

*New academic programs and  
changes in the curriculum to  
better prepare 21st century  
students*



**Prof. Jian Song, Tsinghua University**  
**Sept. 19, 2017**



清華大學

Tsinghua University



Established in 1911, Tsinghua University is one of the most renowned universities in China, fosters talents and creating knowledge for the world.

This historic campus was listed as one of "The World's Most Beautiful Campuses\*".

\*Forbes magazine, 2010.





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## ▶ FIGURES & STATISTICS

Student Profile\*



**14,943**

Undergraduate students

**17,101**

Master students

**10,399**

PhD students

Student Profile\*



**1,262**

Undergraduate students

**1,088**

Master students

**370**

PhD students

Faculty Profile\*

**3,414**

Faculty members

**45**

Members of the  
Chinese Academy of Sciences

**33**

Members of the  
Chinese Academy of Engineering

\*Data by 31 December 2016.





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# Institute for Data Science - New Curriculum

- ❑ In the late 2013, Tsinghua prepared for the foundation of Institute for Data Science;
- ❑ On April 26, 2014, Tsinghua Institute for Data Science was founded and IDS launched master program of big data for interdisciplinary-cultivation in society.



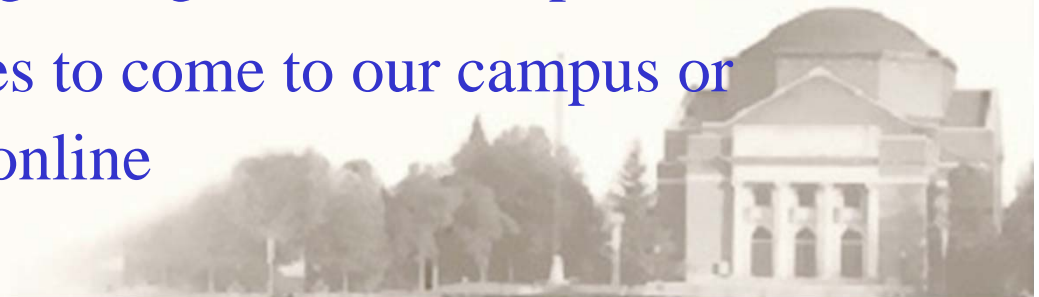
- ❑ Since 2014, recruitment from new enrollments or students in the study of master degree or above from Tsinghua University every year;
- ❑ By April 5 2017, there are a total of 756 students from 28 departments participating in the Talent Cultivation program of Big Data which almost covers all the departments of Tsinghua.
- ❑ Growth in applicants with 150 students in 2014, 279 students in 2015, 327 students in 2016.





## *Talent Development (cont'd)*











- ❑ Establish a close connection with the graduate students by seminars and other activities, and create the environment to join the enterprises (big data day)
- ❑ Student organization "Tsinghua students big data research association" was established
- ❑ Tsinghua big data industry federation becomes a student practice base, with the industrial members providing internship and employment opportunities for students , assigned business mentor guiding the internships
- ❑ Invite first-class companies to come to our campus or provide practical courses online





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# Professors of Big Data

	Fall Semester	Spring Semester	
	Big Data Analytics (A)	Data Ethics	
	Big Data Analytics (B)	Seminars on Data Science and Applications	
	Big Data Systems (A)	Big Data: Thinking and Behavior	
	Big Data Systems (B)	Management & Innovation in the Era of Big Data	
	The Core Technology of Big Data Platform	Big Data: Governance and Policy	
			
			

## *Attractive Activities*

13 Seminars on Frontier Technologies and 15 Seminars on Innovation and Applications by outside speakers with over 4000 students participants in the last two years.







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GLOBAL INNOVATION EXCHANGE



## *An overseas campus: GIX*



**In June 2015, Tsinghua University partnered with University of Washington to establish GIX in Seattle. It's the 1<sup>st</sup> ever physical presence in U.S. for a Chinese research university. During his visit to Seattle in Sep 2015, President XI Jinping presented a dawn redwood, a tree native to China, with his blessings to GIX for its future success.**



