Overview of NCEL:
Network Communications & Economics Lab

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NCEL Lab

- Founded in 2007

- Current members include 2 postdocs and 7 PhD students (2 Hong Kong PhD Fellows)
The Visions of NCEL

- Conduct world-class high-impact theoretical research in the interdisciplinary area between communications, networking, and economics.

- Help members grow into international leading researchers.
Research Themes

Wireless Communications
Network Economics
Optimization
Microeconomics
Research Areas

- Smart Grid
- Cognitive Networking
- Network Economics
- Network Security
- Cooperative Communications
- Wireless MAC
- Network Optimization
- DSL Optimization
- Video Communications
Research Collaborations

• Universities: North America & Europe

• Universities: Asia-Pacific

• Industry partners
Recent NCEL Books

Wireless Network Pricing
Jianwei Huang
Lin Gao

Monotonic Optimization in Communication and Networking Systems
Ying Jun (Angela) Zhang, Liping Qian and Jianwei Huang

Cognitive Virtual Network Operator Games
Lingjie Duan, Jianwei Huang, Blying Shou

Social Cognitive Radio Networks
Xu Chen, Jianwei Huang

More information: http://ncel.ie.cuhk.edu.hk/content/books
Publications in 10 Years

- 10 Book Chapters
- 61 Top Journal Papers
  - *IEEE Transactions on Networking*
  - *IEEE Journal on Selected Areas in Communications*
  - *IEEE Transactions on Mobile Computing*
  - *IEEE Transactions on Wireless Communications*
- 116 Top Conference Papers
  - IEEE INFOCOM, ACM Mobihoc, IEEE ICDCS, ...
- Google Scholar citations 4900+, SCI citations 1900+
International Research Awards

- IEEE ComSoc Distinguished Lecturer 2015-2016
- IEEE ComSoc Asia-Pacific Outstanding Young Researcher Award 2009
- IEEE Marconi Award in Wireless Communications 2011
- Seven International Conference Best Paper Awards
  - IEEE WiOPT Best Student Paper Award 2015
  - IEEE WiOPT Best Paper Award 2014 & 2013
  - IEEE SmartGridComm Best Paper Award 2012
  - WiCON Best Paper Award 2011
  - IEEE GLOBECOM Best Paper Award 2010
  - APCC Best Paper Award 2009
NCEL Member Achievements

- Faculty members
  - Liqun Fu (PhD 2011): Shanghai Tech
  - Lingjie Duan (PhD 2012): Singapore University of Technology & Design
  - Fen Hou (Postdoc 2011): University of Macau
  - Quansheng Guan (Postdoc 2013): South China University of Technology

- Best Paper Awards
  - Yuan Luo (current PhD): IEEE WiOpt 2014
  - Qian Ma (current PhD): IEEE WiOpt 2015
  - Xu Chen (PhD 2012): IEEE INFOCOM 2014 (runner-up) and IEEE ISI 2010 (runner-up)
NCEL Member Achievements

- Hong Kong Young Scientist Awards
  - Xu Chen (PhD 2012): Physical/Mathematical Science Panel Runner-up Award 2014

- CUHK Global Scholarship for Visiting Top Universities
  - Liquan Fu (PhD 2011): visit Princeton University
  - Lingjie Duan (PhD 2012): visit University of California, Berkeley
  - Yuan Luo (current PhD): visit University of California, Berkeley
Selected Research Highlights

More Details at http://ncel.ie.cuhk.edu.hk/current-research
Area I: User Provided Networking
Crowd-Sourced Internet Connectivity

Hybrid Pricing-Reward Scheme

Area II: Dynamic Spectrum Sharing
Hybrid Spectrum Markets

As a percentage of total mobile data traffic from all mobile-connected devices, mobile offload increases from 45 percent (1.2 exabytes/month) in 2013 to 52 percent (17.3 exabytes/month) by 2018 (Figure 14). Without offload, Global mobile data traffic would grow at a CAGR of 65 percent instead of 61 percent. Offload volume is determined by smartphone penetration, dual-mode share of handsets, percentage of home-based mobile Internet use, and percentage of dual-mode smartphone owners with Wi-Fi fixed Internet access at home.

Figure 14. 52 Percent of Total Mobile Data Traffic Will Be Offloaded by 2018

The amount of traffic offloaded from smartphones will be 51 percent by 2018, and the amount of traffic offloaded from tablets will be 69 percent by 2018.

A supporting trend is the growth of cellular connectivity for devices such as tablets which in their earlier generation were limited to Wi-Fi connectivity only. With increased desire for mobility and mobile carriers offer of data plans catering to multi-device owners, we find that the cellular connectivity is on a rise albeit cautiously as the end users are testing the waters. As a point in case, we estimate that by 2018, 42 percent of all tablets will have a cellular connection up from 34 percent in 2013 (Figure 15).
Data Offloading Market

NCEL Welcomes You

- Highly motivated **PhD students** with passion in interdisciplinary network economics research
  - Check [http://www2.cuhk.edu.hk/gss/hkphd/](http://www2.cuhk.edu.hk/gss/hkphd/)
- **Postdoc researchers** with a strong publication record and a strong desire to succeed in academia
- **Visiting PhD students** with strong publications and fresh ideas
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