Theme: Semiconductor Process

- Sub Theme: 3D Metrology, Inspection for CD, and material analysis
  (Overcome the resolution limitation, 3D structural CD
  & void, measurement, Low PR damage methods)

Advanced metrology and inspection (MI) techniques are highly required for single-digit-node semiconductor manufacturing process. Most of conventional optical & e-beam based techniques including spectroscopy, (computational) microscopy, scatterometry, SEM, AFM, etc. encounter various challenges and they need to overcome its own limitation to meet the modern industry's standard. The topics we pursue through this GRO are as follows:

1. 1D, 2D, and 3D metrology technique with high resolution optics (EUV, X-ray, etc.), Scatterometry (on-Cell), SEM, AFM
 - X-ray Ptychography, Laminography, etc. (※ PSI Target)
 - high resolution e-Beam with confocal technique.
 - high resolution 3D SEM with Z-Scan technique.
 - high speed 1D Array Multi-beam Scanning Inspection (※ Delft Univ. Target)
 - Low PR damage metrology method (ex. SEM, AFM,⋯)
 - Metal inner void inspection method with high resolution (void target <1um)
2. Physics based simulation tool for particle-beam scanned microscopy, materials characterization, and elemental analysis.
3. Reflectivity or emissivity distribution inspection by 3D (Photo-)thermography technique
4. Novel computational imaging based metrology (Coded Aperture, meta-material for super/hyper resolution imaging optics, scatterometry, quantum imaging/sensing etc.)
5. Physics informed Neural Network(PINN) for optical simulation technique

※ *The topics are not limited to the above examples and the participants are encouraged to propose original idea.*

※ *Funding : Up to USD $150,000 per year*