

# Using Challenge Problems to Drive Technology



The Text Retrieval Conference

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# What is TREC?

- A workshop series that provides the infrastructure for large-scale testing of (text) retrieval technology
  - realistic test collections
  - uniform, appropriate scoring procedures
  - a forum for the exchange of research ideas and for the discussion of research methodology

# Information Retrieval (aka Search)

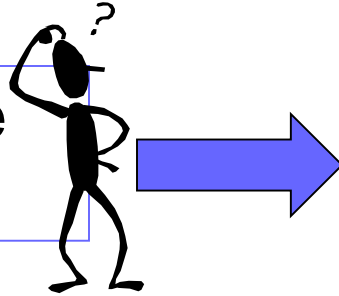
- Provide content-based access to documents not specially structured for computer access
  - ‘document’ is any unit of information of interest  
e.g.,:

scientific journal article	web page
blog post	tweet
medical record	image
voice mail	video
  - generally a very large number of documents
  - generally systems return a ranked list of documents in response to a *query*

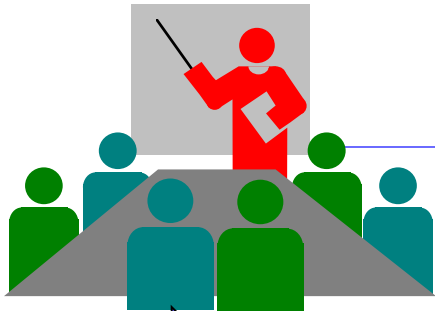


# TREC Approach

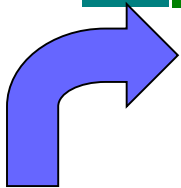
Assessors create topics at NIST



Topics are sent to participants, who return ranking of best 1000 documents per topic



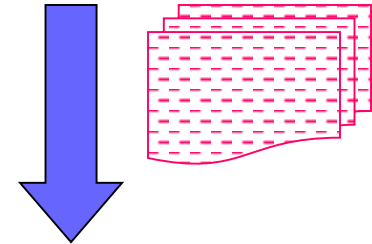
Participants gather at conference to discuss findings



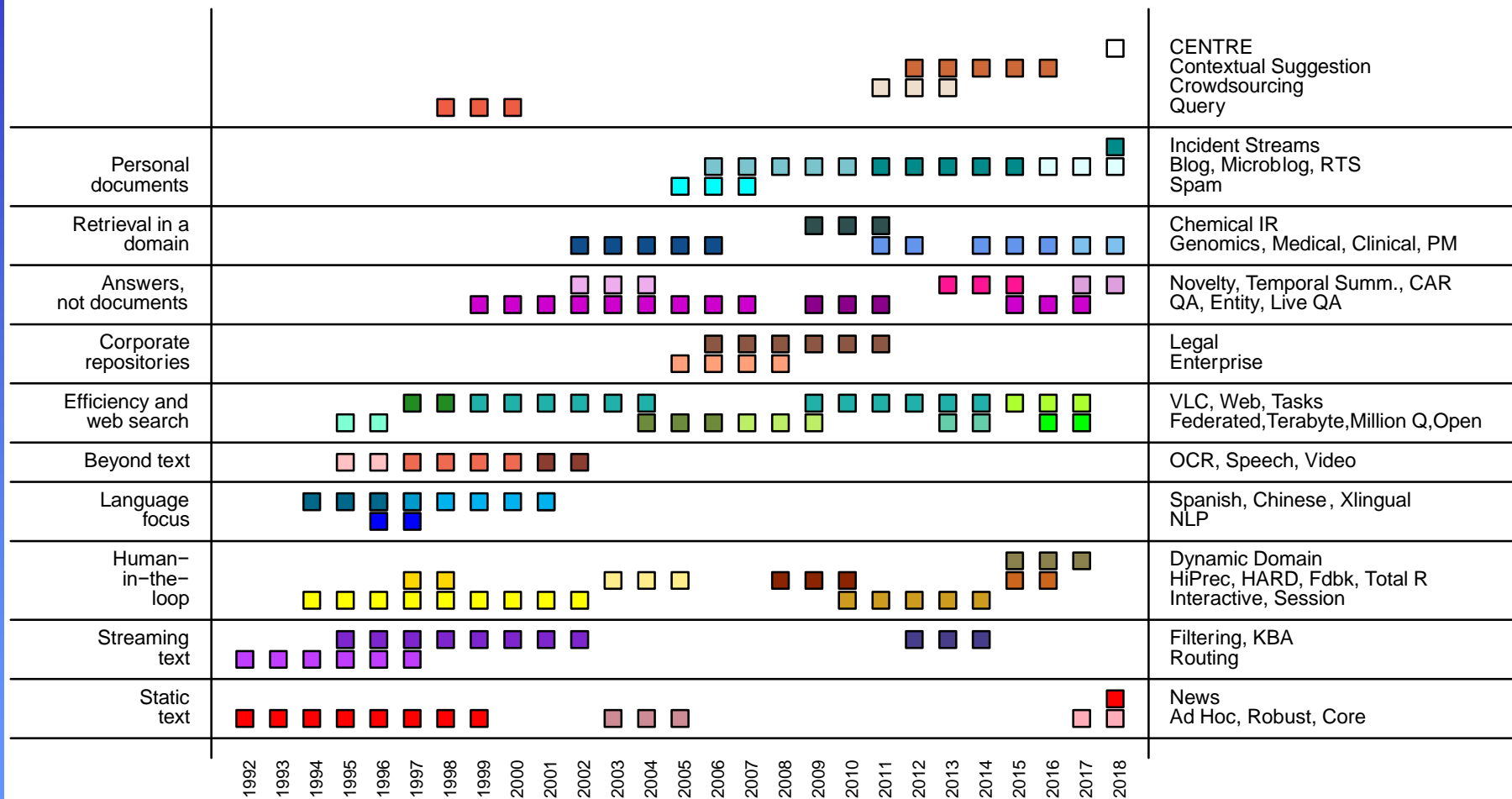
Systems are evaluated using relevance judgments