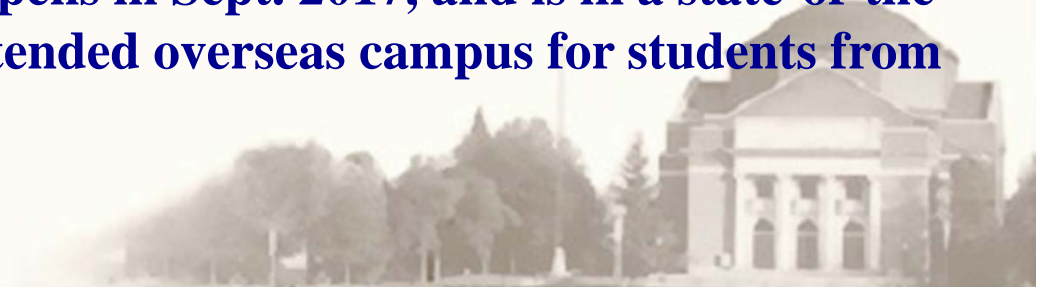


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## *An overseas campus (cont'd)*



**The 1<sup>st</sup> building of GIX at Seattle opens in Sept. 2017, and is in a state-of-the-art facility. GIX will serve as an extended overseas campus for students from Tsinghua's main campus.**





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# 1<sup>st</sup> dual master degree program: Connected Devices



*Connected devices are poised to advance such diverse fields as health and natural resource management.*

**Exponential growth in connected devices is expected over the next decade, resulting in tremendous social and economic value, as the Internet of Things, Ubiquitous Computing, Wearable Computing, and Smart Devices become dramatically more cost effective, simpler to develop, and increasingly mainstream.**



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# 1<sup>st</sup> dual master degree program: *Connected Devices (cont'd)*



The dual master degree includes a **15-month** Master of Science in Technology Innovation (MSTI) at the GIX location in Seattle area, Washington state and a **6-month** Master of Engineering in Data Science & Information Technology (MEDSIT) at Tsinghua University, Beijing.

**To invent new applications and develop the expanding connected device market requires leaders with an array of technology, prototyping, design and entrepreneurial skills. We address global challenges by interdisciplinary project oriented education. We train the students how to integrate resources and leverage the innovation ecosystem to change the world.**



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# Massive Open Online Courses - New Way of Learning










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# Current Status

	 coursera	 edX	 学堂在线 xuetangx.com	 Future Learn	 UDACITY
<b>Courses offered</b>	2135	1338	<b>972</b>	256	174
<b>Participants (Millions)</b>	23.0	10.0	<b>6.3</b>	5.3	4.0

