# INTRODUCTION

- General importance of stochastic reaction networks
- Define a stochastic reaction network (mass action kinetics)
- Mention SSA and other methods and their limitations (SDM, PPM, tau-leaping, ssSSA)
- Describe what multiscale networks are
- Argue about the importance of having tools for simulating such systems

# HYBRID MODELS AND MULTISCALE REACTION NETWORKS

- Introduce PDMP formulation for hybrid models of reaction networks
- Review the framework of Kang et al.

# AVERAGING

- Review theoretical results about correctness of averaging
- Introduce Pseudo-Linear part
- Introduce Zero-Deficiency part

# ADAPTIVE PDMP

- Describe the algorithm in text-form
- Pseudocode for the algorithm
- Elaborate on copy number bounds
- Elaborate on the adaptation procedure
- Elaborate on the averaging procedure

# NUMERICAL EXAMPLES

- Simple example showing adaptation and hybrid model
- Simple example showing averaging
- More complex example showing averaging (e.g. multiple fast subnetworks)
- More complex example showing repeated adaptation (e.g. Repressilator or Toggle Switch)

# CONCLUSIONS

- Summarize new contributions
- Describe open issues and possible future directions

# APPENDIX

- Classic SSA
- Proof of correctness of the algorithm