NIST forms pools of unique documents from all submissions which the assessors judge for relevance



# TREC Tracks



# NIST Role

- Technology-neutral site with technical understanding
- Unique experience and expertise
  - operationalizing tasks
  - developing evaluation methodology
  - validating evaluation methodology

# Why Coopetition?



Competing can give one  
a bigger piece of the  
pie...

...but cooperation  
makes the pie  
bigger!

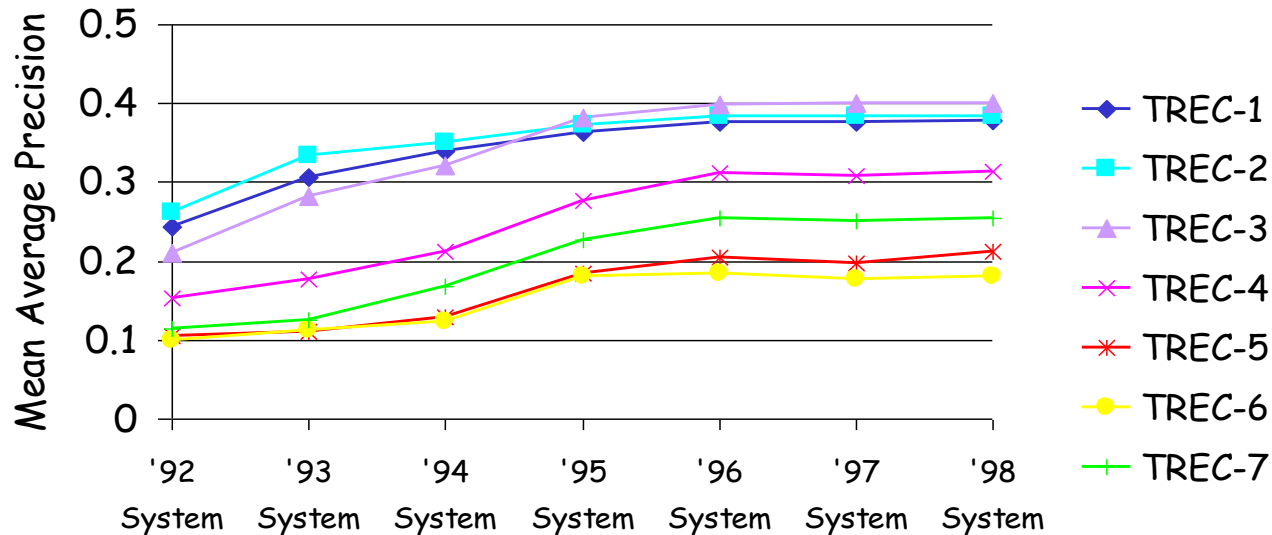


# TREC Impact

- Form/solidify a research community
- Establish the research methodology
- Document, and improve, the state-of-the-art
- Facilitate technology transfer
- Amortize the costs of infrastructure



# Improve the State-of-the-art



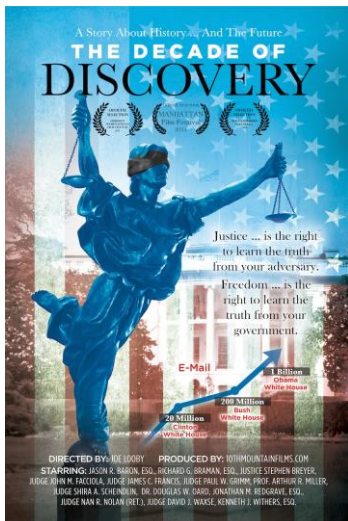
- Effectiveness doubled in first 6 years
  - biggest effect comes from availability of test collections that allow tight research cycles
  - equivalent-quality test sets cannot be built by a single organization because of bias

# Form a Research Community

- New tasks launch entire research areas that have lead to new products

cross-language retrieval  
question answering

video retrieval  
e-discovery



*This project [the TREC Legal track] can be expected to identify both cost effective and reliable search and information retrieval methodologies and best practice recommendations, which, if adhered to, certainly would support an argument that the party employing them performed a reasonable ESI search, whether for privilege review or other purposes.*

