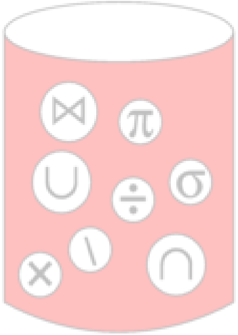

EEECS-3421A:

“Introduction to Database Systems”

Fall 2020

Parke Godfrey

Welcome!

initial: *2020 September 10*

Printable version of talk

To generate a **pdf** of the talk:

- Follow this link: Introduction | 2020-09-10 [to **pdf**].
- Then ask the browser to *print* to get a **PDF**. (*Sadly, this only works correctly in **Chrome** or **Chromium**!*)

Introduction

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- How do we retrieve specific data out of a database?
- How do we *add* and *delete* information?

(We will learn this during this course)

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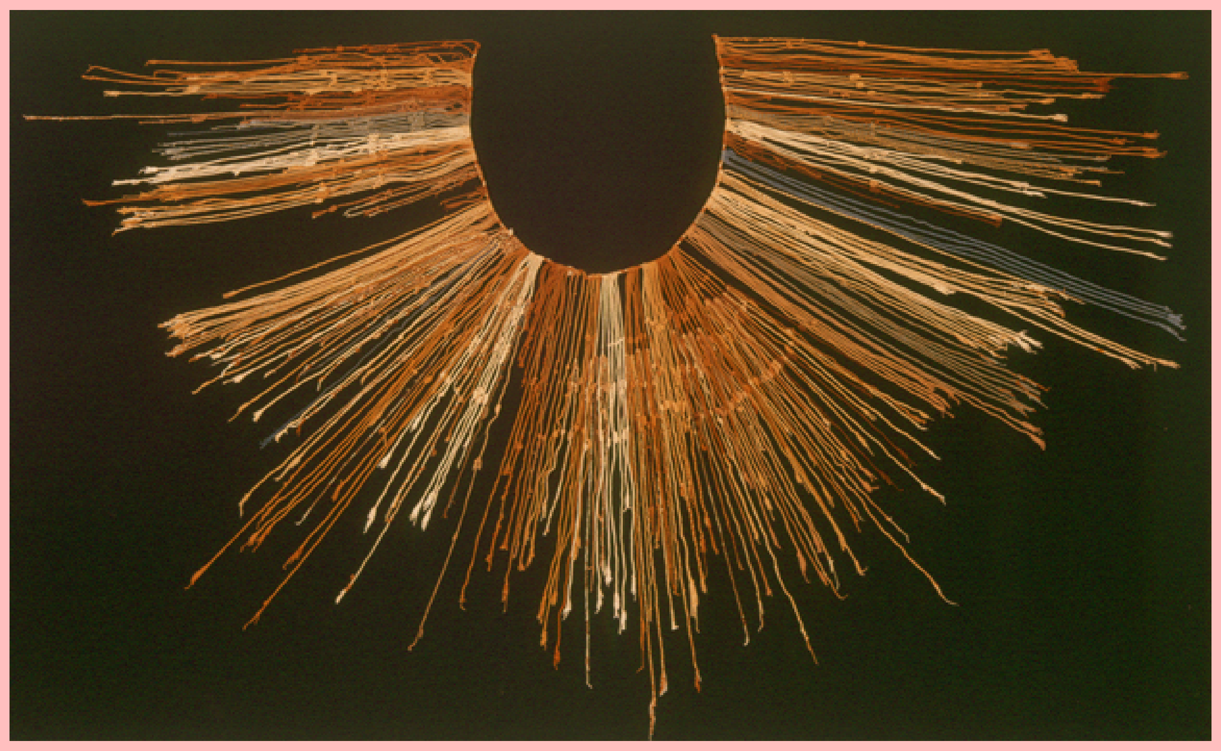

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http://en.wikipedia.org/wiki/Petabyte
http://en.wikipedia.org/wiki/Exabyte
http://www.jameshuggins.com/h/tek1/how_big.htm

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How universal, we shall have to see…

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…and discuss

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What more *functionality* should such a system provide?

