arXiv: Eprint Repository and OAI Data-Provider

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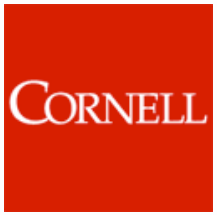
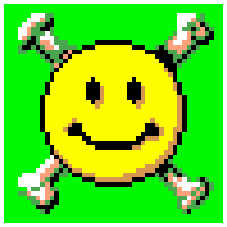


Open Archives seminar "Facilitating Free and Efficient Scientific Communication", DEF/DTV/DTU, Copenhagen, Denmark, 18 February 2004.



One page history of arXiv

- 1991 - hep-th email reflector; ~200 users; copies archived
- 1992 - ftp server added; hep-ph and hep-lat added locally; alg-geom, astro-ph and cond-mat added remotely
- 1993 - web interface added
- 1994 - remote sites merged into main site, remote sites become mirrors
- 1995 - automatic generation of PS from TeX
- 1996 - PDF generation; web upload; growth of world-wide mirror network
- 1999 - involved in creation of OAI
- 2001 - main site moved to Cornell, LANL site becomes mirror
- 2003 - start of significant software development effort; new user db; email/ftp upload disabled
- 2004 - endorsement system launched in January; new submission system planned

arXiv now

- 260,000 full-text articles
- ~3,500 submissions/month
- Estimated 70,000 users (in 2001)
- Unrefereed author self-archiving (moderated, however)
- No-fee retrieval by users worldwide
- Email alerts of new/updated submissions according to subject area
- ~4 FTE staff at Cornell
- Proxy submission site at CCSD in Lyon