---Magistrate Judge Paul Grimm  
Victor Stanley v. Creative Pipe

# Facilitate Tech Transfer

*TREC has proven to be a valuable forum in which IBM Research has contributed to an improved understanding of search, while at the same time the insights obtained by participating in TREC have helped to improve IBM's products and services.*

--- conclusion of IBM's chapter of the TREC book



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# Amortize Infrastructure Costs

- Leverage relatively small government investment
  - test collections and evaluation scripts available from TREC web site
  - reach is much greater than actual participants



*In other words, for every \$1 NIST and its partners invested in TREC, at least \$3.35 to \$5.07 in benefits accrued to IR researchers... These responses suggest that the benefits of TREC to both private and academic organizations go well beyond those quantified by this study's economic benefits.*

---RTI International  
Economic Impact Assessment of NIST's TREC Program  
December 2010

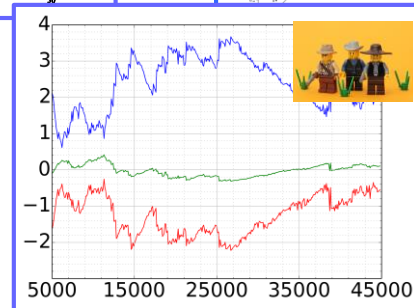
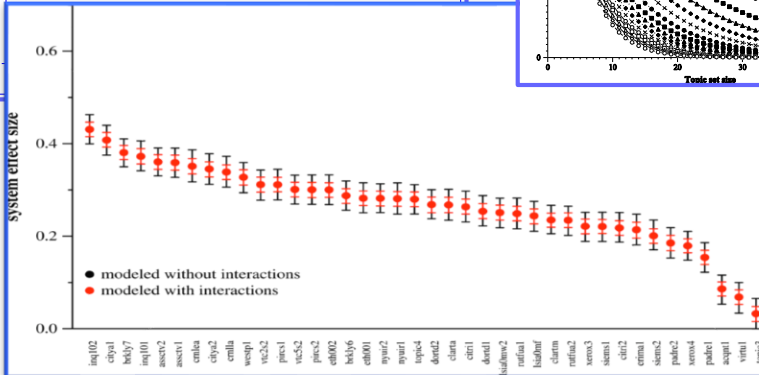
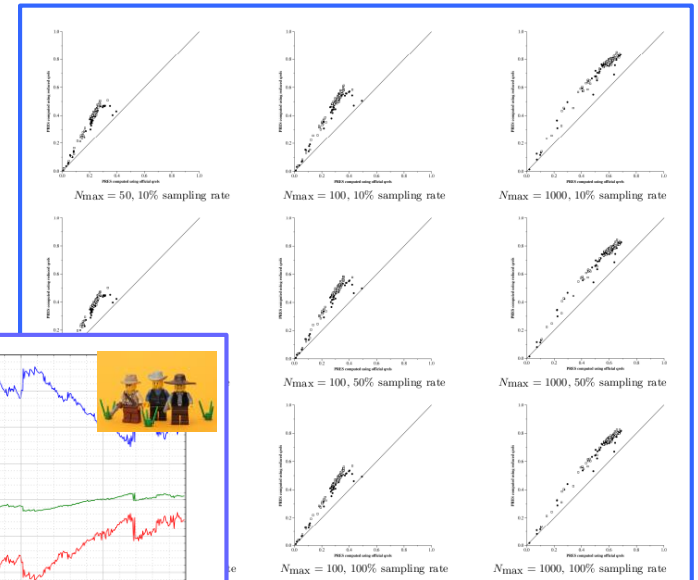
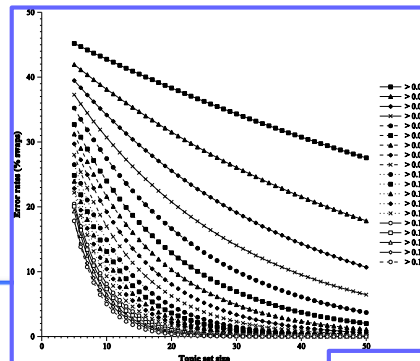
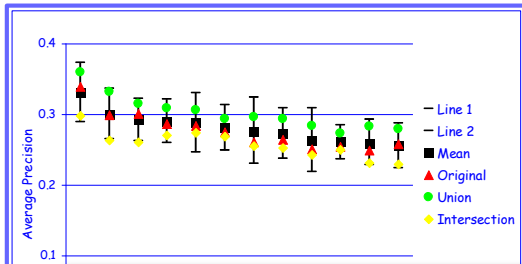
# Establish the Research Methodology



*TREC is an annual benchmarking exercise that has become a de facto standard in IR evaluation.*

---Steve Robertson, Microsoft,  
SIGIR 2008

## Focus of NIST research: evaluate the evaluation



## Why data matters

3/04/2008 07:04:00 AM

Posted by Hal Varian, Chief Economist



The TREC data revitalized research on information retrieval. Having a standard, widely available, and carefully constructed set of data laid the groundwork for further innovation in this field. The yearly TREC conference fostered collaboration, innovation, and a measured dose of competition (and bragging rights) that led to better information retrieval.

