



## Channing Network Science Seminar

October 7th (Wednesday), 2020, 12:30pm

Zoom link: <https://zoom.us/j/356372893>



### Amir Bashan, PhD

Senior Lecturer  
Department of Physics  
Bar-Ilan University, Israel

### Age-related loss of gene-to-gene transcriptional coordination among single cells

**Abstract:** A long-standing paradigm holds that stochastic aberrations of transcriptional regulation play a key role in the process of aging. While transcriptional dysregulation is observed in the majority of cell types in the form of increased cell-to-cell variability, its generality to all cell types remains doubted. Here, we propose a novel approach for analyzing transcriptional regulation in single-cell RNA sequencing (scRNA-seq) data by focusing on the global coordination between the genes rather than the variability of individual genes or correlations between pairs of genes. Consistently, across very different organisms and cell types, we find a decrease in the gene-to-gene transcriptional coordination in aging cells. In addition, we find that loss of gene-to-gene transcriptional coordination is associated with a high mutational load of a specific, age-related signature and with radiation-induced DNA damage. These observations suggest a general, potentially universal, stochastic attribute of transcriptional dysregulation in aging.

Ref: Levy O, Amit G, Vaknin D, Snir T, Efroni S, Castaldi P, Liu Y-Y, Cohen HY, Bashan A. Age-related loss of gene-to-gene transcriptional coordination among single cells. *Nature Metabolism* (in press)

**Bio:** Dr. Amir Bashan has completed his Ph.D. studies in the physics department of Bar-Ilan University (BIU), Israel, in the field of network science under the guidance of Prof. Shlomo Havlin in 2013. He then did postdoctoral research in the Channing Division of Network Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, in the group of Prof. Yang-Yu Liu. Since 2016 he is a PI and senior-lecturer in the department of physics in BIU.

Hosted by Yang-Yu Liu