

# Science/engineering bibliographic databases' future: collection development issues at the university of Maryland

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## Abstract

In light of the increased cost of purchasing library materials in academic institutions in the United States and elsewhere, many institutions are canceling subscriptions to journals and databases from commercial and society publishers. This presentation will discuss the collection management policies at the University of Maryland, College Park (UMCP). Examples will be given of how these recent policies are affecting teaching and research along with the innovative ways librarians are trying to circumvent this difficult period ---- by the discovery and advertising of free resources, using pay-per-view models, etc.

Special emphasis will be given to resources in engineering and the physical sciences. For example, at UMCP, with a well-known physics program (ranked #13 among graduate programs in physics by US News and World Report, 2009), since July 1, 2008, faculty and students no longer have access to INSPEC, a premier physics database (UMCP purchased the INSPEC Archive and access to it will remain intact). This was a very hard decision and the effect will not be known immediately. Even Compendex, a research staple for general engineering, is under heavy scrutiny! Will the free Scitopia, Google Scholar, and the like be a good substitute?

Thus, based on a presentation that Nevenka Zdravkovska made at the ICoASL 2008, International Conference of Asian Special Libraries in Delhi, late November 2008 entitled, 'Bibliographic Databases in the Sciences and Engineering: Are They Going to Survive', this paper discusses the advantages and disadvantages of maintaining subscriptions to these Index and Abstract Databases. Are they worth the money, are they being used appropriately and enough, or can they be dropped and supplemented sufficiently and even comprehensively by other sources? Though some other academic institutions may be able to relate to this similar dilemma, there is no intent to generalize that they are having the same financial issues as experienced at UMCP.

**Keywords:** collection development, bibliographic databases, index and abstract databases, University of Maryland Libraries

## Background

The University of Maryland in College Park, Maryland (USA), founded in 1856, has an enrollment of over 35,000 students. The collections of the University of Maryland Libraries represent a vast variety of formats and languages, including books, periodicals, newspapers, manuscripts, audio-visual materials, and information resources in electronic format in direct support for the instructional and research programs of the university. Liaisons appointed from each department to the Libraries make requests for library materials as do other faculty and graduate students.

The total University Library materials expenditure for fiscal year 2008 was approximately \$1.6 million for print and \$3.6 million for e-journals and databases. But despite being a highly respected institution of higher education, like many others, it is facing difficult financial times at a time when the world economy is experiencing its biggest challenges in recent memory. Even worse, before this collapse of the world economies in 2008, the University of Maryland financial crisis had started long before.

## Collection Development

### *Serials Challenges*

In 2003, the provost at the University of Maryland laid out the situation with the University budget for FY2004 (University of Maryland Libraries, 2004) (starting July 1, 2003), stating that "this is the severest budget deficit the University has experienced since its designation as a flagship campus." The Libraries, as the rest of the University, were affected by this shortfall. It was decided to reduce the

subscription to journals and electronic resources by 5%. This was the third consecutive fiscal year the Libraries had to deal with budget cuts.

The budget situation did not improve in the following years. Materials had to be cut, mainly the serials holdings. For example in FY07 – 8% of the journals were canceled, FY08 – 9% and for FY09 – 5%.

Deciding which journal to cancel is a tall task, of course! Table 1 lists the free tools that may be used in making these hard decisions. The data gathered helped to convince faculty on the quality and reputation of journal candidates for cancellation. In addition to these tools, we also used ISI's costly Journal Citation Report (JCR), which as a subscription, so far, has survived being canceled at UMCP.