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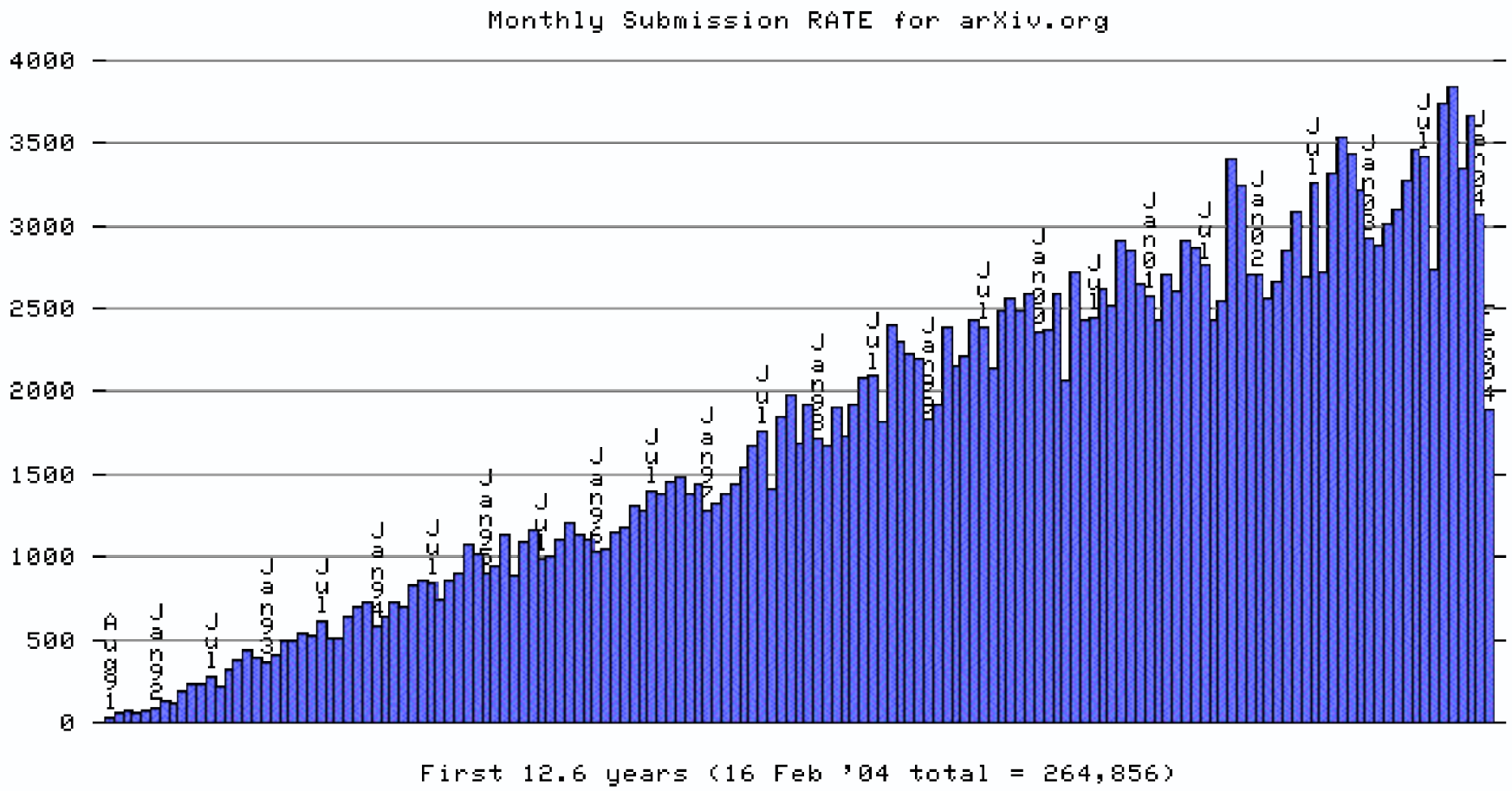
