AGH University of Science and Technology

Multiscale Modelling

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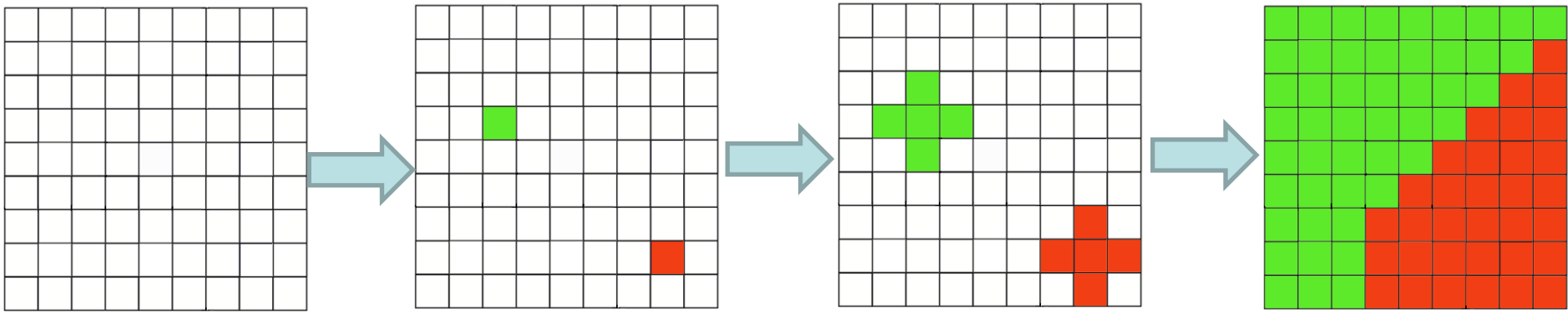
Classes calendar

	Issues
1	Organizational class - simple grain growth CA + visualization
2	Microstructures export/import to/from txt files, pictures.
3	Modification of cellular automata grain growth algorithm- inclusions (at the beginning/end of the simulation)
4	Modification of CA grain growth algorithm - influence of grain curvature
5	**Modification of CA grain growth algorithm - substructures CA**
6	Modification of CA grain growth algorithm - boundaries coloring
7	**Reports 1st part**
8	Monte Carlo grain growth algorithm
9	Modification of MC grain growth algorithm - substructures CA, MC
10	MC static recrystallization algorithm - energy distribution
11	MC static recrystallization algorithm - nucleation
12	MC static recrystallization algorithm - growth
13	**Reports 2nd part**
14	Final degree

