format Onsite ONLY

Language English



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Title:

Techniques in Neuroscience: Optogenetics and Chemogenetics

Abstract:

Genetic manipulation and monitoring of neuronal activity at the cellular levels are indispensable tools in modern neuroscience research. In this two-day seminar series, we will cover various topics related to optogenetics and chemogenetics, the two most commonly methodologies to control activity of neurons.

We will discuss molecular actuators, methods for genetic targeting, gene delivery through viral vectors, and delivery of light and ligands into the brain. In addition, light can be also used to record specific cellular events through engineered indicator proteins. We will discuss those molecular sensors and their applications in neuroscience. Although these genetic tools are primarily developed and used in the rodent brains, the methods have been widely disseminated in other model animals, including nematodes, fruit flies, zebrafish, songbirds, and non-human primates. An overview of the genetic tools will be followed by example applications to discuss their advantages and caveats.

Profile:

Dr. Ken Berglund is Assistant Professor of Neurosurgery at Emory University School of Medicine. His primary research focus is optogenetic and chemogenetic tool development for neuroscience research. Since he joined Emory University in 2014, he and his colleagues have applied molecular neuromodulation he developed as experimental treatments for various neurological disease conditions in rodents, including epilepsy, stroke, Parkinson's disease, Alzheimer's disease, and peripheral nerve injury. His expertise also includes genetic functional and cellular imaging in mouse models. He has developed genetically encoded indicators for calcium and chloride, which revealed various physiological and pathological activity at cellular and subcellular levels in the mouse brain.