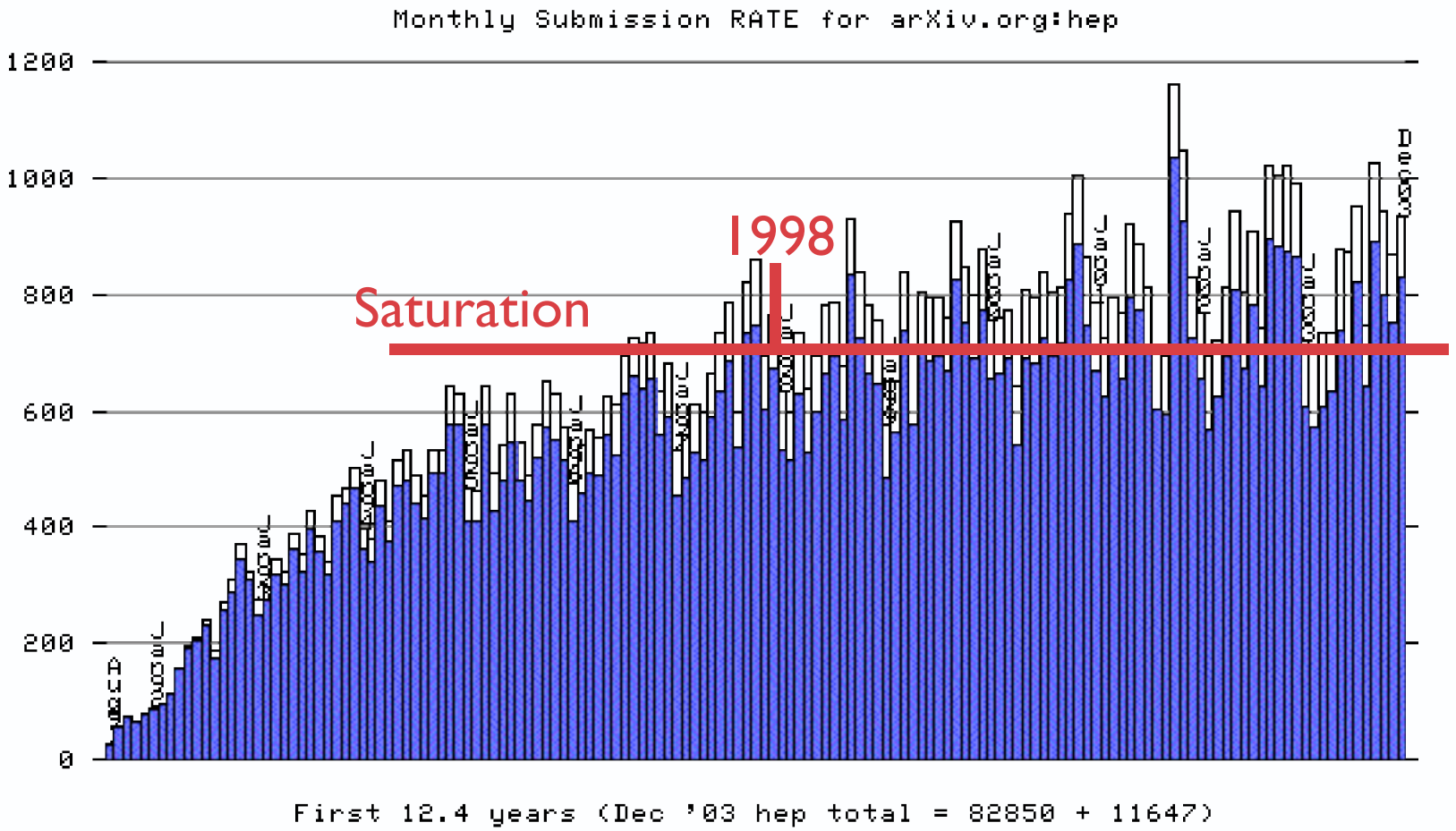
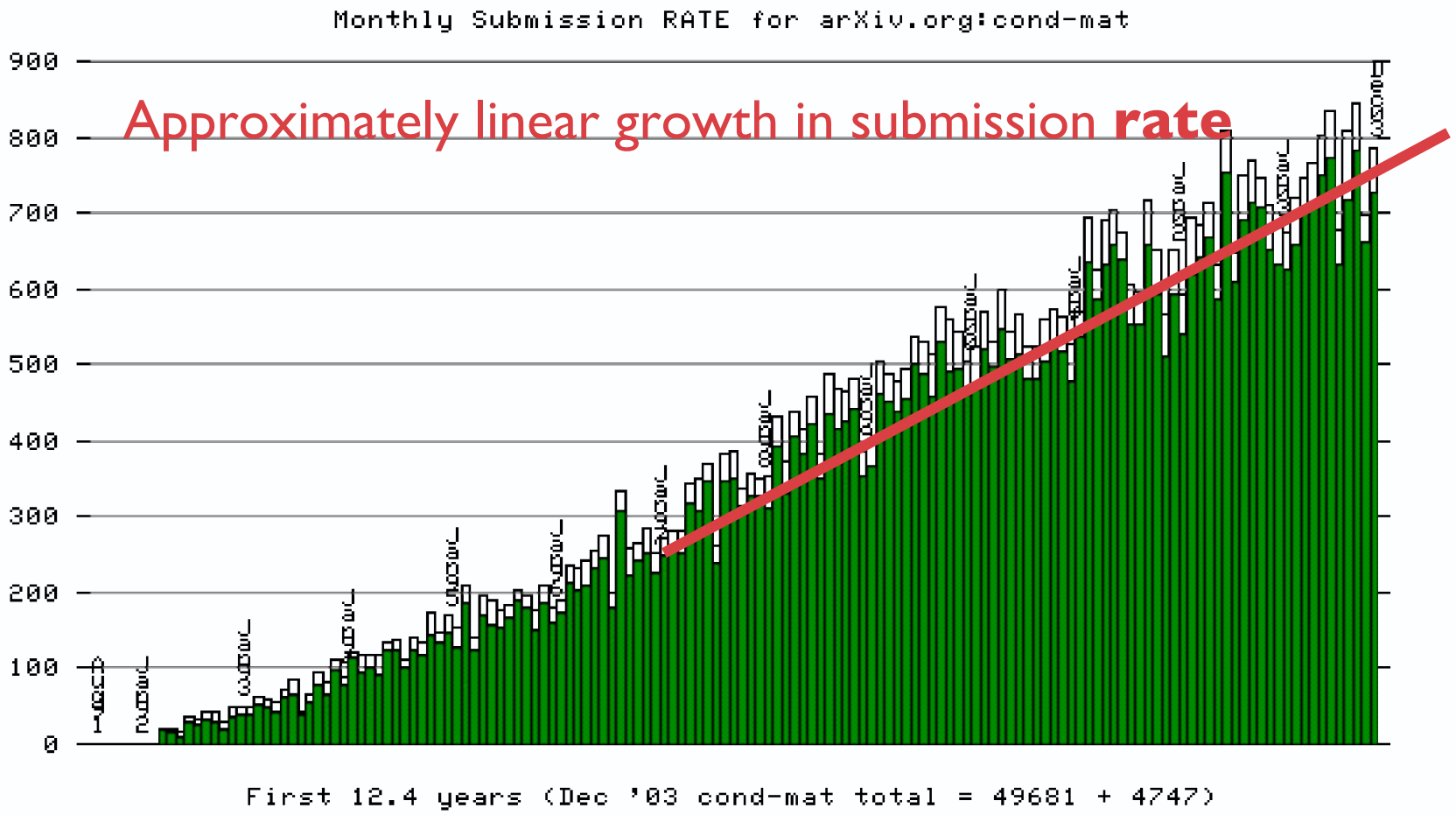
Submissions to arXiv



