

INTERNET RESOURCES

For Chemical Engineers

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The amazing capabilities of the Internet have exponentially improved the chemical engineering curriculum. Through this medium, it is now possible to learn about the latest process engineering techniques and novel technologies, to compare the capabilities of commercial simulators, to obtain detailed information on research and education, and to participate in discussions with colleagues from around the world, among other things. The challenge that comes along with this medium, however, is learning how to navigate its various areas in order to optimize the informational gain.

The interconnection of millions of computers on the Internet has caused some to worry that quality, stability, credibility, and security cannot always be assured, so careful use of the medium must always be a consideration. Fast circulation of information between chemical engineers will most certainly lead to new developments, *i.e.*, building new body parts that can function intimately with living tissue requires delivery of a large amount of biomedical information that could be acquired through the Internet.

In the past few years, the Internet has transformed the way chemical engineers share information by removing the barriers of time and distance.^[1,2] The goal of this paper is to provide a brief listing and a short discussion of on-line resources, discussion groups, and electronic mailing lists. In order to assure the long-term usefulness of this information, a more complete version can be found on the website of the Chemical Engineering Department at the University of Florida <<http://www.che.ufl.edu/sotudeh.html>> where the links will be updated as necessary over time.

Starting Points • Good starting points for learning more about the features of the Internet are shown in Table 1 and Table 2.

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Although many other pages are available, these have some unique and useful features. Many reviews have been published regarding search engine performances, ratings, popularity and traffic, their trends over time, and search techniques.^[3,4] Good starting points specifically for chemical engineers are presented in Tables 3 and 4 (university web pages are also good for obtaining information^[5,6]).

Companies • There are many sites for chemical companies, and links to them are provided in Tables 3 and 4. Typical information is product lists, literature, contact information, submission forms, on-line catalogues, and reference data.

Societies and Institutions • A compilation of Web pages for chemical engineering societies is given in Table 5. In addition to contact information, membership applications, information of meetings, grant and award information is also listed. Several ChE society sites have member directories.

Educational Resources • An increasing number of papers have been devoted to evaluating the use of the Internet for educational purposes.^[7,8] Table 6 gives web sites that contain lecture notes, tutorials, exercises, exams, etc., with additional tutorials being listed in Table 7. Table 8 presents a series of hypertext links related to ChE history.

Research • A list of web pages of academic and government research organizations and laboratories is given in Tables 9 and 10, and a patent search system is shown in Table 11. Special and general reports for decision makers can also be found on the Internet (*i.e.*, the report on the strategy and structure of chemical engineering research in the USA that was developed by a team of UK professors^[9]).

Journals • Table 12 lists web pages for technical and general chemical engineering journals, and a compilation of scientific ChE journals is shown in Table 13. Chemical-engineering related journals are also available through Elsevier Science web site by registration.^[10]

Software and Simulators • In Table 14, a selected list of process simulators and simulation software is listed. In addition, a compilation of a general list of chemical engineering software can be found on the Internet.^[11,12] Few web-based cal-

■ TABLE 1. Selected Starting Points

Internet Information Center • <http://www.mirrorhere.com>
Learn the Internet • <http://www.library.mcgill.ca/isearch/isearch5.htm>

■ TABLE 2. Selected Internet Search Pages

Google • <http://www.google.com> (high relevancy, proximity, clustering, news)
Yahoo • <http://www.yahoo.com> (subject directory, easy information location, etc.)

■ TABLE 3. Selected Starting Points for Chemical and Process Engineers

Askache • <http://www.askache.com> (general assistance, journal information, etc.)
Che-comp • <http://www.che-comp.org/egroup/links.html> (relevant links, etc.)

