



FriSBI

# Elementary approaches to growth rate maximization

**Daan de Groot and Age Tjalma**

VU Amsterdam

Host: Gasper Tkacik

Many microorganisms might have been driven towards maximal growth rates by natural selection. Inspired by this assumption, we investigate what a growth-maximizing microbe must look like. For this, we first uncover the building blocks of self-fabrication: Elementary Growth Modes. These are the minimal modes of gene expression that give rise to balanced self-fabrication. Moreover, it turns out that a microorganism that maximizes its self-fabrication rate, will only use one of such modes. Growth rate maximizing cells should thus be as elementary as possible. However, is there an elementary way to select this optimal growth strategy? The number of Elementary Growth Modes in a typical metabolic network is incomputable, and only one of them is optimal. Complex and pathway-specific regulatory mechanisms might be able to find this optimum, but these cost energy and might be hard to evolve. We try to imagine a cell that does not use complex regulatory mechanisms, but rather self-organizes its way towards evolutionary success.

**Friday, January 24, 2020 03:00pm - 04:00pm**

Mondi Seminar Room 3, Central Building



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: <https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.