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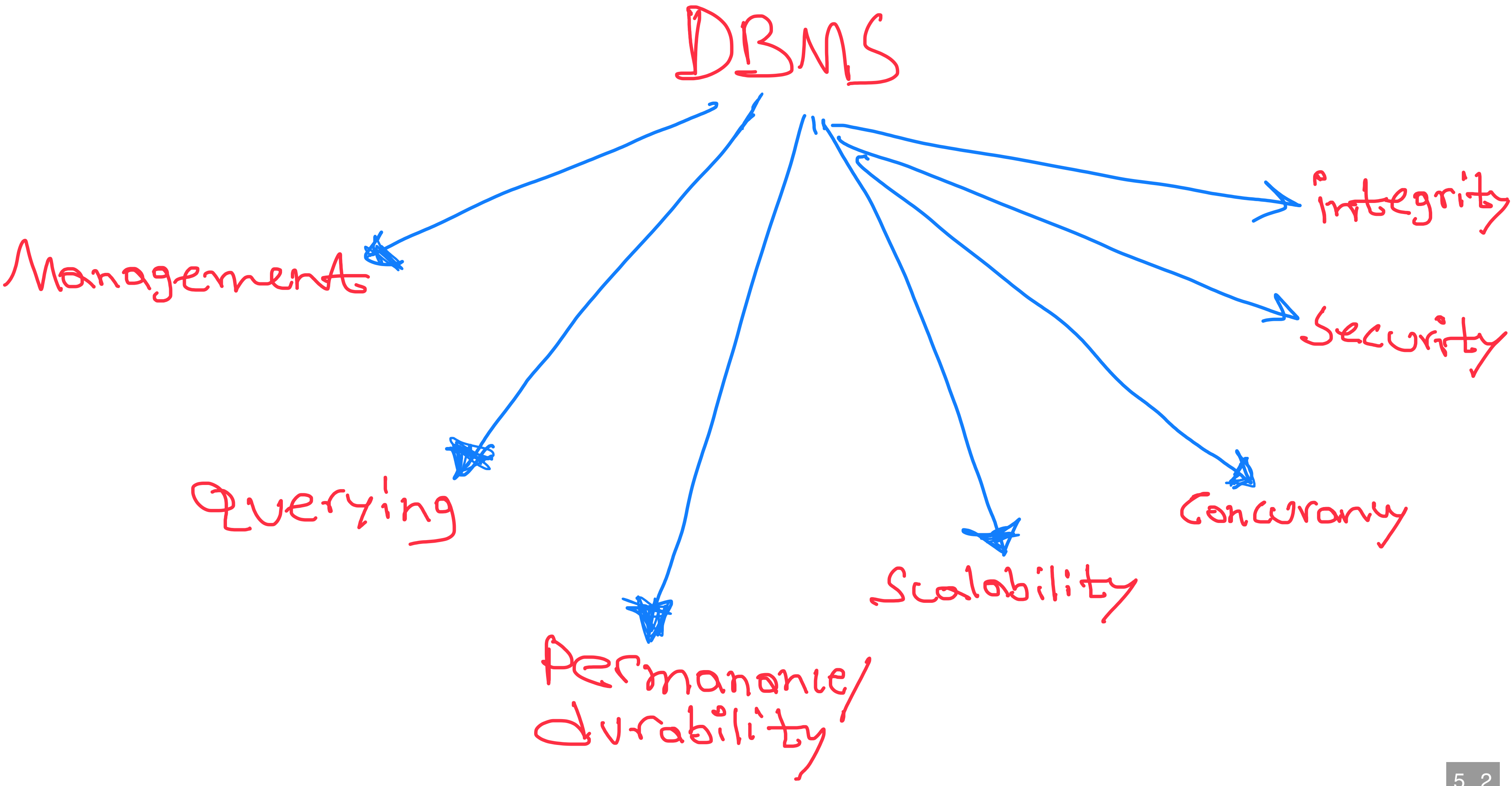

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And do this all *very* efficiently, of course!

