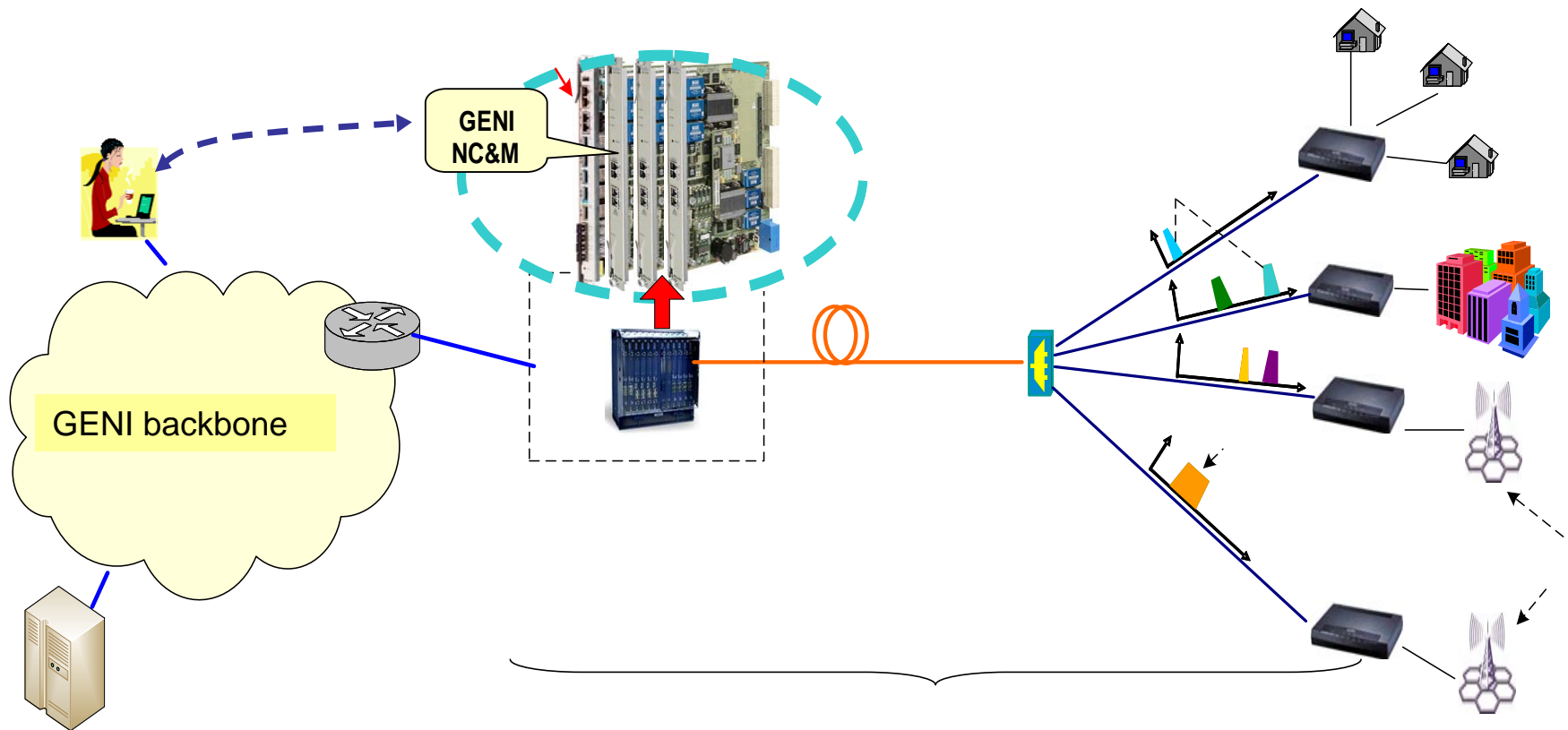# An Experimental Facility for Optical Access and its Integration with Wireless Access

Chunming Qiao

SUNY Buffalo

In Collaboration with NEC Labs America, Princeton, NJ

High Level Functional Architecture

☑Optical OFDMA/WDM based virtual passive optical network (VPON)

    ➢Programmable OLT (including a virtualizable PSD) and ONU (access nodes)

☑GENI Backbone Interface (including NC&M and GUIs)

☑GENI Wireless access interface (via either direct RF, IRF or A/D/A)

Initial Capabilities

☑ provides an programmable experimental facility for conducting research on future ultra-broadband optical access and its integration with wireless (mobile) access.

- ➤ Flexible resource sharing and allocation via OFDM by supporting two or more virtual PONs (e.g., B-PON, E-PON or user defined PON MAC protocols) within the same physical OFDM /WDM PON at the same time.

- ➤ Higher-bandwidth and more resource efficient wireless access via optical/wireless integration (OWI) by demonstrating that WiMAX signals from two base-stations can be carried "transparently" over OFDM/WDM links back to the edge node to e.g., achieve spatial and temporal diversity gains.

Technology Roadmap

☑In 18 months, a prototype facility

- ➤one edge node and 4 access nodes
- ➤256 sub-carriers and 2.5Gbps

☑In 3 years, a small-scale GENI facility

- ➤1024 Sub-carriers and 10Gbps
- ➤an programmable DSP blade for e.g., distributed MIMO
- ➤GENI researchers and opt-in users

☑In 5 years, several sites operating in concert

- ➤support several programmable wireless devices with different RF interfaces
- ➤integration with GENI metro/backbone to provide end-to-end provisioning service.

Thank You!

Questions/Comments?

qiao@computer.org