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*“Knowledge-based, Smart Agriculture and Contract Farming”*

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**Speech Topic:** Advances in Molecular Breeding

### **Abstract:**

New advancements in detection of genetic and genomic variations have changed the landscape of molecular breeding. The application of association mapping in detection of trait linked markers was not restricted by the proper statistical models in the past, but the resolution of molecular markers detection. In the last 30 years, the DNA based molecular markers shifted from RFLP (restriction fragment length polymorphism) and RAPD (random amplified polymorphic DNA) to SSR (simple sequence repeats) and now SNPs (single nucleotide polymorphism) and DNA sequencing variants (SVs).

The advent of massively paralleled sequencing methods has made the markers detection and screening easier and cheaper. The speed, accuracy and constant cost reduction in sequencing techniques has made them the number one choice for marker screening for medium marker density (50-5000 markers) to high density (>5000 markers) genotyping. However, array based probe hybridization methods will be still used in the industry for a while for high-density genotyping until gradually replaced by skim based genotyping by sequencing or other DNA sequencing methods in future. In this presentation, the different methods for high throughput genotyping and their applications in plant breeding and seed production will be discussed.

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