

# Multimedia Communications

## @CS.NCTU

### Syllabus

Instructor: Kate Ching-Ju Lin (林靖茹)

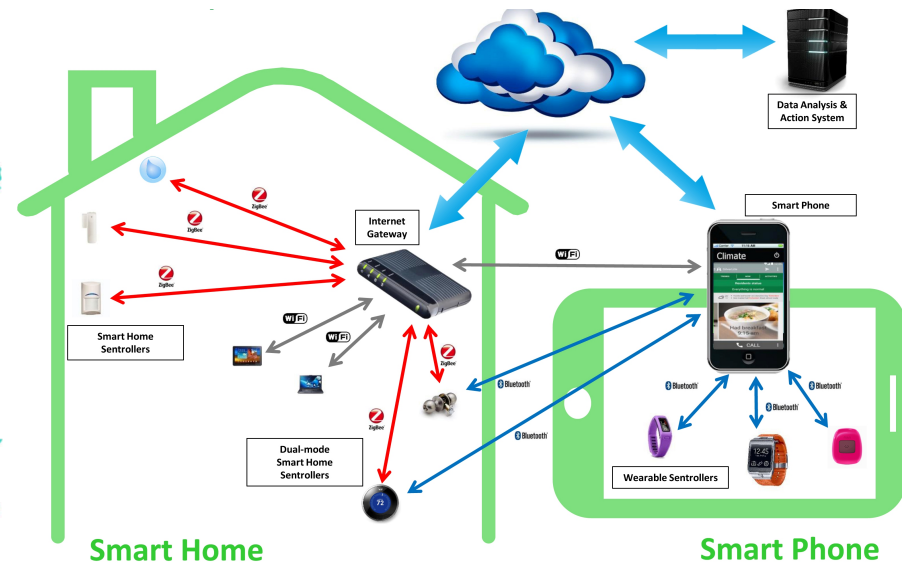
# Instructor

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- Kate Lin (林靖茹)
- Research:
  - [Wireless systems](#) (MIMO systems, full-duplex communications, WLANs, SDN protocols)
  - [Mobile computing](#) (visible light communications, localization, RF-based sensing, mobile HCI)
  - [Multimedia networking](#) (http streaming, P2P networks, wireless video streaming)
  - [Social networks](#) (content dissemination, cellular offloading, personal content recommendation)

# What is Networking?

- Devices connected by communication channels for
  - Information sharing: WWW, Facebook, Youtube
  - Resource sharing: Cloud computing (Amazon, Dropbox)



# What is Multimedia?

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text

CS, NCTU  
Multimedia  
Networking  
2017 Spring  
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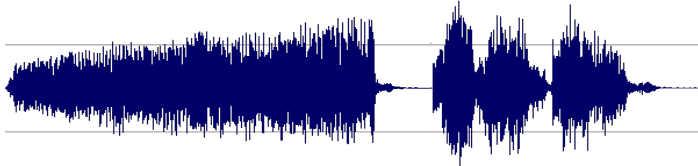
image



video



audio / music



gaming



VR



# What is Multimedia Networking?

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- Network protocol designs **customized** for **sharing multimedia content**



k8631365 www.fotosearch.com

# General Information

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- <http://people.cs.nctu.edu.tw/~katelin/courses/mmcom17/>
- Other information
  - Facebook group: NCTU MMCom
- Instructor
  - Kate Ching-Ju Lin (林靖茹), EC-538
  - Office hours: Fri. after class
- TA
  - 孫造鴻 (Zhao-Hung Sun), [a0987973312@gmail.com](mailto:a0987973312@gmail.com)
  - 賴文揚 (Wen-Yang Lai), [x3639026@gmail.com](mailto:x3639026@gmail.com)
- Schedule
  - 16:30 — 17:20, Tue.
  - 10:10 — 12:00, Fri.

# Course Details

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- Reference textbook

- Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia," Pearson Prentice Hall, 2004
- James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet," Pearson 2017
- Larry L. Peterson and Bruce S. Davie, "Computer Networks, Fifth Edition: A Systems Approach," Morgan Kaufmann Publishers Inc., 2011
- 《多媒體通訊》第三版 ISBN:9572815652 | 紳藍 | 戴顯權、陳滢如、王春清

- Research paper

- For emerging topics not covered in the textbooks

- Prerequisites

- Undergraduate network class
- System/C Programming on top of Linux
- Socket programming

# What will be covered?



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- **Network basics**
  - Networking Introduction (Applications, TCP, UDP)
  - Wireless networks: WLAN, Cellular networks
- **Multimedia concepts**
  - Compression basics
  - JPEG, MPEG, H.264, Scalable video coding,
  - Performance metrics
- **Multimedia networking**
  - RTSP, RTP, RTCP, SIP
  - Video streaming, HTTP streaming (e.g., Youtube, Netflix)
  - Content delivery networks (CDN), overlay and P2P networks
  - Video over wireless networks
- **Online social networks** (e.g., Facebook, Twitter, etc)
  - Community detection
  - Node classification
  - Content dissemination and influence



# Schedule

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week	Lecture
1	Introduction
2-3	Network Overview
4	Wireless Networks
5	Compression Basics
6	Image Compression (JPEG)  Homework1
7-8	Video Compression (MPEG, H.264, SVC)
9	Multimedia Networks
10	<b>Mid-term (May 5<sup>th</sup>)</b>
11	Video Streaming (Rate control, HTTP streaming)
12	CDN, overlay and P2P
13	Video over Wireless  Homework2
14-17	Social Networks
18	<b>Final exam</b>

# Requests

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- 2 Homework assignments
  - Socket programming for audio streaming (over TCP and UDP)
  - Video streaming (dash.js configuration and performance measurement)
- Mini-Assignment
  - Tiny hand-on measurements
- Mid-term
- Final exam

# Grading Policy

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- 30% Homework
- 30% Mid-term
- 30% Final
- 5% Mini-Assignment
- 5% Participation

# Grading policy

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- Late policy for homework assignments
  - (Your score ) \*  $0.8^D$ , where D is the number of days over due
- Cheating Policy
  - Academic integrity
  - Exams must be your own
  - Homework must be your own – cheaters share the score
  - Both the cheaters and the students who aided the cheater will be held responsible for the cheating