

# Hard-ID

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Unique Hardware Identifier for IoT Devices

# Secure IoT Devices

- IoT (Internet of things) devices are becoming ubiquitous
  - wearables, sensors, etc.
- We depend on IoT devices for critical data
  - health sensors, electric grid, smart home, etc.
- Require to authenticate the IoT devices
  - prevent fake devices, false data, etc.

# Current Solutions

- Existing identifiers: MAC address, Barcode, Password
- Identifiers are just bits of data and can be copied, stolen, or cloned – not guaranteed to be unique
- Dangers of fake identifiers
  - let a device impersonate another device, bypass access control list, send fake data, etc.

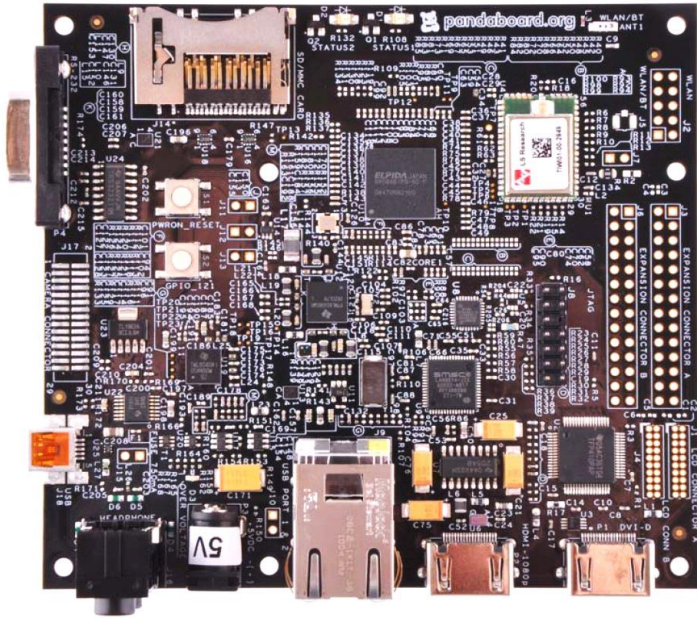
**Advantage: we present a  
unique hardware identifier for IoT security**

# Hardware Identifier for IoT Devices

- Even with the same design and fabrication process, each device is unique
  - Due to the unavoidable and uncontrollable variations in silicon fabrication process
- Our hardware identifier is not easy to copy or bypass
- Security applications:
  - Authentication
  - Secure key storage



# Technology: DRAM PUF



- Current status:
  - Demonstrated and evaluated the concept on two different IoT devices: Intel Galileo and Pandaboard
  - Developed lightweight authentication protocols and key storage algorithms

# Hard-ID

- **We present a hardware identifier for IoT security**
- The hardware identifier is physically unclonable
  - Unique
- DRAM modules exist in most current IoT systems
  - No new cost
- The DRAM identifier is run-time accessible
  - Practical
- No hardware modification
  - Easy to deploy

# Team and Expense

- Wenjie Xiong and Prof. Jakub Szefer
  - Lead engineers for developing
  - Connect with Industry
- Two Engineers: \$300k/y
  - Develop DRAM PUF demonstration on different platforms
  - Develop smart phone Apps
- One marketing person: \$100k/y
  - Make business plans
  - Communicate with potential customers

# IP and Business Model

- **IP:** DRAM PUF not owned by anybody else
- **Commercialization Strategy:** develop demonstrations and sell IP licenses, or directly sell solution to end customers
- IP licensing:
  - hardware companies: add security features in their hardware products to attract more customers
  - banks / security conscious customers: alternative to authentication tokens, new two-factor authentication
- End user:
  - smartphone app to directly access identifier

Thanks!