



## Environment Sensing

Humidity / Temperature  
Intel Lab Traces  
Log-Normal Shadowing



## Skeleton & CH Election

Residual Energy Counter  
Principal-Axis Backbone  
Deterministic Rotation



## CAS Decision Engine

EMA scoring:  
Energy · Radius ·  
Density · Fairness  
Direct   Chain   Two-Hop



## Gateway & Safety Plane

Scoring · Redundant  
Uplinks · Safety  
Override · Jain  
Fairness



## End-to-End Delivery

End-to-End PDR  
Energy Consumption  
Lifetime (FND)



## Diagnostics & Reproducibility

Welch t-tests  
Bootstrap CI  
JSON Manifests

State Update & Fairness Feedback Loop