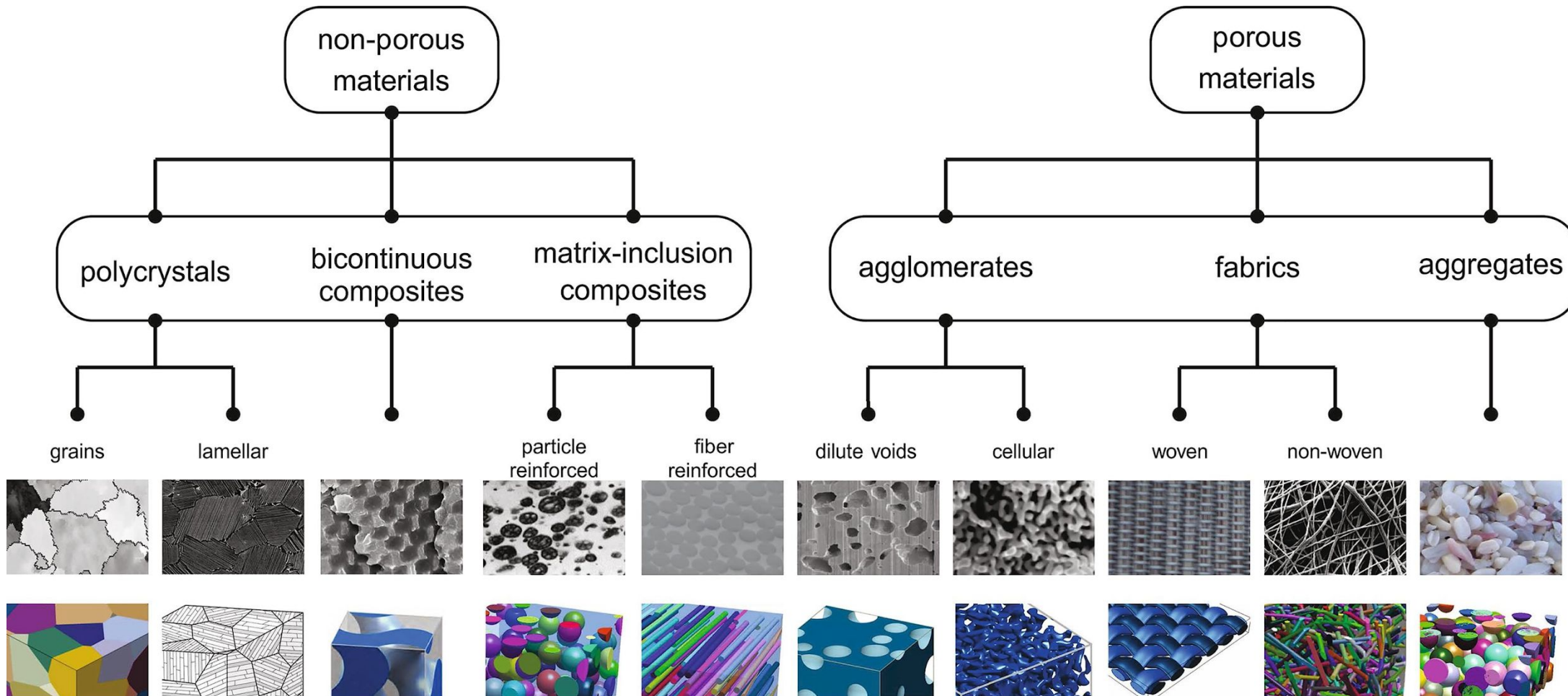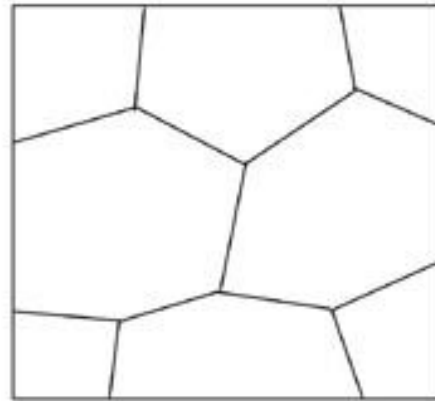# Multiscale Modeling