**Table 1. Free journals tools**

Title/URL	Features
EigenFactor – Ranking and Mapping Scientific Knowledge <a href="http://eigenfactor.org/">http://eigenfactor.org/</a>	The algorithm ranks journals much as Google ranks websites, uses 5 years citation data, and adjusts for citation differences across disciplines.  Measures journal price as well as citation influence.
SJR SCImago Journal and Country Ranking <a href="http://www.scimagojr.com/">http://www.scimagojr.com/</a>	Portal that includes the journals and country scientific indicators developed from the information contained in the <a href="#">Scopus®</a> database ( <a href="#">Elsevier B.V.</a> ). These indicators can be used to assess and analyze scientific domains. (Butler)
Journal-Ranking.com <a href="http://www.journal-ranking.com/ranking/web/index.html">http://www.journal-ranking.com/ranking/web/index.html</a>	Allows users to configure their ranking interests, as well as provide a more reasonable method to evaluate a journal's impact.
MIS Journal Ranking <a href="http://ais.affiniscap.com/displaycommon.cfm?an=1&amp;subarticlenbr=432">http://ais.affiniscap.com/displaycommon.cfm?an=1&amp;subarticlenbr=432</a>	Provides information about evaluations concerning the quality of MIS (Management Information Systems) journals.
Journal Info (Lund University) <a href="http://jinfo.lub.lu.se/">http://jinfo.lub.lu.se/</a>	Look up information on your favorite scientific journal or discover a new one.
Eureka – Science Journal Watch <a href="http://www.eurekajournalwatch.org/index.php/Main_Page">http://www.eurekajournalwatch.org/index.php/Main_Page</a>	Freely-editable source of information on scientific journals, starting with mathematics and physics. Provides easily accessible information on scholarly publishing venues so that the competition among groups and strategies may be a fair one.

### **Bibliographic Databases**

During the period of heavy journals cancellations, subject specialists through their *collaboratives* once a year, reviewed the databases in their subject areas, looking especially at the cost per use data (when available). Some databases, with high cost per use, were canceled in the process, but there was no concerted effort to cancel databases in order to free up money for journal subscription retention. However, due to concerns for the quality of the journals collection from faculty and subject librarians, the Collection Management Team recommended in the FY09 collection review to look for databases whose content is available through other sources – subscriptions or free, with the possibility of canceling overlapping or free content. Since we learned in February 2008 that University of British Columbia canceled their *INSPEC* subscription, and no faculty ever complained about it, we started looking at our 'core' databases with other eyes. (Zdravkovska 2008)

### **Comparison Tools**

There are a number of free tools that help evaluate content and compare content of the myriad of databases now available from different publishers. Here are two examples of tools that are great resources for librarians.

CUFTS: Open Source Serials Management - <http://cufts2.lib.sfu.ca/MaintTool/public/compare>

In addition to being a knowledgebase of over 450 full-text resources, it provides publicly accessible services: resource comparison, journal search, and aggregator MARC generator. (Simon Fraser University Library 2008)

JISC (Joint Information Systems Committee) Academic Database Assessment Tool - <http://www.jisc-adat.com/adat/home.pl>

From the About page: "The JISC Academic Database Assessment Tool (ADAT) aims to help libraries to make informed decisions about future subscriptions to bibliographic databases.

"The site provides access to detailed information and title lists for major bibliographic and full text databases, and key service information for database and eBook content platforms.

"In each case the information has been provided directly by the relevant suppliers and is presented here as a resource to assist librarians in their purchasing decisions. The site provides functionality to compare databases automatically. Any combination of databases can be compared in order to generate lists of relevant titles.

The site is provided under a Creative Commons License." (Creative Commons License 2008).

### Cancellation Process

At the University of Maryland Libraries, records with relevant information on over 300 subscriptions to databases are kept. Costs are tracked of what is paid over multiple years along with usage statistics. Thus, the important cost per use is calculated, which became one of the triggers for starting to look more closely at databases along with the journals themselves. Criteria for deciding the fate of the databases included: importance to the program, percentage of cost increase over the years, cost per use, uniqueness of the collection, uniqueness of performance. Figure 1, below, is an example of the cost/per use of some database examples over a three year period at the University of Maryland Libraries. As for the journals, we used the multiple tools to guide us in making that decision.

From this spreadsheet one can notice that the cost per use for INSPEC, over a three year period, although extremely low, increased steadily – in FY05 it was .68; FY06 - .80; and FY07: 1.02. It should be noted though that the amount of usage is the combined figure for both INSPEC parts – current and archive (UM Libraries bought the INSPEC Archive so that part of the database will continue to be available to the community), where one can assume that the use of the current subscription is lower.