Simple Grain Growth CA algorithm

2 grains
Von Neumann neighborhood



Initial space

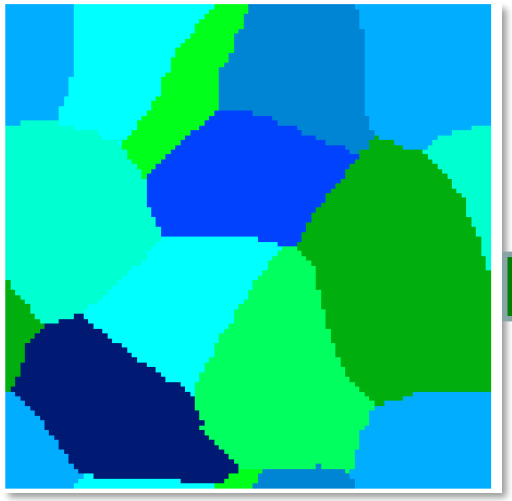
1st step

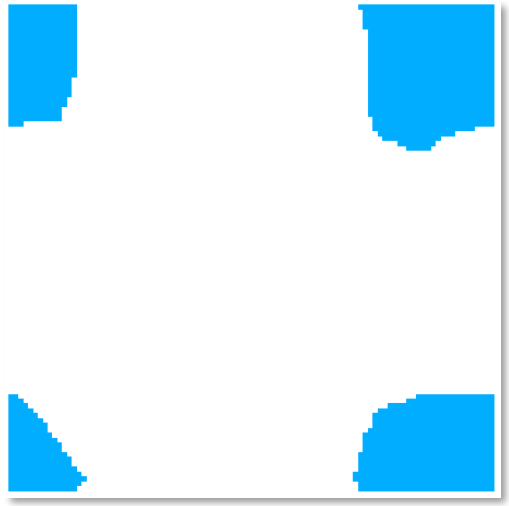
2nd step

last step

Substructure CA->CA

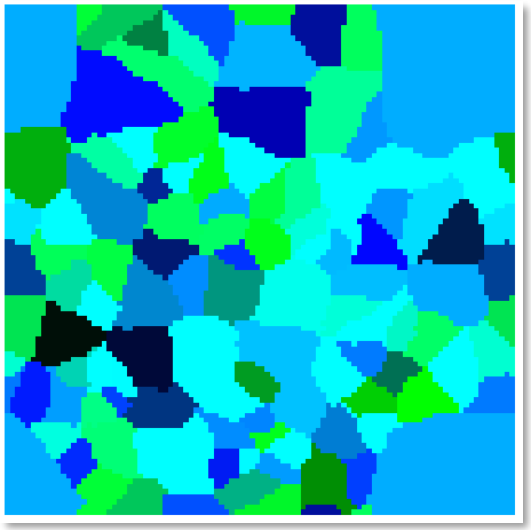
Step 1: Simple grain growth CA





Step 2: Grains selection

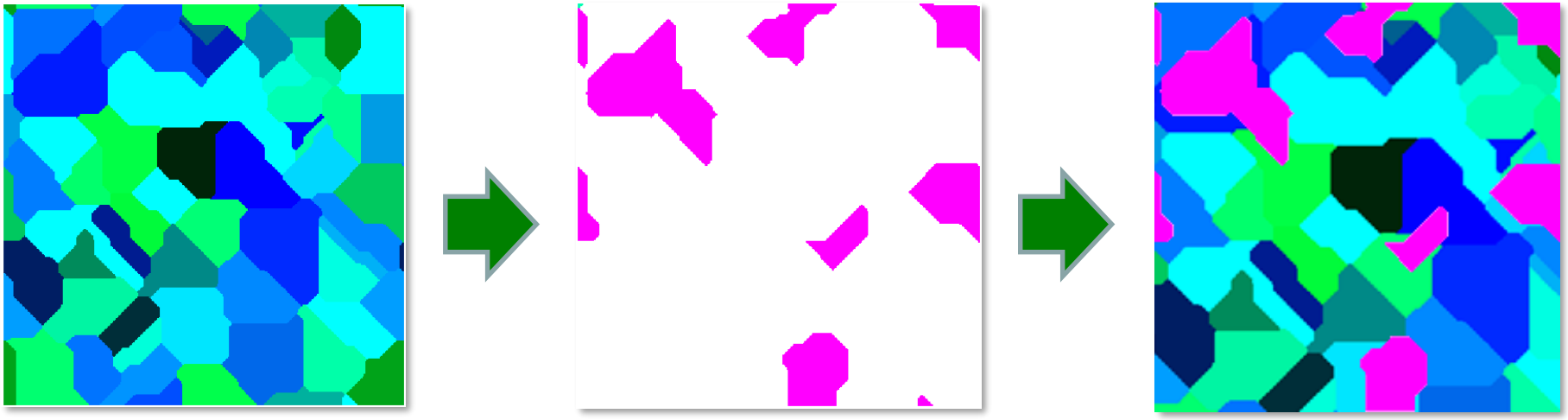
Step 3: 2nd grain growth CA



Dual phase CA->CA

Step 1: Simple grain growth CA

Step 3: 2nd grain growth CA