Classes Schedule

1. Kickoff meeting. Introduction. Simple Grain Growth Cellular Automaton

2. Inclusions, precipitations feature

3. **Consideration of grain curvature**

4. **Substructures / Dual-phase**

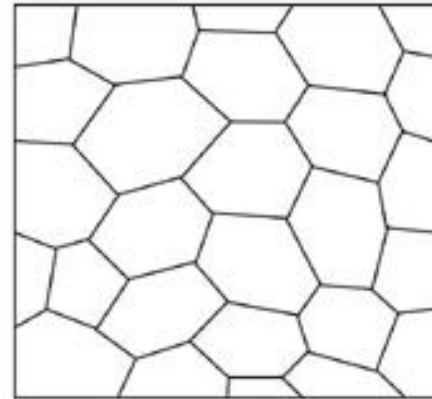5. Boundaries detection

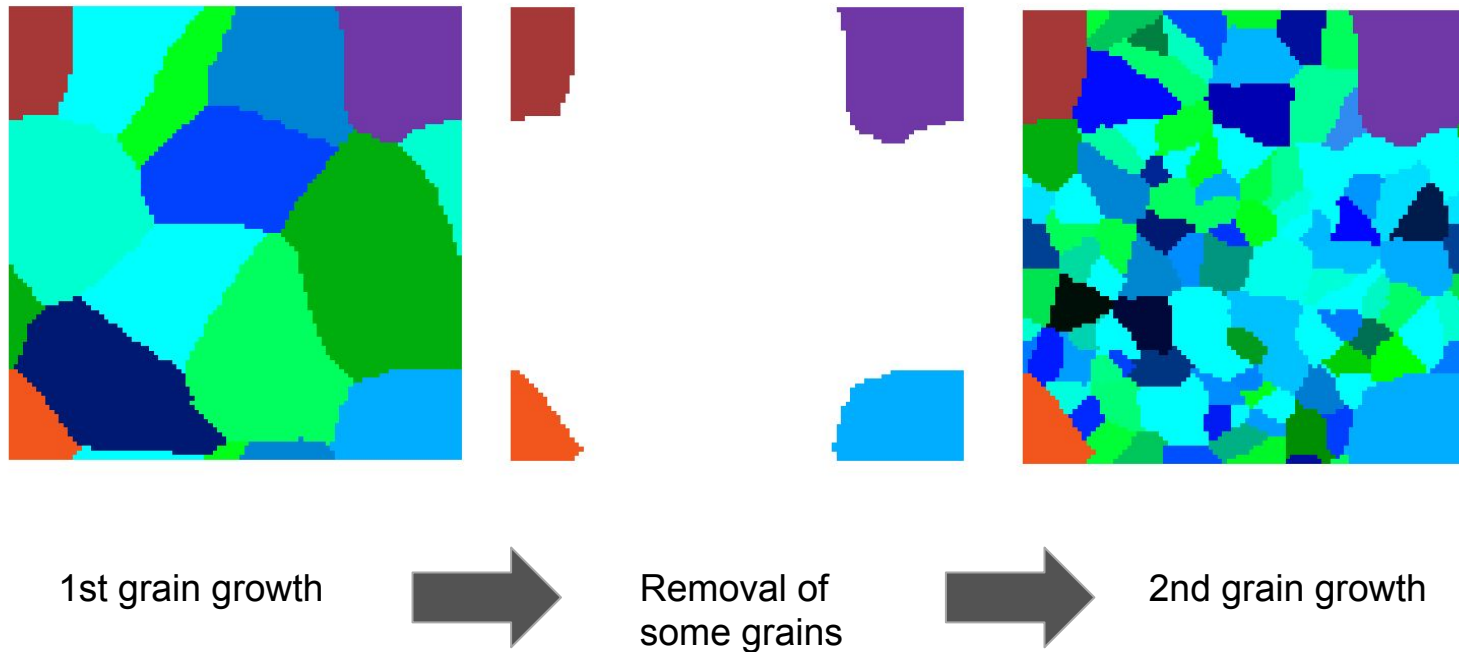6. Leftovers, project submitting

Substructures
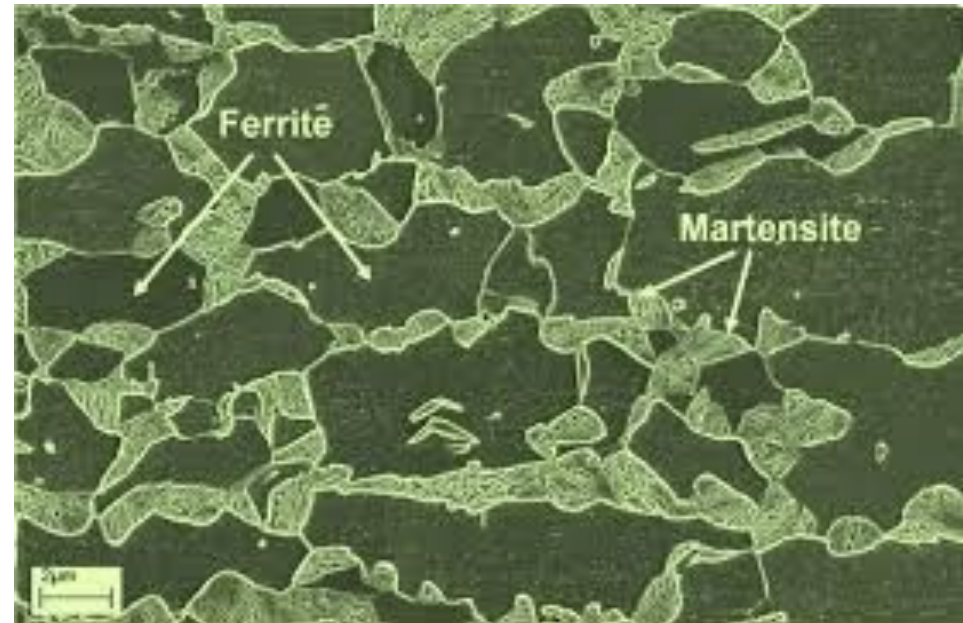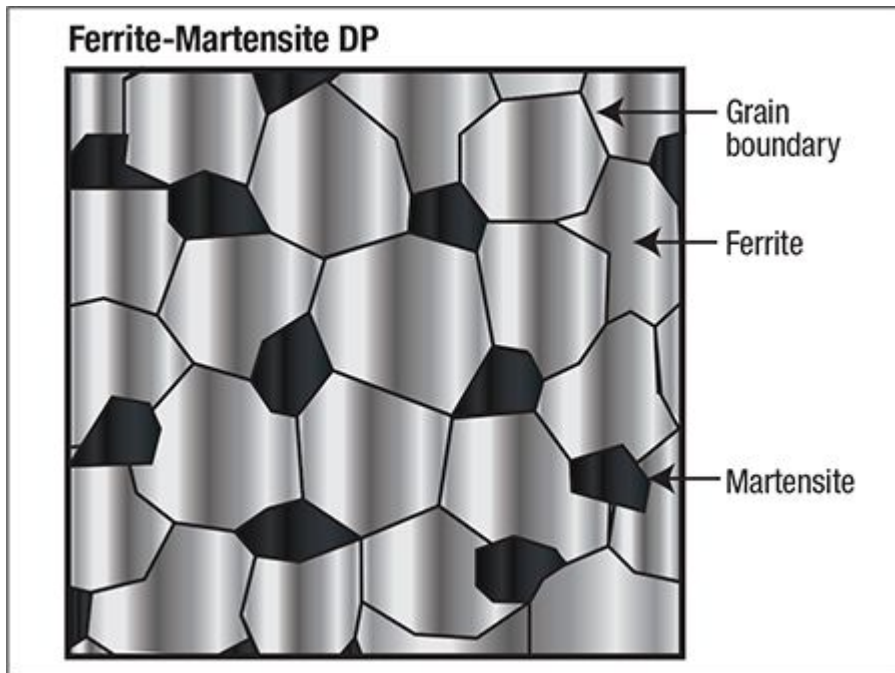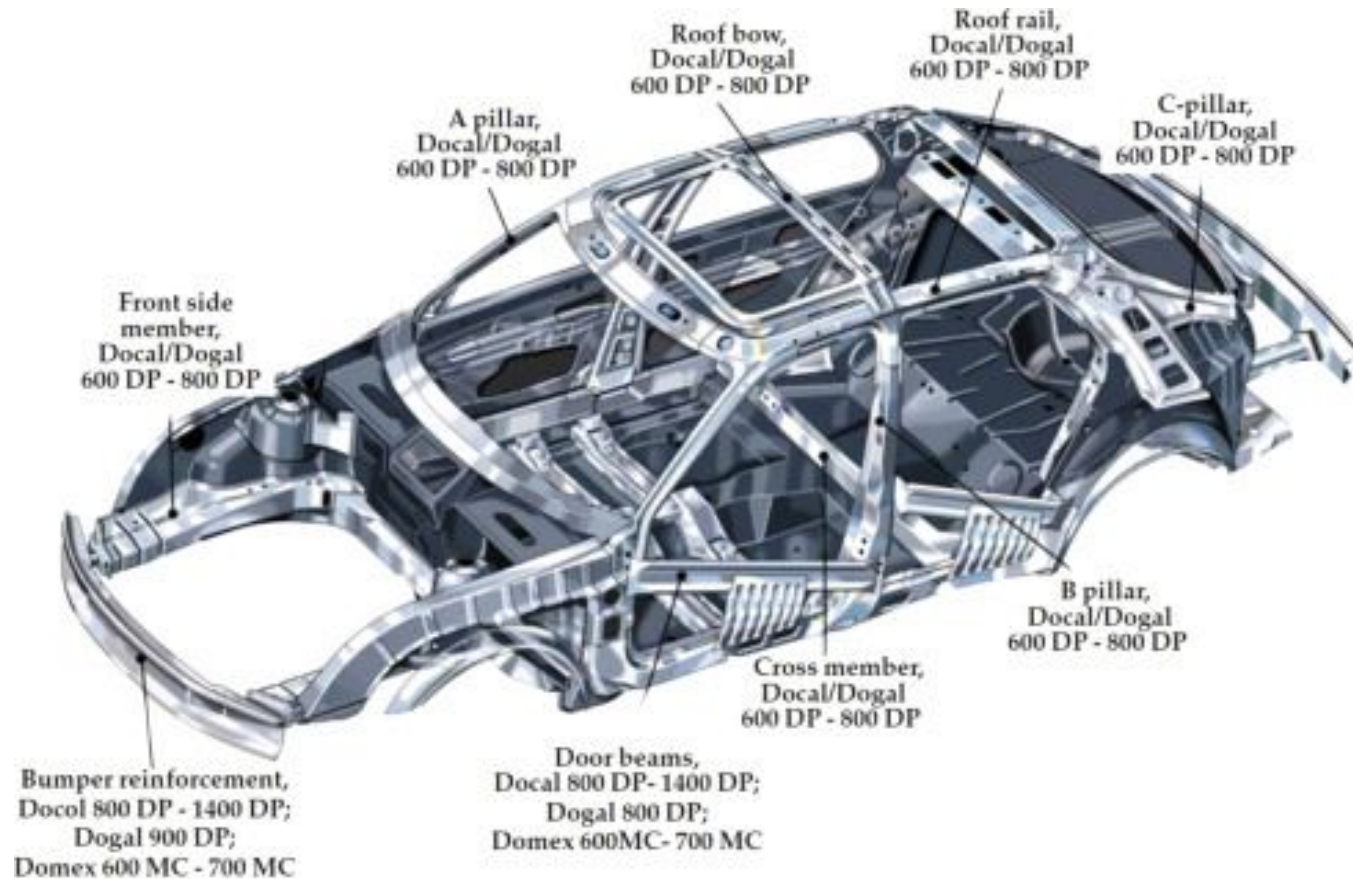
Different grain sizes

