Overview of NCEL: Network Communications & Economics Lab

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NCEL History

- Established in 2007 in CUHK Hong Kong
- 2007-2018: Graduated 12 PhDs, 3 Masters, and 7 Postdocs
- Current: 2 professors, 8 PhD students, and 1 Postdoc
- 2019: expanding to CUHK Shenzhen
NCEL Vision

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

• Help members grow into international leading researchers.
Research Themes

- Wireless Communications
- Network Economics
- Optimization
- Microeconomics
Research Areas

http://ncel.ie.cuhk.edu.hk/current-research
Research Collaborations

- Universities: North America & Europe

- Universities: Asia-Pacific

- Industry partners
NCEL Books

http://ncel.ie.cuhk.edu.hk/content/books
NCEL Tutorials

http://ncel.ie.cuhk.edu.hk/content/tutorials
NCEI Director: Prof. Jianwei Huang

- Presidential Chair Professor and Associate Dean, CUHK, Shenzhen
- IEEE Fellow, Class of 2016 (at the age of 37)
- Thomson Reuters Highly Cited Researcher, 2016/2017
- IEEE ComSoc Distinguished Lecturer 2015-2018
- CUHK Young Researcher Award, 2014
- IEEE ComSoc Asia-Pacific Outstanding Young Researcher Award 2009
- IEEE Marconi Award in Wireless Communications 2011
- Eight International Conference Best Paper Awards
- Editor of IEEE Journal on Selected Areas in Communications, Transactions on Networking, Transactions on Mobile Computing, Transactions on Wireless Communications, Transactions on Network Science and Engineering, Transactions on Cognitive Communications and Networking
- Total Google Citations: 10200, H-Index: 50
NCEL Faculty Alumni

- Liqun Fu (PhD 2011): Xiamen University (Distinguished Professor)
- Xu Chen (PhD 2012): Sun Yat-Sen University (Full Professor)
- Lingjie Duan (PhD 2012): Singapore University of Technology & Design (Assistant Professor)
- Changkun Jiang (PhD 2017): Shenzhen University (Assistant Professor)
- Fen Hou (Postdoc 2011): University of Macau (Assistant Professor)
- Lin Gao (Postdoc 2016): Harbin Institute of Technology - Shenzhen (Associate Professor)
- Quansheng Guan (Postdoc 2013): South China University of Technology (Full Professor)
- Yanru Zhang (Postdoc 2017): University of Electronic Science and Technology of China (Full Professor)
NCEL Member Achievements (1/2)

- Chinese Thousand Talents Award for Young Professionals (青年千人)
  - Liqun Fu (2015) and Xu Chen (2016)

- IEEE ComSoc Asia-Pacific Outstanding Young Researcher Award

- Hong Kong Young Scientist Awards
  - Xu Chen: Physical/Mathematical Science Runner-up (2014)
  - Lingjie Duan: Engineering Science Finalist (2014)
NCEL Member Achievements (2/2)

• CUHK Postgraduate Research Output Award: Yuan Luo (2015)
• CUHK Young Scholar Thesis Award: Yuan Luo (2015)
• Phd Students Visiting Top Universities for 6-9 months
  • Princeton University: Liqun Fu (2010), Meng Zhang (2018)
  • University of California, Berkeley: Lingjie Duan (2011), Yuan Luo (2014)
  • University of Illinois Urbana-Champaign: Qian Ma (2015)
  • Stanford University: Ming Tang (2017)
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).
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
Google “Jianwei Huang”

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