

2008 CIE-USA/GNYC Emerging Technology Short Courses

Date/Time: 5/3/2008, Saturday; 9:30 AM – 4: 30 PM

Location: Polytechnic University, Brooklyn, NY

Driving Directions: Use Google map and www.poly.edu/directions

Sponsors: CIE-USA/GNYC (www.cie-gnyc.org) and Polytechnic Center for Advanced Technology in Telecommunications (www.catt.poly.edu)

Track	Course Title	Lecturer	Time	Room
I	Emerging IP-Video Networks, Personalized Services, and Opportunities	Dr. Guangzhi Li, Dr. Zhu Liu, and Dr. Paul Lin, AT&T	09:30 AM – 12:30 PM	TBD
I	Peer-to-Peer Video Streaming	Prof. Yong Liu, Polytechnic Univ	01:30 PM – 04:30 PM	
II	Passive Optical Networks for First/Last Mile Access	Prof. Nirwan Ansari, NJIT	09:30 AM - 12:30 PM	
II	A Survey of Next Generation Wireless Mobile Systems	Dr. Bi Qi, Bell Labs, Alcatel/Lucent	01:30 PM – 04:30 PM	

Course Fee Schedule:

Registration Fee	On-Line Registration Before 4/30/08	Registration after 4/30/08	Any 2 Courses Discount
Regular Attendee	\$20	\$25	\$10 Off
CATT Member	Free	Free	NA
Student*	Free	Free	NA

***Students must pre-register online and present valid student ID card when checking in.**

Parking Facility: <http://www.poly.edu/doc/PARKINGaroundPoly.pdf>

For on-line registration, visit: <http://www.cie-gnyc.org>

~~ Box Lunch: 12:30 – 1:30 PM ~~ (\$5 each)

Emerging IP-Video Networks, Personalized Services, and Opportunities

ABSTRACT

With more service providers making considerable investments to roll out multimedia services using IP technology, multimedia distribution, especially broadcast TV distribution over an IP network, the so called IPTV, is expected to grow impressively. This course describes the fundamental building blocks of IPTV services, which is partitioned into three parts: IPTV networks, personalized services, and opportunities. Each part is self contained and basic concepts and principles are explained simply without assuming prior IP related protocols and networking experience or mathematical background.

This first part of this course, IPTV networking, is designed for engineers and researchers from industries, as well as faculties and students from universities seeking to understand:

- Principles concepts on IPTV
- IPTV network building blocks
- How does IPTV works
- IPTV QoS
- IPTV network research challenges

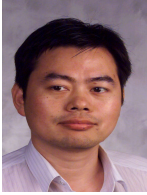
In part I of this course, we will provide easy understanding answers to all those questions based on our experience and research work.

The second part of this course focuses on content personalization services in IPTV system. IPTV customers will have access to thousands of video content sources and require powerful yet intuitive tools to locate desired content. Personalization services identify relevant content from all video sources based on the content preferences specified in the users' profiles. Following topics are included in the part of the course:

- Overview of personalization services in IPTV system
- Multimedia content ingestion and processing
- A prototype of personalization services

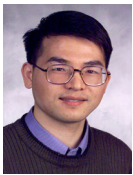
The third part of this course, Opportunities, will look into industry trends for delivery of IP-based video content to three-screens and provide an overview on topics such as:

- "Open" networks opportunities
- Home networking opportunities
- Content management opportunities
- Quality-of-Experience opportunities



Guangzhi Li received his B.S. degree from Tsinghua University, P.R. China in 1988 - one year ahead of university schedule. Then he worked for two years in Sichuan Panzihua iron&steel Corporation. In 1992, after received his master degree from Tsinghua University, he joined an UNDP (United Nations Developing Program) project in CATT (China Academic of Telecommunication and Technology). In 1996, he came to US and received his Masters and Ph.D.

degrees in Computer Science from the College of William and Mary in 2000. Then he joined AT&T Lab-Research where he currently holds a principle researcher position in IP network management and research division. He has extensive experience with optimization of networks and, in particular, optimization of multi-layered transmission and switching networks. His current work includes advanced transport and IP network architectures, network restoration methods for optical cross-connects, methods for IP over optical-layer integration, and methods of overlay service networks. He has published broadly on journals in telecommunications, optical networks, IEEE Communications Society, operations research, and network management. He is member of IEEE and serves as TPCs of international conferences as well as reviewers of international conferences and journals. Starting from 2006, he has intensively involved in AT&T Lightspeed project and the design and evaluation of AT&T IPTV network. He has filed a few patents and published a few papers related to this topic. His mail is: gli@research.att.com.