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- The main paradigm is the *query*.

Paradigm → a pattern/model

A history of database systems

Tabulating Machine Company

- It is hard to trace the origins of an idea.

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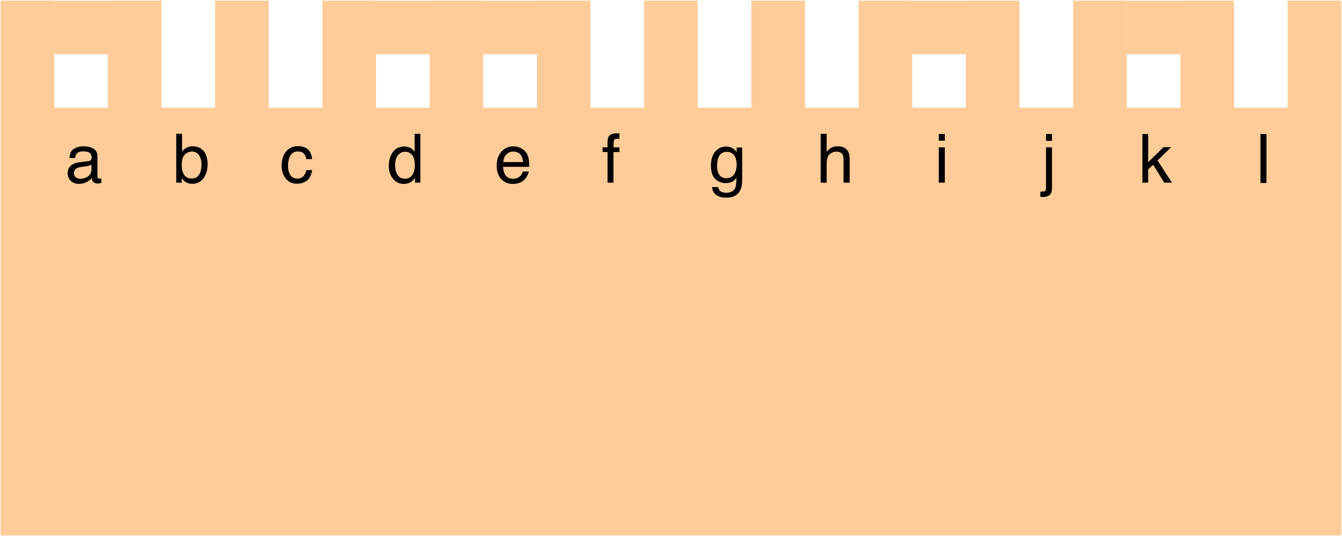
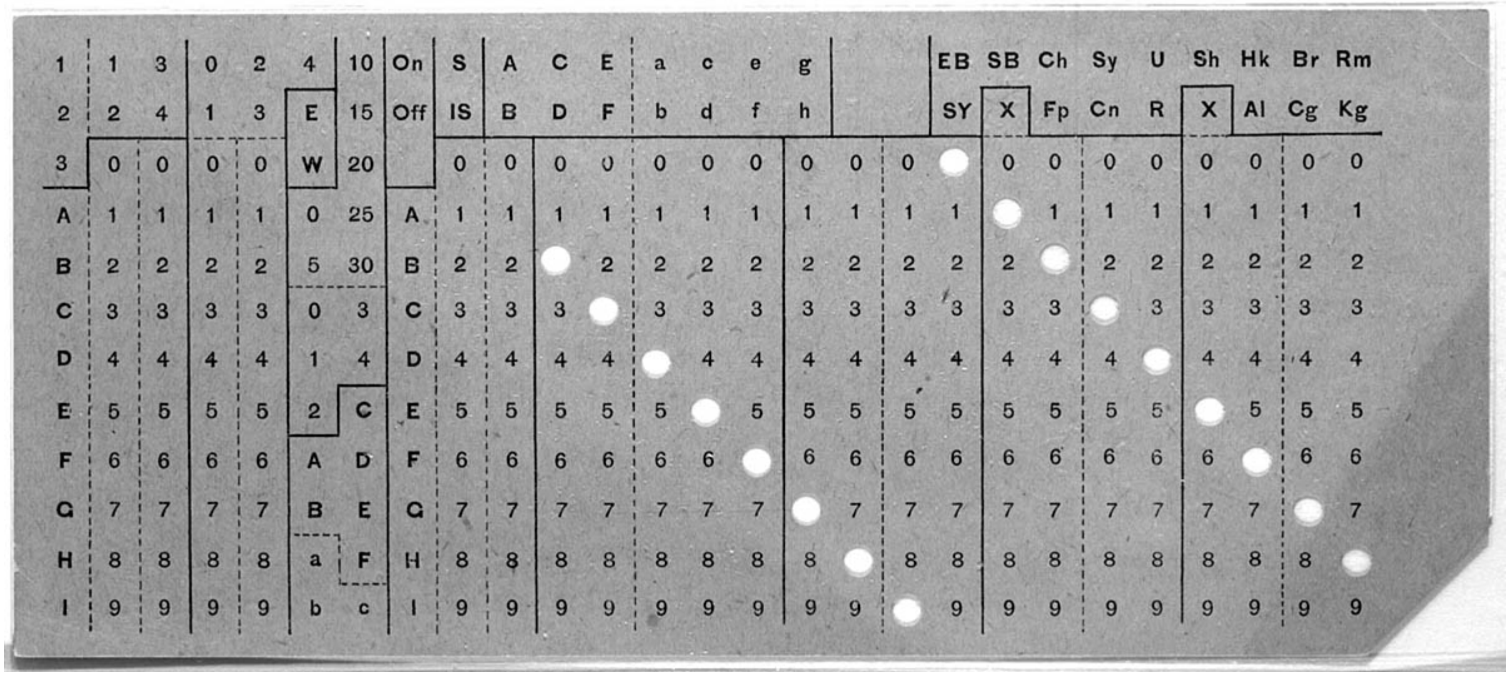
“IBM” was founded in 1896 as TMC — Tabulating Machine Company — by Herman Hollerith.