Step 2: Grains selection

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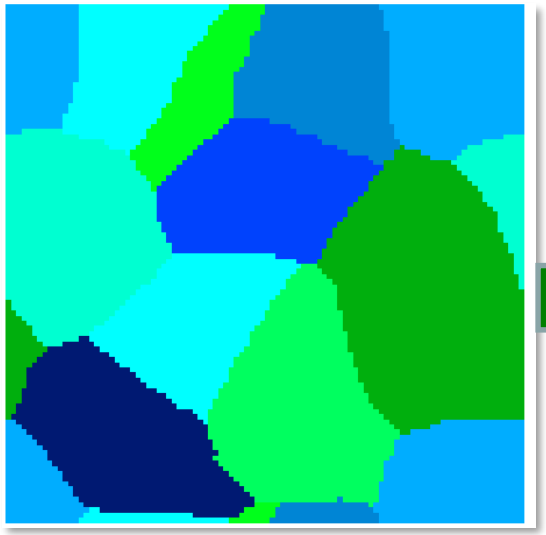
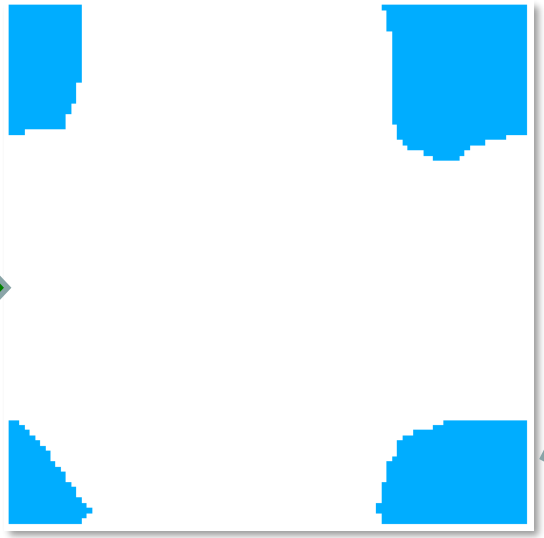
Step 1: Simple grain growth CA

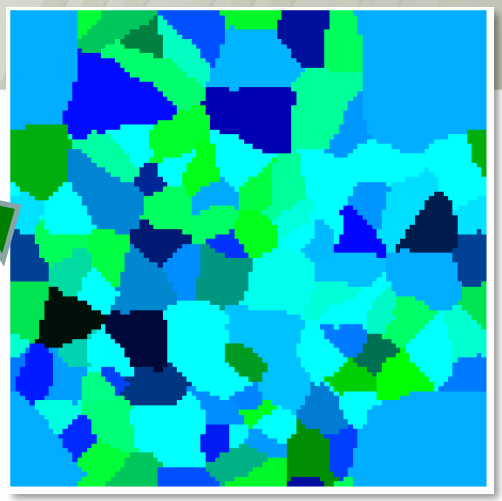


Step 2: Grains selection



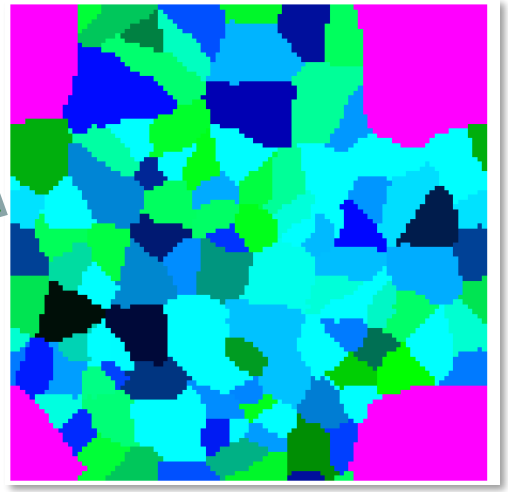
id - size - %
5 - 1749 - 17.49
8 - 1664 - 16.64
10 - 1201 - 12.01
1 - 939 - 9.39
7 - 611 - 6.11
2 - 714 - 7.14
3 - 395 - 3.95
4 - 838 - 8.38
9 - 1085 - 10.85
6 - 804 - 8.04