	A	B	C	D	G	H	I	J
1	Database	Vendor	FY04	FY05	FY06 \$/S	FY07 \$	FY07 S	FY 07 \$/S
61	EEBO	ProQ	\$ 3.07	\$ 0.77			4282	
62	EI Compendex	EI	\$ 1.31	\$ 1.32	\$ 0.12	\$ 29,883.00	22089	\$ 1.35
63	ERIC	Ebsco	\$ -	\$ -	\$ -	\$ -	143766	\$ -
64	Ethnic Newswatch	ProQ	\$ 0.17	\$ 0.05	\$ 0.07	\$ 4,425.00	71972	\$ 0.06
65	Family & Society Studies	Ebsco			\$ 0.06	\$ 2,693.00	33141	\$ 0.08
66	Gallup Brain	Gallup			\$ 4.55	\$ 1,687.00	630	\$ 2.68
67	Gender Watch	ProQ	\$ 0.05	\$ 0.02	\$ 0.02	\$ 1,515.00	75156	\$ 0.02
68	General Science Abstr	Ebsco	\$ 0.46	\$ 0.23	\$ 0.14	\$ 2,400.00	17891	\$ 0.13
69	GEOBASE	FirstSearch	\$ 0.22	\$ 0.89	\$ 1.70	\$ 9,049.00	4655	\$ 1.94
70	GeoRef	Ebsco	\$ 0.54	\$ 0.24	\$ 0.22	\$ 2,648.00	11303	\$ 0.23
71	GLBT	Ebsco			\$ 0.57	\$ 6,355.00	8771	\$ 0.72
72	Grove Art	Grove			\$ 0.28		6116	\$ -
73	Grove Music	Grove			\$ 0.11	\$ 2,720.00	20504	\$ 0.13
74	Health Source	Ebsco			\$ -	\$ -	54171	\$ -
75	Historical Abstracts	ABC	\$ 0.52	\$ 0.39	\$ 0.49	\$ 6,132.00	7298	\$ 0.84
76	Hist of Sci & Tech	RLG			\$ 0.90	\$ 3,140.00	3256	\$ 0.96
77	Hoovers	ProQ	\$ 0.09	\$ 0.06	\$ 0.08	\$ 4,495.00	69447	\$ 0.06
78	Humanities Abstr/ Int Comple	Ebsco	\$ 0.55	\$ 0.27	\$ 0.19	\$ 5,358.00	20823	\$ 0.26
79	IEEE Library	IEEE			\$ 2.97		83466	\$ -
80	INSPEC	Ebsco	\$ 0.76	\$ 0.68	\$ 0.89	\$ 34,679.00	34055	\$ 1.02
81	Intl Bibl of Theatre Dance	Ebsco			\$ 0.16	\$ 2,394.00	8361	\$ 0.29
82	Intl Idex to Black Per	ProQ	\$ 4.88	\$ 4.51	\$ 7.19	\$ 3,445.00	699	\$ 4.93
83	Intl Political Sci Abstr	SP/Ebs	\$ 1.39	\$ 0.87	\$ 0.56	\$ 2,357.00	9916	\$ 0.24
84	Jnl Citation Reports	ISI/Thomson	\$ 1.69	\$ 1.65	\$ 0.57	\$ 8,338.00	12492	\$ 0.67
85	Library Literature	Ebsco	\$ 0.14	\$ 0.10	\$ 0.08	\$ 2,195.00	9916	\$ 0.22
86	LION	ProQ	\$ 1.30	\$ 0.85	\$ 0.88	\$ 21,662.00	37713	\$ 0.57
87	Literature Resource Center	Gale	\$ 0.38	\$ 0.46	\$ 0.51	\$ 19,748.00	24079	\$ 0.82
88	LLBA	CSA	\$ 0.25	\$ 0.19	\$ 0.16	free	14283	\$ -
89	LN Academic	LN	\$ 0.10	\$ 0.10	\$ 0.14	\$ 46,676.00	304227	\$ 0.15
90	LN Congressional	LN	\$ 0.87	\$ 0.05	\$ 0.71	\$ 13,539.00	15400	\$ 0.88
91	LN Govt Periodicals	LN	\$ 0.39	\$ 0.63	\$ 0.63	\$ 1,903.00	1187	\$ 1.60
92	MathSciNet	AMS	\$ 0.17	\$ 0.09	\$ 0.08	\$ 7,090.00	48838	\$ 0.15
93	Mental Measuremenst YB	Ebsco	\$ 0.22	\$ 0.05	\$ 0.17	\$ 1,218.00	8993	\$ 0.14