Query by selection



Hollerith Punched Cards


1 1 3 0 2 4 10 On S A C E a c e g EB SB Ch Sy U Sh Hk Br Rm
2 2 4 1 3 E 15 Off IS B D F b d f h SY X Fp Cn R X Al Cg Kg
3 0 0 0 0 W 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
A 1 1 1 1 0 25 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
B 2 2 2 2 5 30 B 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
C 3 3 3 3 0 3 C 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
D 4 4 4 4 1 4 D 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
E 5 5 5 5 2 C E 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
F 6 6 6 6 A D F 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
G 7 7 7 7 B E G 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
H 8 8 8 8 a F H 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
I 9 9 9 9 b c I 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9

The relational data model

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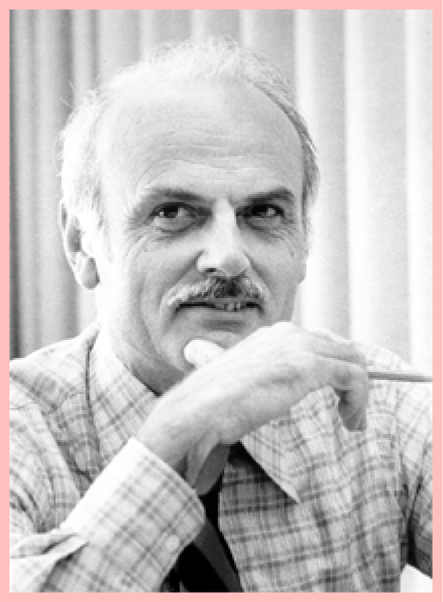
Edgar F. Codd invents the *relational data model*, and its *first-order theory*. [1970]

An IBM team implements *System R* (the first *cost-based relational query optimizer*).



