

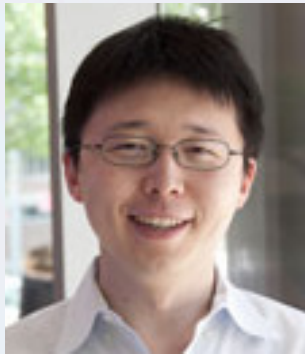
## Neural Prosthesis Seminar

# “Neuroengineering: Molecular and Optical Axis of Control”

January 20, 2012 • 8:30 AM

Biomedical Research Building • BRB 105

Case Western Reserve University



**Feng Zhang, PhD**

### Feng Zhang, PhD

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#### Abstract:

The integration of genetic, behavioral, and engineering techniques has enabled us to chart the heterogeneous cellular and circuit organization of the brain with unprecedented resolution. Yet, the emerging brain atlas is both illuminating and perplexing in its complexity. How do brain circuit elements interoperate and give rise to the panoply of behavioral and cognitive functions?

Recent developments in optogenetic technologies (channelrhodopsins and halorhodopsins) are beginning to give researchers the ability to reverse engineer intact neural circuits, by directly probing the necessity and sufficiency of cellular and topological circuit characteristics with high-speed and cell type-specific perturbations, using light to directly activate or inhibit specific neurons. Our latest developments have focused on three directions: 1) expanding the repertoire of genetically-encoded neuromodulators, 2) developing better cell-type and circuit-specific gene targeting and genome engineering systems, and 3) integrating optogenetics with a variety of circuit-level and behavioral readout methods. The emerging optogenetic platform enables deconstruction of previously inaccessible brain circuits, and will improve our understanding of the causal relationship between circuit activities and neuropsychiatric diseases.

For more information, please contact Cathy Naples at (216) 707-6490.

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