

## Power Information and Decision System Laboratory

- **Lab Feature :** The lab focuses optimization, decision-making and computation for mathematical problems motivated from power system applications. Current focuses of the lab include the system-level coordinated control for smart distribution systems with high penetration of renewable energy sources, stochastic optimal decision-making in demand response and ancillary services, rapid solution of unbalanced distribution (optimal) power flow problem and its relevant mathematical properties and cyber-physical security of smart power grid. The lab sincerely seeks candidates with strong mathematical background and desire for impact on practical applications.
- **Research Topics**
  - Optimal system-level coordinated control for smart distribution systems
  - Stochastic optimal decision-making in demand response and ancillary services
  - Unbalanced three-phase (optimal) power flow problems – computation and solution properties
  - Optimal software update scheduling for large number of smart inverters
  - Reduction techniques for power system graph combinatorial optimization problems
  - Graph decomposition based approach for power system graph combinatorial optimization problems
  - Analysis and planning for power system cyber-physical security
  - Modeling and identification for electric vehicle state-of-charge and state-of-health estimation
- **Projects**
  - Application of graph decomposition theory in the optimal analysis and planning of large-scale smart electricity grids (MOST)
  - Joint design optimization of power dispatch and storage sizing and placement in networks with renewable generations (MOST)
  - Optimal dispatch of flexibility resources in power systems with high penetration of renewables (MOST)
  - 可再生能源之風力發電棄風率及風險評估 (財團法人成大研究發展基金會)