Oracle

Larry Ellison implements *Oracle* from the System R paper, and markets Oracle. [1978]

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IBM wakes up, markets DB2. [~1983]

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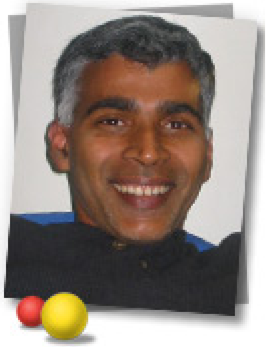
Google implements its own *Big Table* to store the entire WWW.

BigTable was designed and implemented by Jeffery Dean and Sanjay Ghemawat. [2005]



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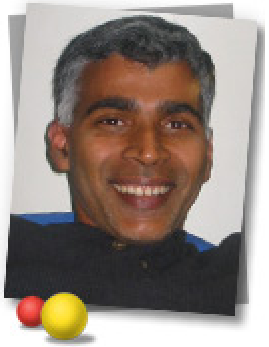
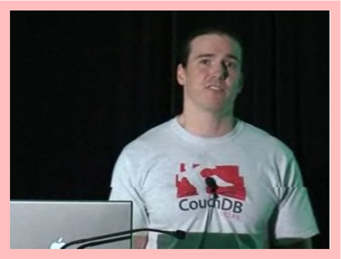
This marks the true start of “big data” revolution.



NoSQL



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Scale out versus *scale up*.

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Relational database engines are scaled down to be embedded in mobile devices: Android and iOS.

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Sybase Anywhere started in 1992! A Waterloo-Kitchner company.

Now part of SAP.

This course

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- **data models**
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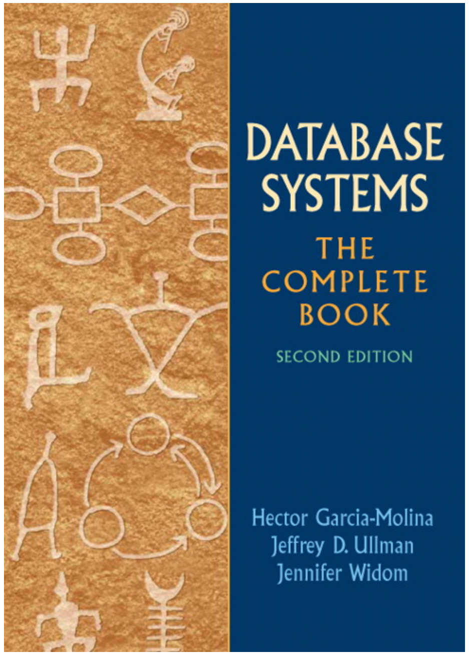
- class site
- syllabus: schedule

Textbook



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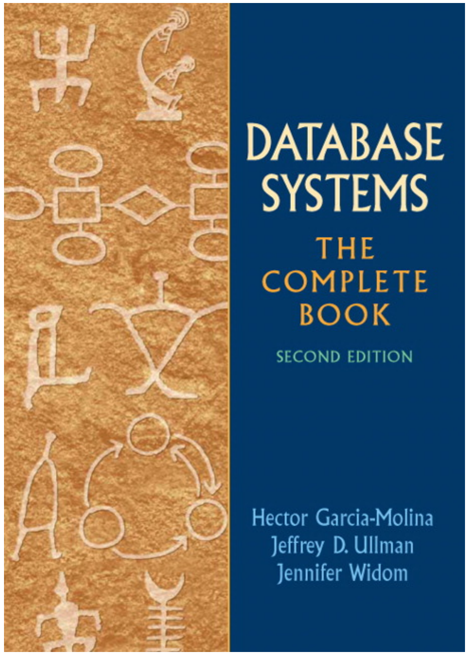

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    - It is about “implementing” (*designing*) databases (*schema*), querying them, and building applications that use databases.
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  - **EECS-4411**, *Database Management Systems*, is about *building* database systems.
- This course is *not* about *big data*, per se, which is about *scale out*.
  - **EECS-4415**, *Big Data Systems*, is about that.
  - **EECS-4414**, *Information Networks*, is about *analytics* / *data mining* over very large *social-network* data ("graph databases").