**Class Central by Dec. 2016**

No. of Courses  
**1240**

No. of registered students  
**7.27**  
Millions

No. of students choosing courses  
**9.56**  
Millions



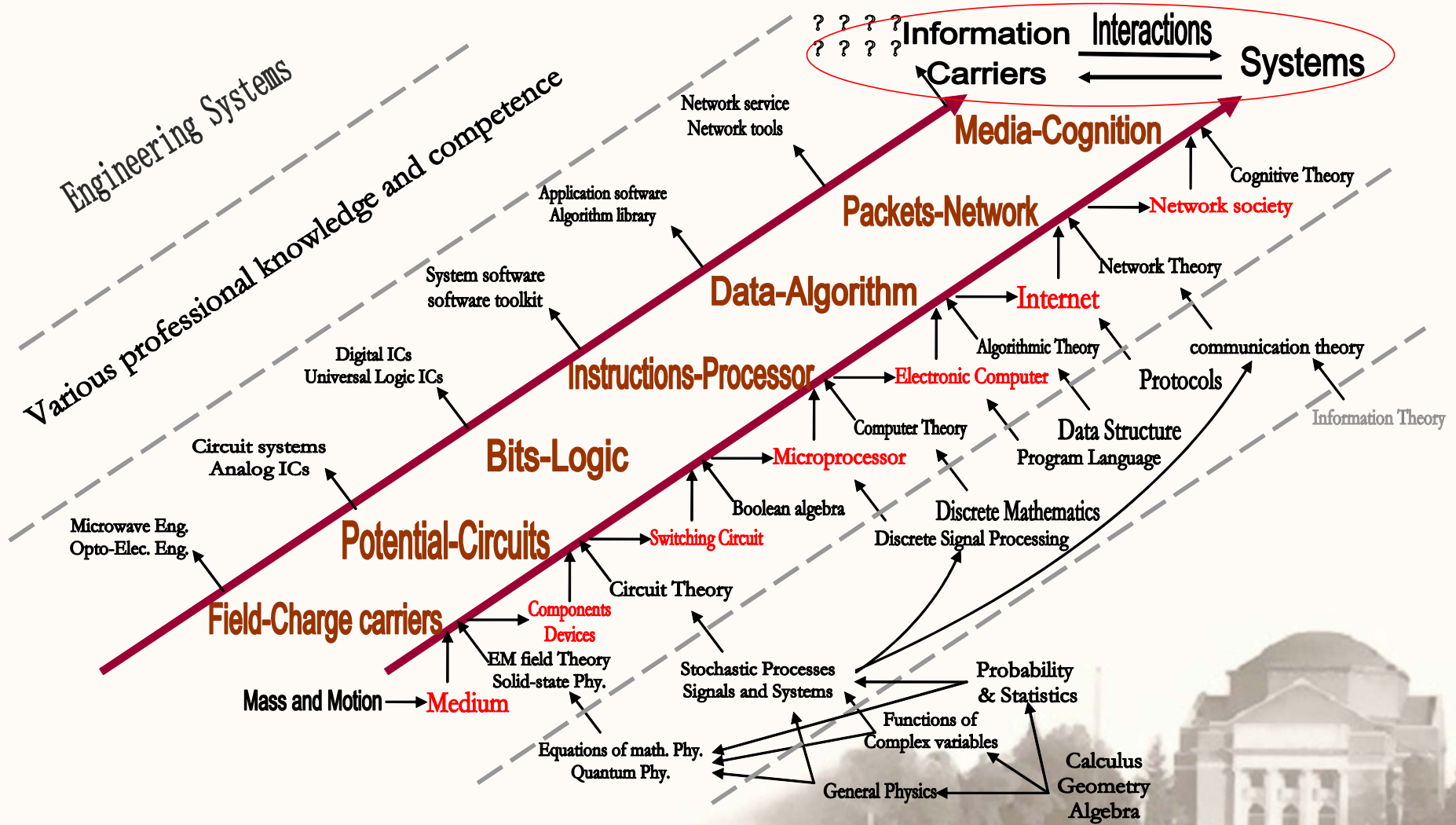
**By Jun. 2017**

# Motivation of Curriculum Reform

- ▶ **The reform began in May 2007**
- ▶ **The objective is triple-folded:**
  - ▶ **Bridge the gap between device and system:**
    - ▶ **Device + System → Electronic Engineering**
  - ▶ **Update the contents of the courses from two perspective**
    - ▶ **History**
    - ▶ **Development**
  - ▶ **Comprehensive Development of Students**