High-energy physics submissions



Condensed matter submissions



World-wide mirror network

- arXiv mirror network has 17 sites in US and 15 other countries.
- Utility of mirror network limited by internet topology (star from US, not reflecting geographical closeness)
- Maintenance of mirror network is significant administrative overhead, no plans to expand (encourage caching proxies).

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Administrator time

- >95% of submissions are entirely automated -- this is **essential**:

  If each of the ~200 submissions per day required just 15 minutes of administrative time then we would require 6 full-time staff just to deal with new submissions (without accounting for the few submissions with genuine problems)

- Only check on every submission is a metadata check by student administrator
- Also have to check PDF submissions by eye (<10% of total; fonts/copyright)

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Why is arXiv successful?

- Exceptionally user-friendly and attractive website design ;-)
- Provided a facility that people wanted. Rapidly made paper preprint distribution obsolete in high-energy physics.
- Reliable and trusted service (mirrors may be important here)
- Development has attempted to meet community needs and added new features to keep up with changing expectations
- Subject area expansion carefully implemented, new areas seeded to ensure uptake

Archiving arXiv?

- arXiv is not an archive in any sense that and archivist would agree with
- However, we do:
  - Collect and store formats we believe can be preserved (open, documented; no MS Word)
  - Keep the content online and accessible
  - Have ability to convert all to PDF
  - Mirror content, some mirror sites have independent backups
  - National library of France archiving content
  - Moved to institutionally backed library at Cornell

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Making arXiv OAI compliant

1 Write software to implement OAI requests

Homebrew as early adopter (perl)

Could now use free libraries, may still need to write custom db interface

2 Transform internal metadata into accepted standard

Fairly straightforward mapping of internal fields to DC

Had to convert internal encoding (TeX) to UTF-8, e.g. \{O} → Ø

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Better metadata…

- In 2001 I wrote *"Involvement in OAI has highlighted the need for arXiv to collect better metadata"*
- Still true and we have, so far, only marginally improved the metadata we collect
- Have gone through and fixed lots of old records using semi-automated methods
- Currently export only Dublin Core metadata, plan to export richer metadata
- Author search considered very important => working towards name authority within arXiv

