



# NSF Campus Cyberinfrastructure PI and Cybersecurity Innovation for Cyberinfrastructure

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**NSF Program:** CICI

**Award Number:** 1739034

**Program Area:** Resilient Security Architecture  
for Research Cyberinfrastructure

**Project:** CICI: RSARC: DDoS Defense In Depth for DNS (DDIDD)

<https://ant.isi.edu/ddidd/>

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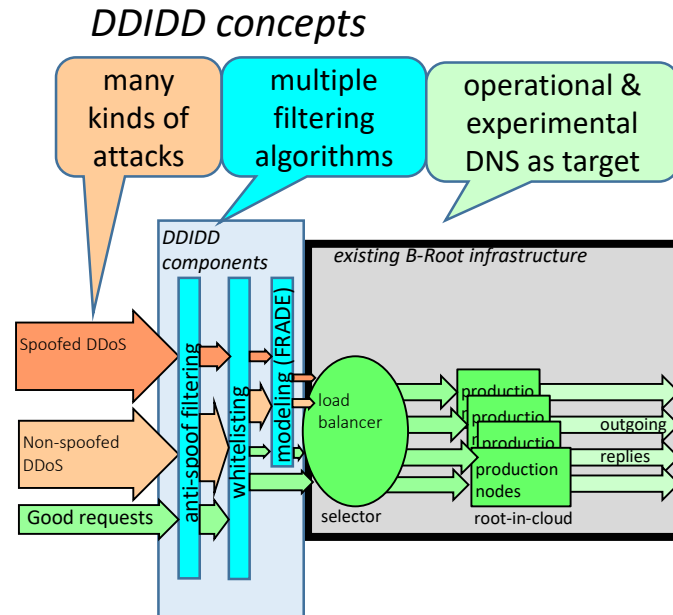
## Quad Chart for: **DDoS Defense In Depth for DNS (DDIDD)**

### Challenges

- Many kinds of DDoS attacks
  - Spoofed traffic
  - Direct, non-spoofed bogus traffic
  - Legitimate-like requests from new sources
  - Legitimate-like requests from established sources
- How can we defend against all?

### Insight and Approach

- No *one* method efficiently addresses all threats
- We need *multiple* methods:  
**Defense in Depth**
- Planned approaches:
  - Anti-spoof filtering
  - Off-loading bogus query responses
  - Whitelisting known good clients
  - Modeling known good clients
  - Dynamically scaling infrastructure



### Broader Impacts

- Initial tests on B-Root, one of the 13 root nameservers for the Internet
- Open source releases for all
- Technology transfer from prior NSF projects (CNS #1319215, FRADE)
- Leverage our prior work
  - Oikonomou and Mirkovic. Modeling Human Behavior for Defense Against Flash Crowd Attacks. IEEE ICC, 2009. 10.1109/ICC.2009.5199191
  - Moura, Schmidt, Heidemann, de Vries, Müller, Wei, and Hesselman. Anycast vs. DDoS: Evaluating the November 2015 Root DNS Event. 10.1145/2987443.2987446

### About Us

- PIs: John Heidemann, Jelena Mirkovic, Wes Hardaker (USC/ISI)
- Joint work of researchers and B-Root operations at ISI
- <https://ant.isi.edu/ddidd/>
- New project, started October 2017