Welcome

Get your free subscription to the *Library Connect Newsletter* at

[http://libraryconnect.elsevier.com/subscribe](http://libraryconnect.elsevier.com/subscribe)
Librarians supporting applied research and discipline-specific researchers – March 13, 2014

Oliver Renn, Head of the Chemistry | Biology | Pharmacy Information Center, Dept. of Chemistry and Applied Biosciences, ETH Zürich
Oliver specializes in knowledge and information management, and education and training initiatives. He has a PhD in bioinorganic chemistry and his prior work experience includes research, publishing, an oncology startup, and a major pharma company (as information center director).

Jan Reedijk, Emeritus Professor of Chemistry, Leiden University and Professor of Chemistry at King Saud University in Riyadh
Jan has authored and co-authored more than 1,100 research papers in molecular inorganic chemistry and served as Director of the Leiden Institute of Chemistry from 1993-2005. He is a founding editor of the European Journal of Inorganic Chemistry, and is President of the Inorganic Chemistry Division of the International Union of Pure and Applied Chemistry.

Ye Li, Chemistry Librarian, Shapiro Science Library, University of Michigan
Ye supports all levels of teaching, learning and research in chemistry, and collaborates with faculty and researchers on cheminformatics projects. She has a PhD in chemistry and an LIS master's degree. Ye is Chair-elect 2014 and Chair 2015 of the Chemistry Division of the Special Library Association (SLA-DCHE).
Compare and contrast: The evolution of academic and corporate library services
What expectations do researchers have for library support in the corporate setting? (1)

No expectations, because there aren’t any libraries left.
What expectations do researchers have for library support in the corporate setting? (2)
What expectations do researchers have for library support in the corporate setting? (3)
What expectations do researchers have for library support in the corporate setting? (4)
What services are needed for researchers in a corporation [1]?

<table>
<thead>
<tr>
<th>Information Access</th>
<th>5. Information Consulting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information Acquisition &amp; Vendor Relations</td>
<td>6. Information Retrieval &amp; Analysis</td>
</tr>
<tr>
<td>2. Information &amp; Library Services</td>
<td>7. News Intelligence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Technology</th>
<th>Knowledge Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. IT &amp; Informatics</td>
<td>12. Knowledge Management Services</td>
</tr>
<tr>
<td>11. Technical Information Management</td>
<td></td>
</tr>
</tbody>
</table>
What expectations do researchers have for library support in academia (1)
What expectations do researchers have for library support in academia (2)
**What services are needed for researchers in academia?**

<table>
<thead>
<tr>
<th>Information Access</th>
<th>Information Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information Acquisition &amp; Vendor Relations ✓</td>
<td>4. Awareness &amp; Training ✓</td>
</tr>
<tr>
<td>2. Information &amp; Library Services ✓</td>
<td>5. Information Consulting ✓</td>
</tr>
<tr>
<td>3. Community Management (Marketing) ✓</td>
<td>6. Information Retrieval &amp; Analysis ✓</td>
</tr>
<tr>
<td></td>
<td>7. News Intelligence X</td>
</tr>
<tr>
<td></td>
<td>8. Text Analytics ?</td>
</tr>
<tr>
<td></td>
<td>9. Knowledge Discovery ?</td>
</tr>
<tr>
<td><strong>Information Technology</strong></td>
<td></td>
</tr>
<tr>
<td>10. IT &amp; Informatics ✓</td>
<td></td>
</tr>
<tr>
<td>11. Technical Information Management ✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Knowledge Management</strong></td>
<td></td>
</tr>
<tr>
<td>12. Knowledge Management Services ✓</td>
<td></td>
</tr>
</tbody>
</table>
“Library” services unique to the academic setting

• Developing the library as a place
  – A place for learning, studying and communicating (Sofa Lounge)

• Communicating science
  – Communication of science respectively scientific results
  – Altmetrics Support (see latest Library Connect webinar)
  – Open Access Publishing Support