Figure 1. FY07 Cost per search spreadsheet (UM Libraries)

As mentioned above, in addition to cost per use, a very important element that was looked at was the unique features of the database. Is the content available somewhere else? For example, IEEE Xplore has full-text of conference proceedings not available anywhere else (UM canceled the IEEE proceedings print because of their availability in IEEE Xplore). INSPEC and Compendex both have unique content ---- but a lot of overlap as well! In the round of cancelation in FY08, INSPEC was canceled, but Compendex was spared. However, is that going to be true in a couple of years as well? Time will tell. Appendix 1 lists several major databases with their uniqueness in the database world.

### **Free Databases**

One thing that has made these gut-wrenching cancellation decisions a little less tough is the emerging availability of some free databases, which cover the subjects of the commercial databases and the print indexes and abstracts. Appendix 1, again, lists some of the commercial databases used at an engineering and physical sciences library. Appendix 2 is a partial list of free databases.

In an article published in *Searcher* in 2009, Dana Roth discusses several free resources that reference librarians use to verify a citation, and he states: "Given current and future economic conditions, it is obvious that many subject-specific databases are at risk. With the possible exception of SciFinder (Chemical Abstracts/MEDLINE) and Math Reviews, an improving Google Scholar is obviously a serious threat, over time, to databases such as INSPEC, BIOSIS, Compendex, and eventually Scopus and Web of Science." (Roth 2009). Ben Wagner, in the article published in the *Learned Publishing* 2009 states: "Free finding aids will continue to improve rapidly and to gain 'mind-share', especially among the younger generations." (Wagner 2009)

### **On-Demand Databases**

In 1998, when INSPEC decided to pull the database from OCLC's pay-as-you-go FirstSearch model and offer it as an annual subscription only through several platforms at an annual cost in the range of over \$20,000, institutions with small physics departments were put into an extremely difficult situation. Georgetown University, as one of the premier institutions of Higher Education, qualified for the highest cost although, at that time, the physics department had solid researchers, but no graduate programs. After investigating all the options and costs associated, we discovered that there was not a big difference in the pricing by platform for an annual subscription. However, we discovered that DataStar, the European branch of Dialog – (recently acquired by Proquest), offered a pay-per-view option. We decided to go with this option and deposited initially \$5,000 in the account with the option of adding additional funds as needed. Through this arrangement we offered both INSPEC and Compendex. Part of the cost, in addition to viewing records, was the connecting time. To prevent casual use of the database, which would result in unnecessary connecting time fees, we limited access to this service to the IP addresses in the building where the physics department was housed.

This arrangement proved to be a great success! We did not exceed our initial deposit, and a couple of years later we added BIOSIS through this arrangement, again, without increasing the yearly deposit. Starting in 2003 we noticed that we were not spending all the money in the account and lowered the deposit to \$2,500. By 2006 we were hardly spending any money through DataStar.

We should also mention STNEasy here for schools with small Chemistry departments – a useful tool for getting Chemical Abstracts data. Payment for STNEasy is similar to that of DataStar, where cost is incurred for connecting time, number of viewed/printed records and number of keywords/structures. (Dialog Proquest 2008). However, unlike DataStar, this service uses username/password login (it is not by IPs).

