



# Vissarion Fysikopoulos

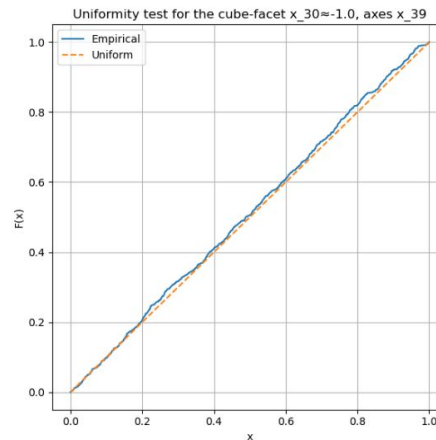
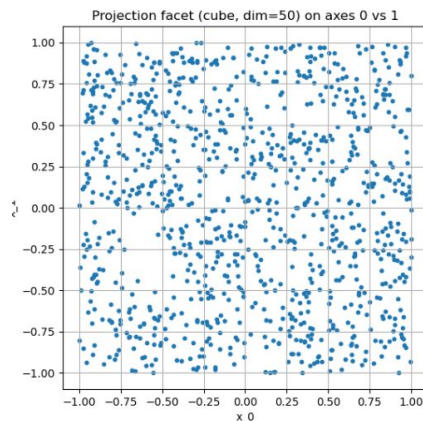
GeomScale

# Shake and Bake - Sampling from the boundary of convex polytopes

- **Contributor:** Iva Janković (currently PhD student @ Univ. of Edinburgh)
- **Goal:** Implement Markov Chain **Monte Carlo**-based Shake and Bake algorithm for uniform sampling from the boundary of a convex polytope
- **Motivation:** Fundamental problem in computational **geometry & statistics** + applications in metabolic network analysis
- **Results:** Implementations of new and classic algorithms in **C++** with **R** and **python** interfaces

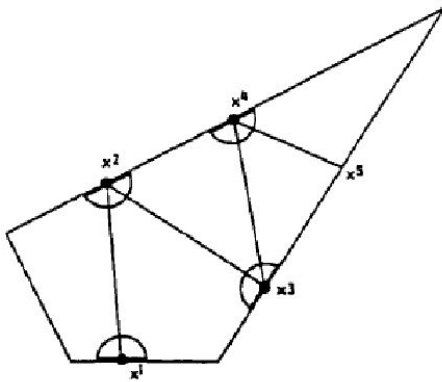
# Challenges I

- Implement the basic version of 80's algorithm
- Much faster than existing implementations (`shakeandbake` R package)
- **Challenges**: evaluate the **quality** of samples
- **Solution**: implement a **statistical test** for each facet of the polytope



# Challenges II

- Implement a new hybrid algorithm: **billiard shake and bake**
- Preliminary results show that it is much **faster** than the original one



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