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Channing Microbiome Seminar

October 22nd (Friday), 2021, 9-10AM (ET)

Zoom link: <https://us02web.zoom.us/j/81070959105?pwd=RFJNd3dSZmR6dXJZNjJiYVZzQ3NEQT09>

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Complexity-stability relationship in empirical microbial ecosystems

Abstract: May's stability theory, which holds that large ecosystems can be stable up to a critical level of complexity, a product of the number of resident species and the intensity of their interactions, has been a central paradigm in theoretical ecology. So far, however, empirically demonstrating this theory in real ecological systems has been a long-standing challenge, with inconsistent results. Especially, it is unknown whether this theory is pertinent in the rich and complex communities of natural microbiomes, mainly due to the challenge of reliably reconstructing such large ecological interaction networks. Here, we introduce a novel computational framework for estimating an ecosystem's complexity without relying on a priori knowledge of its underlying interaction network. By applying this method to human-associated microbial communities from different body sites and sponge-associated microbial communities from different geographical locations, we found that in both cases the communities display a pronounced trade-off between the number of species and their effective connectance. These results suggest that natural microbiomes are shaped by stability constraints, which limit their complexity.

Short 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