MSc Computational Science
joint programme UvA/VU

# MODELLING SPATIAL INTERACTIONS IN *ASPERGILLUS* SPECIES FROM GERMINATION TO OUTGROWTH

## RESEARCH AND DATA SCENARIOS

Presented by Boyan Mihaylov

October 25, 2024

Supervisor: Prof. dr. Han Wösten, Utrecht University

Examiner: Dr. Jaap Kaandorp, University of Amsterdam

# OUTLINE

## 1 Potential Research Questions

1. Effect of spore density on early and intermediate hyphal morphology
2. Interaction between diffusion and hyphal morphology
3. Explaining the Dantigny model through spatial interactions

# 1. EFFECT OF SPORE DENSITY ON HYPHAL GROWTH

Explained through spatial interactions

- Background
  - Pellets seem to grow at low spore densities, free filaments at high spore densities[6].
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  - Spore agglomeration
  - Germination
  - Early to intermediate hyphal growth

- Data
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  - Other *Aspergilli*
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Two-way interaction between hyphal growth and diffusive transport

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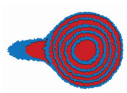

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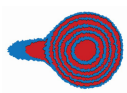

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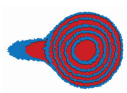

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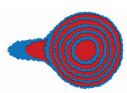

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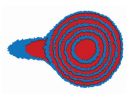

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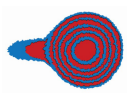

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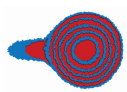

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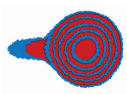

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Modelling germination from first principles

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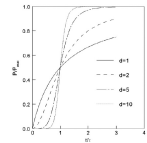


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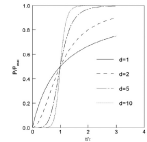


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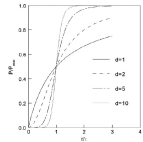


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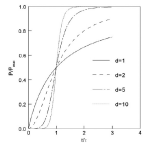


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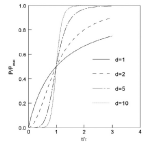


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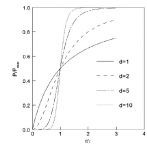


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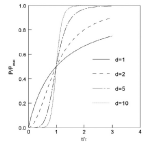


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[3] Maryam Ijadpanahsaravi, Wieke R. Teertstra, and Han A. B. Wösten. “Inter- and intra-species heterogeneity in germination of Aspergillus conidia”. In: *Antonie Van Leeuwenhoek* 115 (2022), pp. 1151–1164.

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# BIBLIOGRAPHY II


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