Create custom signal maps to improve performance + security
⇒ Boost Wi-Fi performance in another room
⇒ Stop third-parties from sniffing Wi-Fi packets

Directional antennas
⇒ Expensive (> $9000)
⇒ Bulky

3D printed glossy reflectors
⇒ Cheap (~$50)
⇒ Adaptive to environment
⇒ Lightweight

Motivation

Results

Floor plan + signal constraints

Generated reflector

Without reflector

With reflector

Design

1) Ray tracer
⇒ Models reflection, refraction, diffraction
⇒ Predictive error of 2-3 dBm

2) Pareto Simulated Annealing
⇒ Multi-objective optimization
⇒ Randomized algorithm to fit constraints

Fabrication

Future work

Other frequency bands
⇒ 60GHz, visible light, infrared

More complex models
⇒ Explore outdoor + multifloor environments

Multi-reflector system
⇒ Relay signals to occluded areas

Different material types
⇒ Explore reflective properties