### **New Developments**

On February 3, Library Journal Newswire reported

ICOLC, an international, informal group currently comprising approximately 200 library consortia worldwide, released a statement suggesting that the effects of the economic downturn on library budgets will be severe, and "prolonged." It asked publishers and vendors to work flexibly with library consortia to get through the crisis, which, officials noted, could see library and consortia budgets "decline by double-digits year over year," reductions that unlike "the sporadic or regional episodes experienced from year to year" could serve as "real and permanent reductions to base budgets." (Albanese 2009)

As a result of this announcement, SOLINET informed its customers that "Lexis Nexis has agreed to waive its 2.5 percent annual increase, as well as to offer further 'deeper', though as yet unspecified, discounts."

At the the ALA Midwinter Conference in Denver in January 2009, the mood was pretty somber. As described in an email by Linda Yamamoto to the PAMNET listserv:

"It was one of the more depressing conferences I've been to because so many institutions are facing deep cuts, although some have been cutting a little each year so they aren't so badly off. The range I heard (the lower end was 3rd hand) has been 4-33% cuts for the next fiscal year. Publishers are very concerned because institutions are looking hard at use stats and even the "core" electronic resources are not being exempted from scrutiny and possible cancellation/reductions." (Yamamoto 2009)

## Conclusion

This paper discussed the collection management policies at the University of Maryland, in light of the increased cost of purchasing library materials in academic institutions in the United States and elsewhere. This has led to a cancellation of subscriptions to journals and databases from commercial and society publishers, and as mentioned in the previous section, has led to adjustments in justifying renewals of continuation titles.

Danny P. Wallace states in his article, "Academic Library and Research in the Twenty-First Century: Linking Practice and Research", the forces in the 21st century are a challenge to information professionals as they do not need reconsideration of core roles but the rethinking of strategies. "In many cases they are being replaced by anecdote rather than evidence..." as indicated by our witnessing of a slight, but definite, change in research habits in academia. As Mr. Wallace concludes, "the research needs of the 21st century revolve around finding new truths .... not confirming to that which is already known". (Wallace 2007)

Thus, along with this new mindset, and since libraries have limited funds, which have decreased over the years in real money without calculating for inflation, the obvious fact is that publishers cannot continue to raise subscription costs and will, more than likely, have to drop them! So, even though there are compelling reasons for continuing to subscribe to some of the bibliographic databases due to unique features and information (something not available anywhere else), print or online Indexes and Abstracts, as we know them, long a staple of research libraries, may be on their way out ---- be it good or bad! Only time will tell.

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## Appendix 1 – Commercial Databases (Selected)

Title	Description	Features/Uniqueness
<b>Multidisciplinary</b>		
WorldCat  1200 (or 1500?) – present	Records for materials cataloged by OCLC member libraries. WorldCat offers holdings information vital for collection development, cataloging, authority control, and retrospective conversion services.	Free version exists, WorldCat Local. Google-like search box, with same content, but limited search options. OCLC is selling customized WorldCat Local database; some suspect WorldCat Local will not be free in the future.
Web of Science 1900 – present (coverage depends on years purchased)	The interface for access to the ISI Citation databases: Arts & Humanities Citation Index, Science Citation Index, and Social Science Citation Index.	First to offer discovery by searching for cited references. Analysis of citations great asset. WoS tracks the most relevant titles in each covered discipline.
Scopus (Elsevier)  1966 - present	Comprehensive database for scientific, technical and medical information, containing approximately 13,000 journal titles from 4,000 publishers, and abstracts going back to 1966.	It provides searching capability, linking to full-text sources, cited references, saved search and alerting feature, and is the most comprehensive A&I database of scientific literature ever assembled.
JCR	Unique and comprehensive tool providing bibliometric analysis of more than 5,000 journals in the areas of science and technology and of 1,500 journals in the social sciences. Coverage is international and includes journals published by over 3,000 publishers in 60 countries. Provides a systematic and objective means of determining the relative importance of science and social sciences journals within their subject categories.	First to introduce Impact Factor. Although there are free tools, Impact Factor is still considered one of the most relevant measures.
<b>Physical Sciences/Engineering</b>		
INSPEC 1969 – present  Archive (before 1969)	Bibliographic database providing access to the world's scientific literature in electrical engineering, electronics, physics, control engineering, information technology, communications, computers, computing, and manufacturing and production engineering.	A lot of the current information can be discovered from free sources like Scitopia, Google Scholar, etc.
EI Compendex  1884 - present	Comprehensive interdisciplinary engineering database with over eight million summaries of journal articles, technical reports, and conference papers and proceedings, dating from 1884 forward.	Many international conferences