• Teaching
  – Get engaged in the courses and be part of the curriculum

If you don’t do this, someone else will do it.
Skill sets needed (1)

- IT guy
- Scientist
- Librarian

#LCwebinar
Skill sets needed (2)

Mixed skill sets are essential
Skill sets needed (3)

Even better: Staff with communication skills
Skill sets needed (4)

Happy scientist – happy information scientists
Examples of tools and services in academic settings (1)
Examples of tools and services in academic settings (2)
Tools needed to keep the “library” up-to-date

How we try to stay tuned to new developments:

Information flow is based on WordPress blog software and is used as an internal content management system for scouting.

- Website
- Infozine
- Facebook, LinkedIn and other
- Consulting
- Education & Training
References and Further Reading


• Website of the Chemistry | Biology | Pharmacy Information Center ETH Zurich: www.infozentrum.ethz.ch/en. For information on coffee lectures, please check older news entries

• Coffee Lecture Video: http://youtu.be/pioJPo-IPAo
What Chemistry Researchers may learn from Librarians

Jan Reedijk
Professor of Chemistry, Leiden Institute of Chemistry, NL and King Saud University, Riyadh, KSA
Questions asked to address:

• How can the university library support chemistry research?
• How can we discriminate between datamining (information retrieval), paper preparing and teaching?
• Do needs of researchers in applied fields differ from those in basic chemistry research? From those in other fields?
• In what way could the library serve as a liaison between the (applied) researcher and other communities & stakeholders?
My Approach/input in the Webinar:

1. As a researcher for almost 50 years, searching for proper literature and using this in writing papers;
2. As a teacher to students and colleagues, how to properly use databases and library subscriptions.
Major Duties for Librarians in a Scientific Library are relatively simple

• Have online databases accessible for researchers (Scopus, Web of science, CCDC, and the like), as well as many of the connected journals.

• Have courses to offer for academics how to use these databases appropriately, i.e. “datamining”, storage (like in Endnote) and their use in research paper writing.

• Be alert to find and use new data and sources (like multireference works) and inform the scientists about such new developments and teach them their use.

• Maintain a library: (Cyber)space and awareness
Database analysis; Data storage & Use

• How to obtain the data? Paid (free) sources:
  X-ray data: from CSD, PDB (free);
  Literature: from WOS and Scifinder; Scopus
  Synthesis: from Crossfire (Gmelin, Beilstein)
  Patents: Patent databases (many are free)
  Often: search on the basis of a drawing!

• How to import obtained data (directly) in your
  own database (like Endnote)?
• How to import the data (references, structures)
  directly in your report files (Word, PowerPoint)?
Categories (Targets for Librarians)

• Undergraduate Students need: facilities to study using library books; terminals for literature search; simple “datamining” beyond Wikipedia.

• PhD students and Postdocs need: Advanced “datamining” (WoS; SCOPUS; CCDC; Scifinder; patent databases); perhaps courses in writing.

• Academic Staff needs: Facilities (&service) for database analysis and (in universities): courses for their students.
For the undergraduates

• They should learn in an early stage that:
  a) Google searches are NOT always scientific
  b) Wikipedia Items are often not accurate

• Peer refereed papers, books and multireference works should be their primary sources of study material

• In essays and papers: copy/pasting is NOT allowed (see below item on ethics in science)

• Asking “correct” search questions is not easy!
For the PhD students and Pdocs

• For most of their work they need older literature (database analysis, in early stages; multireference works), and also alerting services to remain up to date in their field

• *Learn to formulate good search questions*

• In later stages they need to learn to write papers and thesis chapters, with a balanced literature input, without copy/paste (*cultural differences!!*)
For the Academic Staff

• In writing research proposals a thorough knowledge of literature is required, and to be accessible in/via library. Teach student to formulate search questions.

• Same for writing research papers at a later stage.