Large Grain

Small Grain

Different grain sizes

1st grain growth → Removal of some grains → 2nd grain growth

DP Microstructure

Ferrite-Martensite DP

Grain boundary

Ferrite

Martensite
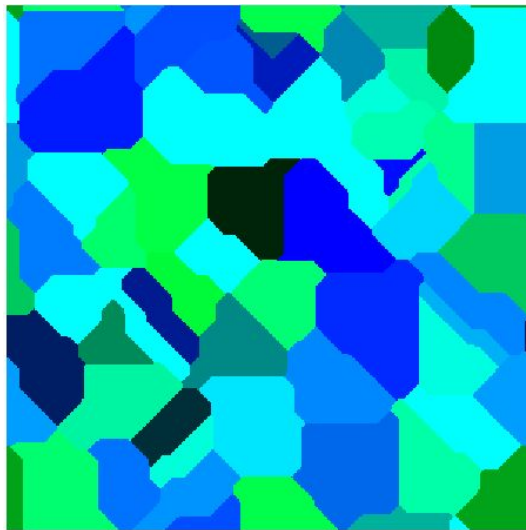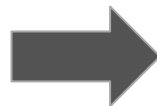

Ferrite

Martensite

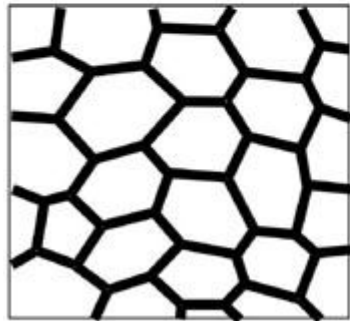# DP Steel Usage
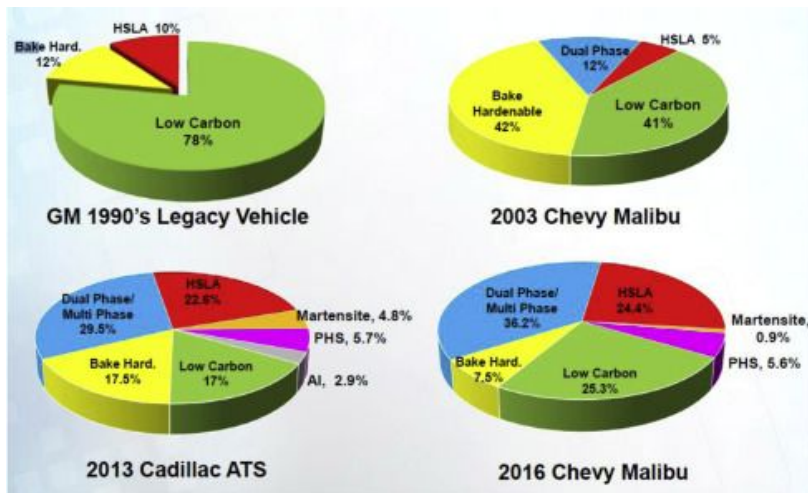
DP Structure