Zhu Liu received his B.S. and M.S. degrees in Electronic Engineering from Tsinghua University, Beijing, China, in 1994 and 1996, respectively, and the Ph.D. degree in Electrical Engineering from Polytechnic University, Brooklyn, NY, in 2001. He joined AT&T Labs - Research, Middletown, NJ, in 2000, and is currently a Principle Member of Technical Staff in the Video and Multimedia

Services Research Department. His research interests include multimedia content processing, multimedia databases, video search, pattern recognition, machine learning, and natural language understanding. He holds 8 U.S. patents and has published more than 40 papers in international conferences and journals. Dr. Liu is a senior member of IEEE, and a member of ACM and Tau Beta Pi.



Paul Lin earned his B.S. and Ph.D. degrees, both in physics, from the National Taiwan University and the University of Chicago, respectively. He joined Bell Labs in Murray Hill, NJ in 1980 and is now a Principal Member of Technical Staff in the AT&T Architecture and Planning Area.

His broad industry experience spans from submicron device patterning, e-beam lithography, to SONET OC-192 standards and more recently to Video-over-IP service architecture and content management.

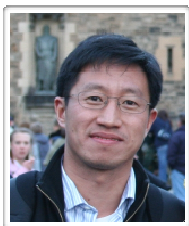
Peer-to-Peer Video Streaming

ABSTRACT

Internet Protocol Television (IPTV) applications are quickly becoming the new killer applications on the Internet. There are three major competing IPTV solutions. In a traditional client-server solution, video content is streamed to end users either directly from video source servers or indirectly from servers in Content Delivery Networks (CDNs). IP multicast was proposed as a more efficient solution than client-server based unicast in the early days of the Internet. Unfortunately, IP multicast was never widely deployed on the Internet. More recently, Peer-to-Peer (P2P) IPTV has emerged as the third solution with low server infrastructure cost. P2P IPTV systems have successfully enabled large-scale video multicast services on top of the "best-effort" Internet. Several deployed systems, such as CoolStreaming, PPLive, SopCast, and Joost have attracted millions of users to watch live or on-demand video programs on the Internet.

This short course covers the basic design principles of P2P video streaming systems. It also describes the current practice and future directions of P2P IPTV. The course consists of three sections:

1. **General Design Principles:** We provide a survey on the existing P2P solutions for live and on-demand video streaming. Representative P2P streaming systems, including tree, multi-tree and mesh-based systems are introduced. We describe the challenges and solutions of providing live and on-demand video streaming in P2P environment.
2. **Current Practice:** In this section, we describe our findings from an extensive measurement study of one of the most popular IPTV systems, namely, PPLive. We present statistics about the operations of real P2P IPTV systems and user Quality-of-Experience (QoE) in such systems.
3. **Future Directions:** P2P IPTV is expected to get more popular in near future. In this section, we share with you our views on the future of P2P IPTV and describe several interesting research directions for P2P video streaming.



Yong Liu graduated with Ph.D. degree from ECE Dept. at University of Massachusetts, Amherst in 2002. He worked as a post-doctor in computer networks research group at U-Mass from February 2002 to February 2005. He joined ECE department of Polytechnic University as an assistant professor in March 2005. His current research interest includes: overlay/P2P networks, network measurement and robust network design. More information about his research and teaching is available at: <http://eeweb.poly.edu/faculty/yongliu/>

Passive Optical Networks for First/Last Mile Access

ABSTRACT

With advances of optical fiber technologies, a dramatic increase in bandwidth has been facilitated in the backbone network through the penetration of wavelength-division multiplexing (WDM) technology, providing tens of Gbps per wavelength. At the same time, local area networks (LANs) have been scaled up from 10Mbps to 100 Mbps and are being upgraded to Gigabit Ethernet speeds. However, the access network in between only runs at low Mbps or even Kbps bandwidth speeds. As an inexpensive and scalable solution to mitigate the bottleneck of broadband access, passive optical networks PONs address the last mile of the communications infrastructure between the service provider's central office (CO) and customer sites. After briefly reviewing the wired access technologies, including DSL and cable modem, this tutorial provides a comprehensive overview of PONs, including the network architecture and enabling technologies, as well as diverse versions of PONS and their corresponding protocols. A close examination of the resource management issue along with the state-of-art schemes over time division multiplexed PONs (TDM-PONs) will be presented. Moreover, a unified state space representation will be introduced to describe the management on TDM-PON upstream resource.