• Should have proper knowledge of database analysis and awareness to supervise their students.

• Have proper knowledge about (not) use of Open Access.

• Discuss the relevance of ResearcherID, ORCID, Researchgate, etcetera: all, none or some?
Libraries are required to have available

• Good book collection for browsing and lending
• Sufficient (electronic) journal subscriptions (publisher packages) and multireference works
• Database sources and awareness systems (campus wide), such as Web of Science; Scopus; Scifinder; Cambridge Database; Patent databases
• Assistance for corporate staff in “mining”
• (setup/maintain) Repository of papers from the own institution?
Databases & sources to “mine”

- Journals in Library: direct links from desktop, laptop or tablet/smartphone; search profiles.
- Scopus and Science Direct.
- Google and google scholar; Wikipedia.
- Web of Science & Scifinder.
- Cambridge database (CSD); protein database (PDB); Patent databases.
- For chemists: *Often searches based on drawings!*
Future Possible duties for Librarians: 
*Ethics and Writing & Citing behavior*

- Journal selection in submitting a paper? (Open access, or not).
- Proper use of altmetrics? (*separate webinar*)
- (Not) citing other work properly.
- Copy/Paste rules; what is (not) done.
- Librarians, certainly in academics, (could) give courses on such items.
Library Support for Applied Research in Academia: Challenges and Services
Outline

• Applied research keeps growing in academia
• Support for applied research at the University of Michigan (U-M)
• Challenges for librarians in supporting applied research
• Library resources and services supporting applied research at U-M
Library Services around the Research Life Cycle

- Core Expertise
  - Finding, managing and evaluating information, data, (and knowledge)
  - Making connections – people, resources, and organizations

Key – Collaboration among Librarians and with other campus organizations and beyond
Network Graph – Chemistry Faculty with Joint Appointments at the University of Michigan

Data summarized from http://www.lsa.umich.edu/chem/people/faculty
(Accessed March 4, 2014)

Applied research grows beyond engineering and medical fields

Access the interactive chart at http://bit.ly/1ca3fOo

#LCwebinar
Support for applied research at the University of Michigan

Portal for
• Patents & Licensing
• Start-up Assistance
• Entrepreneurship Programs
• Business engagement
• Economic development

innovate.umich.edu/
www.techtransfer.umich.edu/
www.cfe.umich.edu/
bec.umich.edu/
medicine.umich.edu/medschool/research/office-research/innovation-business-development

#LCwebinar

Library Support to Applied Research in Academia: Challenges and Services
Ye Li
Connect with Local Economy

- urcmich.org/
- www.experts.scival.com/RegionalPortal/mcrn/
- www.michiganbusiness.org/
- www.annarborusa.org/

Library Support to Applied Research in Academia: Challenges and Services
Ye Li
Challenges in Supporting Applied Research

• Legal concerns
  – Can public university funds support business development directly?
• Resource accessibility
  – Many licenses specifying academic use only
  – Boundary between academic research and business application not always clear
• Confidentiality
  – Trust from researchers to discuss ideas and results at early stages
• Expertise needed in business, regulatory, and legal resources
  – Example: Patent, scale-up, market evaluation etc.
• Data source for informatics / "big data" related research
  – Corpus for text and data mining started opening up but terms for use not clearly defined
Library Services around the Research Life Cycle

- Generate Ideas
- Find and communicate with collaborators
- Find, organize, manage, and evaluate scholarly information
- Define research topic/questions
- Plan research
- Seek for grant/funding opportunities
- Write grant proposal (including data management plan)
- Collect, create or acquire data
- Process, analyze, visualize and interpret data
- Preserve data
- Manage and archive data
- Disseminate/share data and research results
- Discover and re-use data and research results
- Apply research results /solve real world problems
- Measure research impact
**Library Support**