# Rebuild Core-Conception of EE



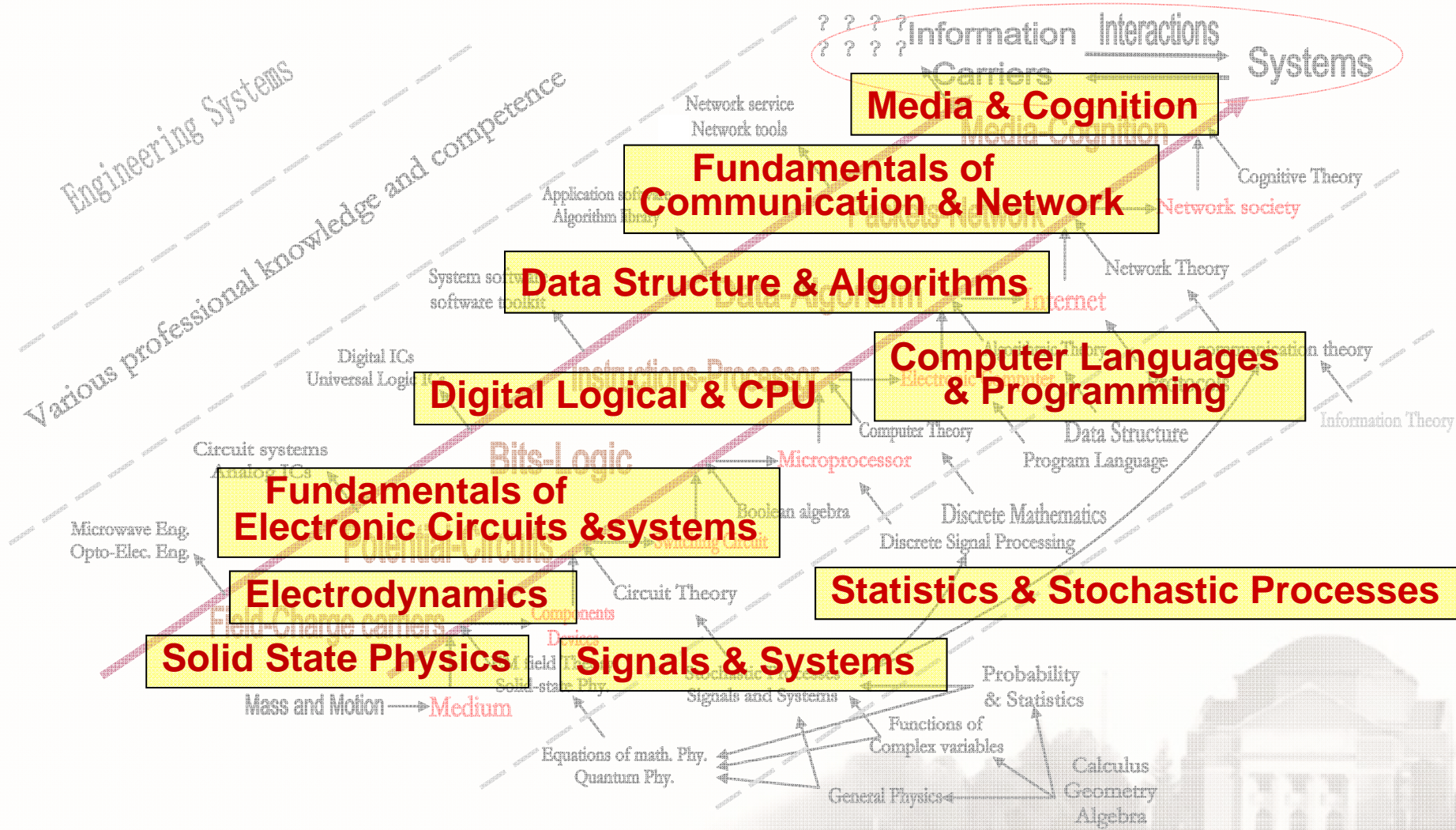




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# Curriculum Design - Ten core courses





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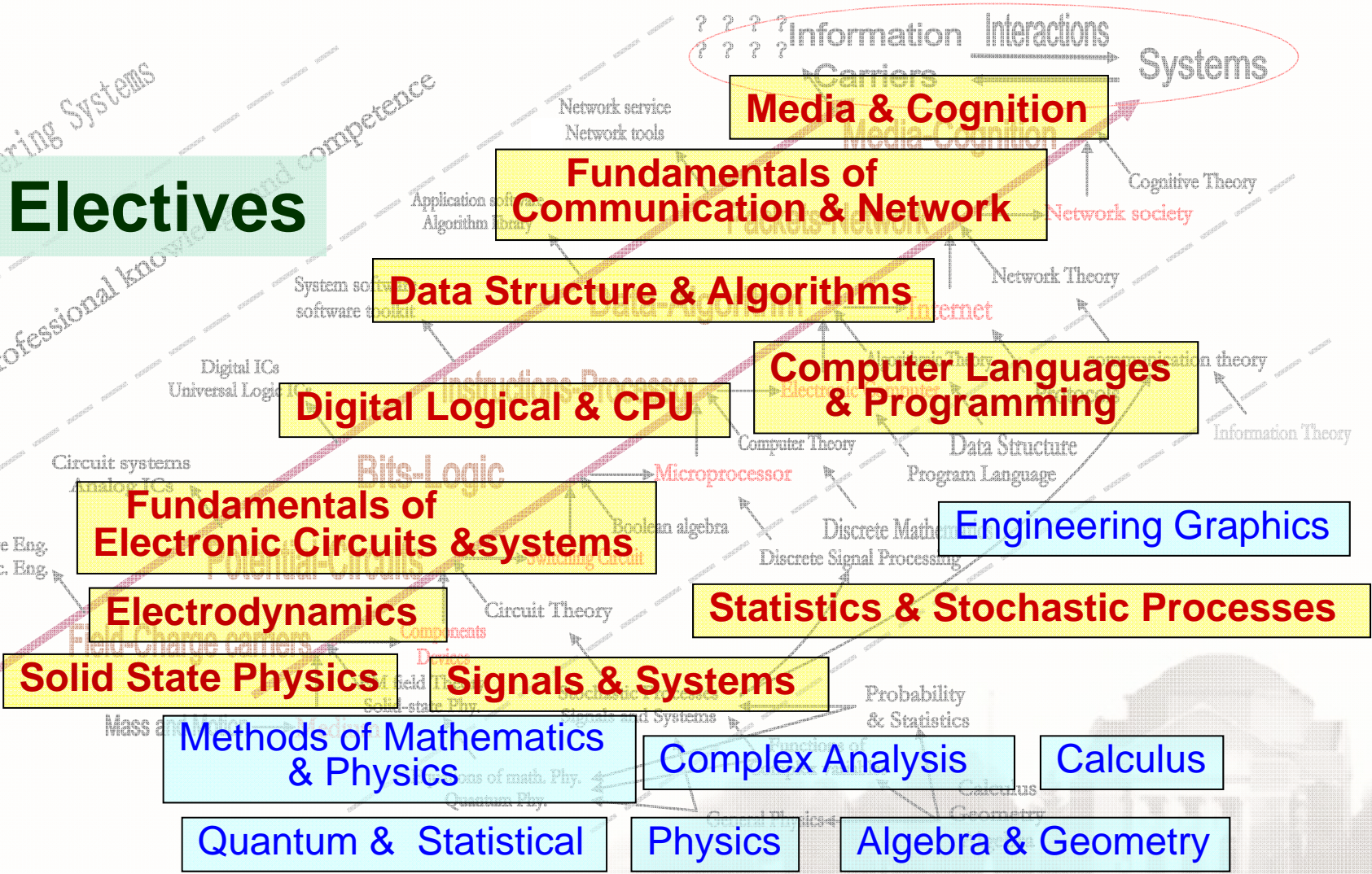
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# Curriculum Design -- The overall structure