■ TABLE 4. Additional Links of Interest to Chemical Engineers

Chemical Abstracts • <http://www.cas.org> (searchable database)
ChE and Computer Resources • <http://www.pse.res.titech.ac.jp/~rafael/comp/resource.html>

■ TABLE 5. Selected Sites for Chemical Engineering Societies and Institutions

American Chemical Society • <http://www.acs.org/>
American Institute of Chemical Engineers • <http://www.aiche.org/>

■ TABLE 6. Selected Sites for Chemical Engineering Online Courses

Advanced Mathematics • <http://clausius.engr.utk.edu/che505/index.html>
Advanced Reactor Design • <http://www.uofl.edu/~r0mira01/che6411.htm>

■ TABLE 7. Sites for Additional Online Tutorials

Sugar Engineers' Library • <http://www.sugartech.co.za/>
Tutorials • <http://www.svce.ac.in/~msubbu/Tutorials/index.htm>

■ TABLE 8. Sites of Historical Information for Chemical Engineers

Chemical Engineering Timeline • http://www.pafko.com/history/h_time.html
History of ChE • http://www.cems.umn.edu/~aiche_ug/history/h_toc.html

■ TABLE 9. Selected Sites of ChE Academic Research Centers and Laboratories

Advanced Combustion Engineering Research Center • <http://www.acerc.byu.edu>
Biochemical Engineering Research Group • <http://www.swan.ac.uk/chemeng/berg.htm>

■ TABLE 10. Selected Sites of Governmental Research Organizations and Laboratories

United States Department of Energy • <http://www.energy.gov>
Von Karman Institute (Fluid Dynamics) • <http://www.vki.ac.be/>

■ TABLE 11. Selected Sites of Patent Information Resources

Delphion Intellectual Property Network • <http://www.delphion.com/>
U.S. Patent and Trademark Office • <http://www.uspto.gov>

■ TABLE 12. Sites for Technical and General ChE Journals

Chemical Engineering Progress • <http://www.aiche.org/cep/>
Hydrocarbon Processing • <http://www.hydrocarbonprocessing.com/hp.html>

■ TABLE 13. Selected Sites for Scientific Chemical Engineering Journals

American Institute of Chemical Engineers (AIChE) • <http://www.aiche.org/aichejournal/>
Canadian Journal of Chemical Engineering • <http://www.chcjc.ca/>

■ TABLE 14. Selected Sites for Chemical Engineering Process Simulators and Software

ASPEN PLUS • <http://www.aspentech.com>
HYSIM and HYSYS • <http://www.hyprotech.com/>

■ TABLE 15. Usenet Groups of Interest to ChEs and Links to their Webs

Sci.energy (energy) • <http://www.faqs.org/faqs/by-newsgroup/sci/sci.energy.html>
Sci.engr.chem (chemical engineering) • <http://www.retallick.com/resources/netresrc.html>

■ TABLE 16. Selected Electronic Mailing Lists for Chemical Engineering

Cheme-1 • (Chemical Engineering) <http://www.louisville.edu/~r0mira01/cheme-1.htm>
Csche-1 • (Canadian Society of Chemical Engineering) <http://listserv.unb.ca>

culators, which are useful for fast calculations (*i.e.*, *TCC*), can also be found on the Internet. CEP's Software Directory maintains comprehensive software information relevant to chemical and process engineering.^[13]

Mailing and Discussion Groups • Discussion groups and electronic mailing lists are given in Tables 15 and 16. Electronic mailing lists are well suited to small groups of users with specialized topics, and Usenet newsgroups are suited for general topics and more users.^[14]

CONCLUSIONS

In the future, the Internet will see an increasing number of users, better use of existing resources, and implementation of new technologies. It is presently under-used as a teaching and research tool and has enormous potential yet to be discovered in those areas. For chemical engineers, the main challenge is to develop this technology for remote collaborative research, collective education. Use of its full potential will overcome many existing barriers of time and distance. In addition, on-line education to the full potential of the existing resources could affect the chemical engineering curriculum in the coming years. Chemical engineering studies will be affected when experimental set-ups, pilot plants, and laboratories can be shared by connection to the Internet with a robotically controlled camera, remote Internet instrument control, and a data-acquisition system.

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