Nirwan Ansari received the B.S.E.E. (*summa cum laude*) from the New Jersey Institute of Technology (NJIT), Newark, in 1982, the M.S.E.E. degree from University of Michigan, Ann Arbor, in 1983, and the Ph.D. degree from Purdue University, West Lafayette, IN, in 1988.

He joined NJIT's Department of Electrical and Computer Engineering as an Assistant Professor in 1988, and has been Full Professor since 1997. He has also assumed various administrative positions. He authored *Computational Intelligence for Optimization* (Springer, 1997, translated into Chinese in 2000) with E.S.H. Hou, and edited *Neural Networks in Telecommunications* (Springer, 1994) with B. Yuhas. His current research focuses on various aspects of broadband networks and multimedia communications. He has also contributed over 300 technical publications, of which over one third in refereed journals and magazines.

He is a Senior Technical Editor of the *IEEE Communications Magazine*, and also serves on the editorial board of *Computer Communications*, the *ETRI Journal*, and the *Journal of Computing and Information Technology*. He was the founding general chair of the First IEEE International Conference on Information Technology: Research and Education (ITRE2003), was instrumental, while serving as its Chapter Chair, in rejuvenating the North Jersey Chapter of the IEEE Communications Society which received the 1996 Chapter of the Year Award and a 2003 Chapter Achievement Award, served as Chair of the IEEE North Jersey Section and in the IEEE Region 1 Board of Governors during 2001-2002. He has been invited to deliver keynote addresses, distinguished lectures, tutorials, and talks at various conferences/workshops/symposia. His awards and recognitions include the NJIT Excellence Teaching Award in Graduate Instruction (1998), IEEE Region 1 Award (1999), an IEEE Leadership Award (2007, from IEEE Princeton/Central Jersey Section), and designation as an IEEE Communications Society Distinguished Lecturer.

A Survey of Next Generation Mireless Mobile Systems

ABSTRACT

With the deployment of 3G high speed packet data wireless mobile systems worldwide, stage has been set to evolve 3G wireless systems to the next generation. From this point forward, the efforts are focused on the delivery of the broadband experience with integrated and blended service. In this talk, we shall share our view of where the industry is going and what wireless experience an average user may expect to have in the near future. Our analysis will cover three major next generation standards including UMB, LTE and WiMAX, as well as the existing 3G standards.

Dr. Bi received his M.S. from Shanghai Jiao Tong University and Ph.D. from Pennsylvania State University. After teaching at Utah State University as an assistant professor for one year, he joined Bell Laboratories in 1988 and became a Distinguished Member of Technical Staff in 1995. Two years later, he was promoted to Technical Manager.



Dr. Bi is a recognized expert in wireless communications. He received Awards of Excellence from the Advanced Technology Lab of AT&T in 1996 and 1997, and Bell Labs President's Gold Awards in 2000 and 2002. Under his leadership, his team was recognized in innovations and was awarded the Bell Labs Innovation Team Award in 2003 by the Bell Labs Research. In 2004, he received the Speaker of the Year Award from the IEEE New Jersey Coast Section.

Based on his pioneering contributions in wireless communications, he broke ground in 2003 to become the first Chinese from the People's Republic of China to receive the prestigious Bell Laboratories Fellow Award. In 2004, he was recognized by the Chinese Institute of Engineers and was awarded the Asian American Engineer of the Year Award during Engineers Week in the United States.

Dr. Bi is also dedicated to international and social activities. From 1998 to 1999, he served as the technical chair for the Wireless Mobile ATM Conference. From 1999 to 2000, he organized the first and the second CDMA conferences at Lucent Technologies. From 2000 to 2002, he served as the technical chair for IEEE Globecom's wireless program. In 2003, he served as the technical chair for the IEEE Wireless Communications and Network Conference. Currently, he serves as the chair and organizer for the Wireless and Optical Communications Conference.

Dr. Bi has published extensively in many technical journals and conferences and has served as editors in many technical publications. He was often invited as a keynote speaker in many international conferences and has filed more than 60 US patents. He was also the New York chapter president of the Alumni Association of the Chiao Tung University from 2002 to 2006. He has been listed in Who's Who since 2003.