IEEE Xplore  1988 - present	Provides full-text access to all IEEE transactions, journals, magazines and conference proceedings published since 1988 and all current IEEE standards.	
<b>Mathematics</b>		
MathSciNet  1940 – present	Access to fulltext of Mathematical Reviews and Current Mathematical Publications.	Core resource for Math. Its European competitor, Zenterblatt Mat, is free.
<b>Government Sponsored Research</b>		
NTIS (CSA)  1964 - present	Contains latest U.S. government-sponsored research and worldwide scientific, technical, engineering, and business-related information. Additionally, information is available from international government departments and other international organizations including those from Canada, Japan, the former Soviet Union, Western and Eastern European countries.	Free version available, with limited search capability and shorter abstracts.
Geobase  1980 - present	Multidisciplinary database supplying bibliographic information and abstracts for the Earth sciences, ecology, geomechanics, human geography, and oceanography. The database covers approximately 2,000 international journals, including both peer-reviewed titles and trade publications.	Georef is a superior DB with much of the same content, especially, in geology
SPIE	Includes more than 200,000 technical papers from SPIE Journals and Conference Proceedings, including full coverage from 1998 to the present.	Indexed in Scitopia

## Appendix 2 - Free Databases (Selected)

Title	Description	URL
<b>Multidisciplinary</b>		
Google Scholar  Dates vary	Google Scholar enables you to search specifically for scholarly literature, including peer-reviewed papers, theses, books, preprints, abstracts and technical reports from all broad areas of research.	<a href="http://scholar.google.com/">http://scholar.google.com/</a>
Google Book Search	Some of the digitized out-of-copyright books are old indexes. This is another way of verifying or finding citations.	<a href="http://books.google.com/">http://books.google.com/</a>
WorldCat Local	Records for materials cataloged by OCLC member libraries.	<a href="http://www.worldcat.org/">http://www.worldcat.org/</a>
The European Library 2.0	Portal that lets you search the library catalogs of National Libraries in Europe, digital resources, etc.	<a href="http://search.theeuropeanlibrary.org/portal/en/index.html">http://search.theeuropeanlibrary.org/portal/en/index.html</a>
<b>Sciences/Engineering</b>		
Scitopia	Searches the entire electronic libraries of the leading voices in major science and technology disciplines and provides relevant results. More than three and a half million documents, including peer-reviewed journal content and technical conference papers, spanning 350 years of science and technology can be searched through the site.	<a href="http://www.scitopia.com">http://www.scitopia.com</a>
ArXiv.gov Dates vary	Electronic pre-prints in physics, mathematics, computer science and quantitative biology.	<a href="http://arxiv.org/">http://arxiv.org/</a>
Engineering E-Journal Search Engine (EJSE)	Free online service providing you with access to the very best Web resources for education and research, evaluated and selected by a network of subject specialists. It covers the physical sciences, engineering, computing, geography, mathematics and environmental science. The database contains over 35000 records.	<a href="http://www.intute.ac.uk/sciences/">http://www.intute.ac.uk/sciences/</a>
TicTOC	Find over 12,000 scholarly journal Table of Contents (TOCs) from 435 publishers.	<a href="http://www.tictocs.ac.uk">http://www.tictocs.ac.uk</a>
ASCE Research Library	Comprehensive online tool for locating articles of interest across all disciplines of civil engineering with access to more than 40,000 full-text papers from ASCE Journals and Proceedings published or over 400,000 pages. Approximately 4,000 new papers will be added each year.	<a href="http://www.ascelibrary.org/">http://www.ascelibrary.org/</a>
<b>Mathematics</b>		
ZMath	Contains about 2.7 million entries drawn from about 3500 journals and 1100 serials from 1868 to present.	<a href="http://www.zentralblatt-math.org/zmath/en/">http://www.zentralblatt-math.org/zmath/en/</a>
<b>Government Sponsored Research</b>		