1st grain growth → Removal of some grains, mark remaining structure as a phase 1 → 2nd grain growth

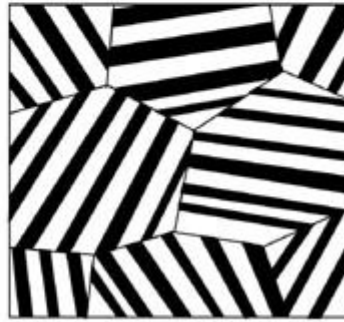# Lamellar structure

Grain Boundary Phase
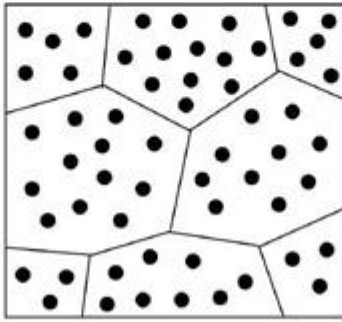
Precipitates within Grains

Lamella within Grains

α-lamellar colonies

β-grain boundary

50 μm
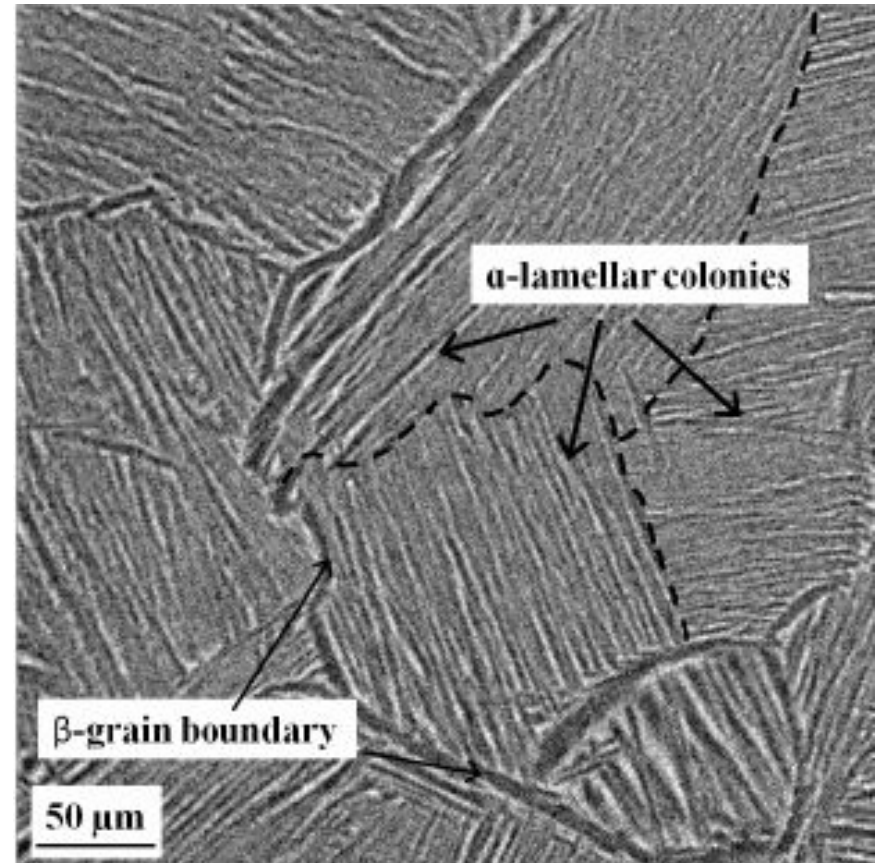
Perlite = Martenizite (Fe-C) + Ferrite (Fe α)

Implementation

- User can delete selected grains after grain growth

  - by clicking on them or by selecting from list

- User can perform second Grain Growth (Substructures feature)

- User can perform second Grain Growth, now using another distinct phase (Dual-Phase feature)