SUB



or

DP



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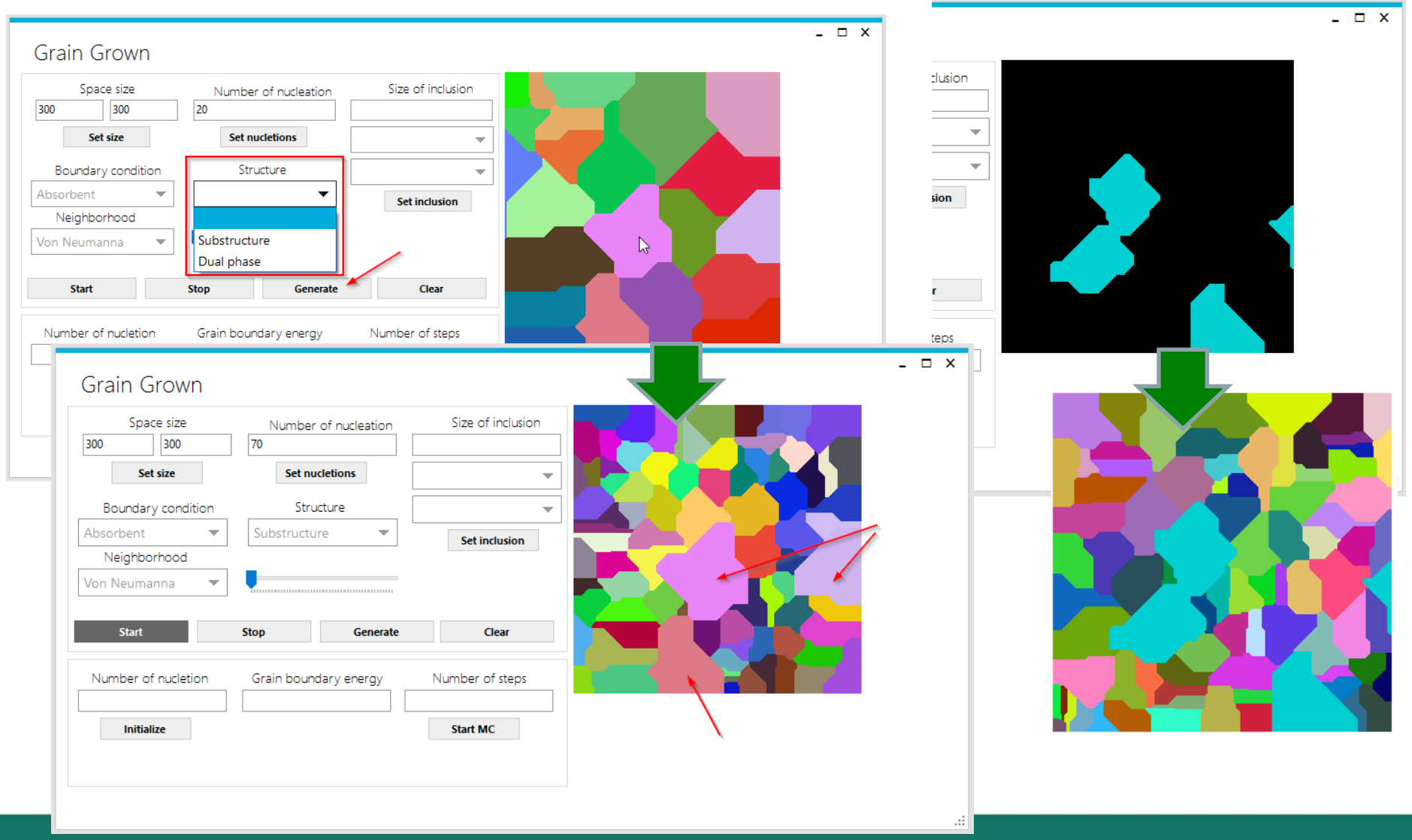
Grain Grown
Space size
300
300
Set size
Number of nucleation
20
Set nucleations
Size of inclusion
Set inclusion
Boundary condition
Absorbent
Neighborhood
Von Neumanna
Structure
Substructure
Dual phase
Start
Stop
Generate
Clear
Number of nucletion
Grain boundary energy
Number of steps
Grain Grown
Space size
300
300
Set size
Number of nucleation
70
Set nucleations
Size of inclusion
Set inclusion
Boundary condition
Absorbent
Neighborhood
Von Neumanna
Structure
Substructure
Start
Stop
Generate
Clear
Number of nucletion
Initialize
Grain boundary energy
Number of steps
Start MC