Science.gov	Gateway to over 36 databases and 1,850 selected websites, offering 200 million pages of authoritative U.S. government science information, including research and development results.	<a href="http://www.science.gov/">http://www.science.gov/</a>
Information Bridge	Free public access to over 200,000 full-text documents and bibliographic citations of Department of Energy (DOE) research report literature. Documents are primarily from 1991 forward and were produced by DOE, the DOE contractor community, and/or DOE grantees. Legacy documents are added as they become available in electronic format.	<a href="http://www.osti.gov/bridge/">http://www.osti.gov/bridge/</a>
NTIS.gov	US government-sponsored research. Will contain all of the records back to 1964; abstracts were not available when first introduced, but that is no longer the case. 60K records added/year. Replacement for the commercial CSA NTIS database.	<a href="http://www.ntis.gov">http://www.ntis.gov</a>
PubMed (Medline) 1966 - present	NLM's search service to access MEDLINE and Pre-MEDLINE (with links to participating on-line journals), and other related databases.	<a href="http://www.ncbi.nlm.nih.gov/pubmed/">http://www.ncbi.nlm.nih.gov/pubmed/</a>
Science.gov	Searches over 36 databases and 1,850 selected websites, offering 200 million pages of authoritative U.S. government science information, including research and development results.	<a href="http://science.gov/">http://science.gov/</a>
NASA Technical Report Server (NTRS)	Provides access to approximately 500K aerospace related citations, 90K full-text online documents, and 111K images and videos.	<a href="http://ntrs.nasa.gov/search.jsp">http://ntrs.nasa.gov/search.jsp</a>
National Institute of Standards and Technology (NIST) Gateway	Easy access to many (currently over 80) of the NIST scientific and technical databases. These databases cover a broad range of substances and properties from many different scientific disciplines. The Gateway includes links to free online NIST data systems as well as to information on NIST PC databases available for purchase.	<a href="http://srdata.nist.gov/gateway/">http://srdata.nist.gov/gateway/</a>
USA.gov (formerly first.gov)	Official information and services from the U.S. government. Centralized place to find information from U.S. local, state, and federal government agency websites.	<a href="http://www.usa.gov/">http://www.usa.gov/</a>
Transportation Research Information Services (TRIS)	Bibliographic database funded by sponsors of the US Transportation Research Board (TRB), primarily the state departments of transportation and selected federal transportation agencies. Contains over half a million records of published transportation research including technical reports, books, conference proceedings and journal articles. The time span covers literature from the 1960s to the present, with some coverage of prior years. Highway Research Board publications are covered back to 1923.	<a href="http://ntlsearch.bts.gov/tris/index.do">http://ntlsearch.bts.gov/tris/index.do</a>

<b>Patent Sites</b>		
USPTO	Full text of U.S. Patents 1976-Present. Search by patent number and current US classifications 1790-Present. Full text images from 1790-Present are available using a free TIFF plug-in. The rapidly growing Patent Applications database (2001-present) is a separate file.	<a href="http://www.uspto.gov">http://www.uspto.gov</a>
European Patent Office	Search titles and some abstracts of over 50 million patents from 71 countries. Display and print full text of US utility patents 1836-Present	<a href="http://ep.espacenet.com/">http://ep.espacenet.com/</a>
Google Patents	Covers the entire collection of issued patents and millions of patent application made available by the USPTO—from patents issued in the 1790s through those most recently issued in the past few months. Currently does not include international patents.	<a href="http://www.google.com/patents">http://www.google.com/patents</a>
Boliven	Contains data and images for US patents from 1976 to present, EP documents from 1978 forward, WO applications from 1989 forward and JP abstracts from 1976 forward. Search options include Basic, Advanced, Expert and Patent Number. Search results can be filtered by source, assignee, date, and document type and sorted by relevance or date. A "Quick Flip" display option allows searchers to flip through displays of front pages very quickly.	<a href="http://www.boliven.com/patents">http://www.boliven.com/patents</a>