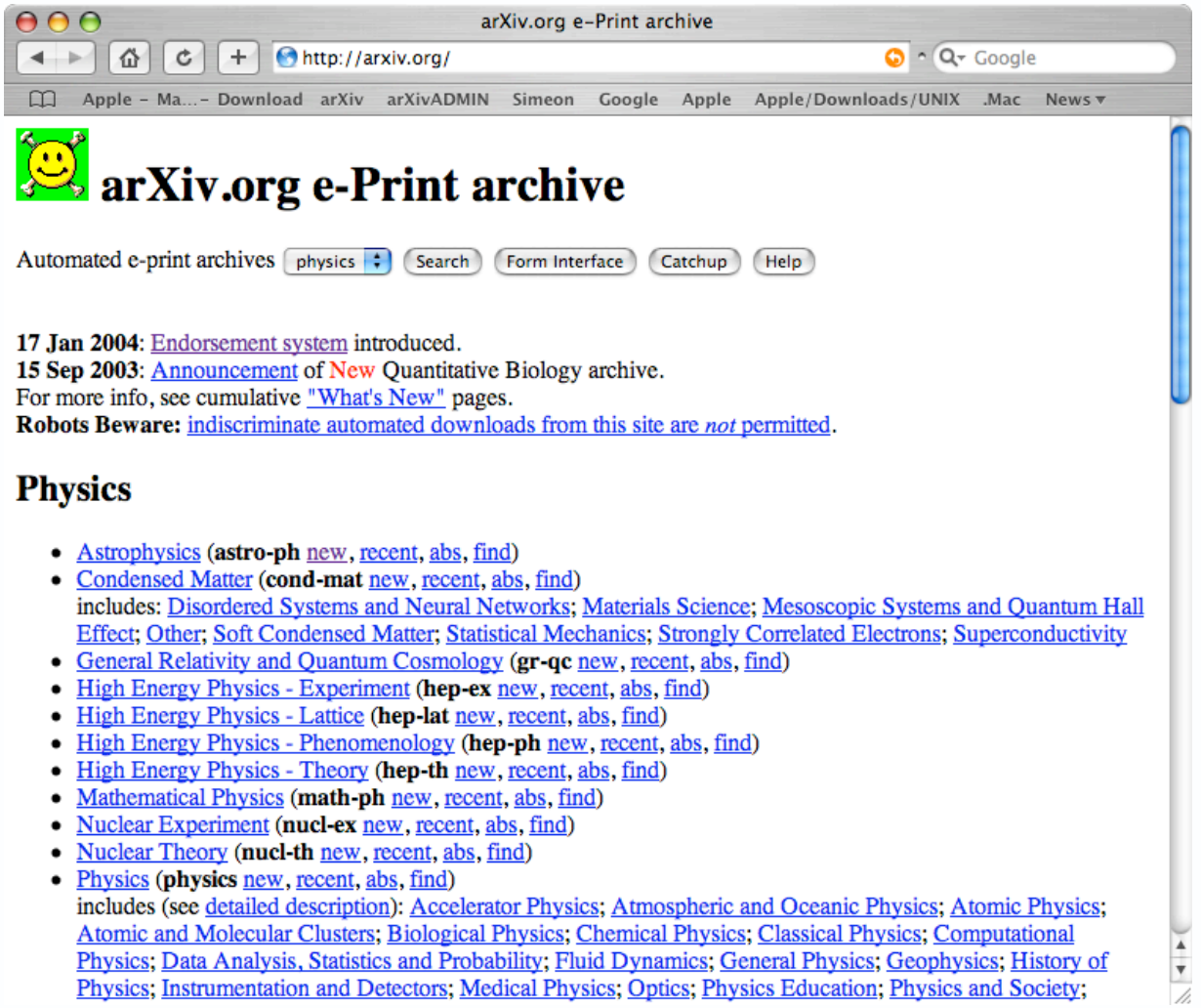
arXiv and Citebase

- Citebase (Southampton, UK) takes arXiv metadata and full-text PDF from local mirror
- Automatically extracts citations from papers, attempts to identify with arXiv papers
- Inverts citations data to get cited-by
- Calculates co-citation information
- Exposes via web interface (http://citebase.eprints.org/) and via OAI interface (in AMF)
- Citebase also collects usage statistics which we think need to be handled carefully

arXiv and peer review

- Could think of arXiv as passively orthogonal to peer review (perhaps Elsevier does?)
- In some fields, notably hep-th, speed of field evolution makes peer-review almost obsolete for scientific *communication* (not for tenure, rewarding, etc)
- arXiv can support alternative schemes by separating registration, dissemination, and archiving from certification (peer-review or other)
- Possibility of overlay journals; a few exist over arXiv

That beautiful user interface



Questions?

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