Five Novel Contributions

1 **Integrated Framework**

First unified ML approach across LOC, FP, and UCP schemas

2 **Macro-Averaging**

Equal weight per schema prevents LOC dominance

3 **Calibrated Baseline**

Rigorous comparison with calibrated power-law

4 **LOSO Validation**

Cross-source generalization (11-fold for LOC)

5 **Imbalance-Aware Training**

Quantile reweighting for skewed distributions