

# The 64<sup>th</sup> iCeMS SEMINAR

CeMI Seminar Series 19

**Tue 30 Nov 2010**  
**14:00–15:30**

Venue: 2nd floor Seminar Room (#A207)  
Main Building iCeMS Complex 1  
Kyoto University

Lecturer: **Dr. Yuichi Taniguchi**  
Department of Chemistry and Chemical Biology  
Harvard University

## “Quantifying *E. coli* proteome and transcriptome with single-molecule sensitivity in single cells”

Protein and messenger RNA (mRNA) copy numbers vary from cell to cell in isogenic bacterial populations. However, these molecules often exist in low copy numbers and are difficult to detect in single cells. We carried out quantitative system-wide analyses of protein and mRNA expression in individual cells with single-molecule sensitivity using a newly constructed yellow fluorescent protein fusion library for *Escherichia coli*. We found that almost all protein number distributions can be described by the gamma distribution with two fitting parameters which, at low expression levels, have clear physical interpretations as the transcription rate and protein burst size. At high expression levels, the distributions are dominated by extrinsic noise. We found that a single cell's protein and mRNA copy numbers for any given gene are uncorrelated.

**Quantifying *E. coli* proteome and transcriptome with single-molecule sensitivity in single cells.** Taniguchi Y, Choi PJ, Li GW, Chen H, Babu M, Hearn J, Emili A, Xie XS. *Science* 329, 533-538 (2010)

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**Hosted by:** iCeMS (Institute for Integrated Cell-Material Sciences), Kyoto University