**Electives**

Engineering Systems

Various professional knowledge and competence





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## *Teaching Laboratory Center*

- ❑ **Center Founded in Sept. 2008**
- ❑ **Nine Teaching Labs in the Center:**
  - ★ Modern Communication Lab.
  - ★ Computer Networks Lab.
  - ★ EM Field and Wave Lab.
  - ★ Signal Processing Lab.
  - ★ Physical Electronics and Photon Electronics Lab.
  - ★ Circuit Lab.
  - ★ Multimedia Information Processing Lab.
  - ★ LSI design Lab.
  - ★ Electronics Lab.





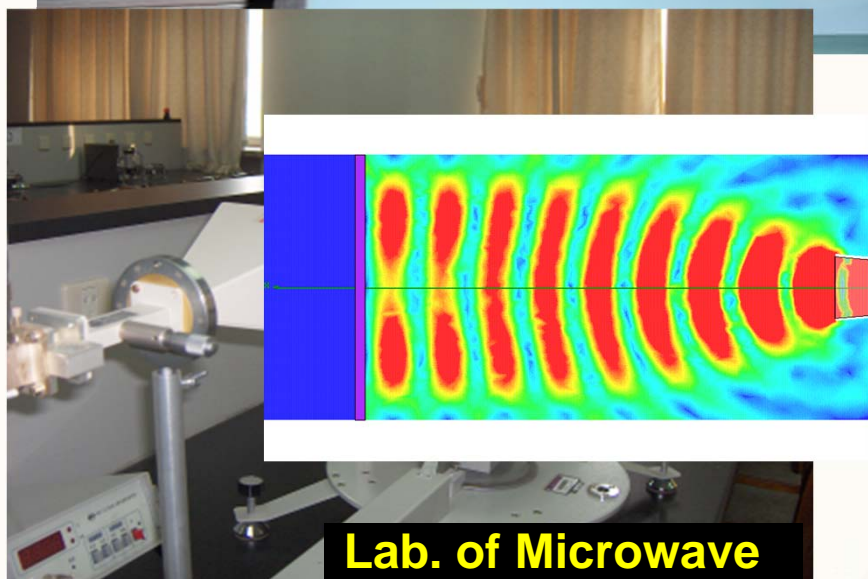
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# Teaching Laboratory Center (cont'd)

**Lab. of Acoustic-Optic Frequency Shift**



**Synthetic Experiment Platform  
for Digital Systems**



**Lab. of Microwave**



**Lab. of Modern Communications**



[www.tsinghua.edu.cn](http://www.tsinghua.edu.cn)

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**Thank you very much**