**Infrastructure – Collection and Tools**

- Collections
  - Resource accessibility
    - (Aspired to) working with researchers and vendors
      - Identifying access solutions for research in TechTransfer pipeline
      - Providing deep discounted subscription for start-up companies with our incubator
    - Recommending open access resources
    - Recommending local organizations serving small business
      - MichBio
      - Michigan Relations Network
Library Support
Infrastructure – Collection and Tools

- Tools inspiring innovation
  - e.g. 3D scanning, visualization and open access 3D printing

http://um3d.dc.umich.edu/3d-printing/
Library Support

Infrastructure – Space

• Collaboration space for research groups or student groups
  – Neutral
  – Easy access to shared resources and technology

Satellite library at the North Campus Research Complex – co-located with our TechTransfer Center and incubator

http://www.lib.umich.edu/mlibrary-ncrc

www.cfe.umich.edu/

Provide space for student entrepreneurs and startup teams for training, advising, discussion ...

Library Support - Instruction and Consultation

Example 1

- Q: Is the compound(s) we plan to synthesize novel? Has anyone filed a patent on it?
  - Searching databases with patent information in Chemistry (See comparison table)
  - Challenges
    - Confidentiality
    - When to stop searching
    - Non-English patents indexing and translation
  - Collaborate with TechTransfer Center
  - May need to consult patent lawyers
  - Collaborate with librarians fluent in foreign language
## Databases with Patent Information in Chemistry

<table>
<thead>
<tr>
<th>Database</th>
<th>Time</th>
<th>Country</th>
<th>IPC code</th>
<th>Structure searchable?</th>
<th>Markush findable?</th>
<th>Open Access?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Abstract Services (CAS) – via SciFinder or STN</td>
<td>Early 1800s – present</td>
<td>Currently 63 patent offices worldwide</td>
<td>Over 35,000 IPC(^2) and 99 USPC(^3)</td>
<td>Yes</td>
<td>Partially(^4)</td>
<td>No</td>
</tr>
</tbody>
</table>
| Reaxys (Elsevier)                                  | 1803 – present (source varies over time) | World, US, and European patent offices | Main IPC C07  
Main IPC A61K and secondary IPC C07  
Main IPC C09B  
Main IPC A01N | Yes | Partially, (1976-present ?) | No |
| Derwent Chemistry Resource (Thomson Reuters) – via STN | 1960’s or 70’s – present | Currently 47 worldwide patent authorities | Backend database (DCPI) contains all classification codes | Yes | Partially, via Merged Markush Service | No |
| SureChem                                           | About 1920 – present | ~ 90 countries | ? | Yes | No | SureChem Open |
| ChemSpider                                         | ? | USPTO, EPO, WIPO/PCT, JP | ? | Yes | No | Yes |
| PubChem                                            | ? | USPTO, EPO, WIPO/PCT, JP | ? | Yes | No | Yes |

---

1 Time coverage usually varies from country to country in all databases. The starting time here are the earliest ones covered.
2 IPC: International Patent Classification codes
3 USPC: United States National Patent Classification codes
4 See [http://www.cas.org/content/markush](http://www.cas.org/content/markush) for limitations

Library Support - Instruction and Consultation Example 2

• Q: When and how should I publish my work so that I can protect my intellectual property and reserve my rights for business development? Should I license my patent or plan a start-up? How?
  – Collaborate with Michigan Publishing and Copyright Office
  – Collaborate with TechTransfer Center

Invited talk at the library

Available at http://bit.ly/1cFl4Pk

#LCwebinar
Library Support - Instruction and Consultation

Example 3

Q: Does my project have a business potential? How can I start planning for a start-up?

- Provide business and industrial resources in collaboration with the Business Library

http://guides.lib.umich.edu/entrepreneurship

- Business and Planning
- Industry research and marketing
- Patents and trademarks
- Standards
- Regulatory resources
- Funding sources and grants
Library Support - Instruction and Consultation

Example 4

- How do I plan for scale-up of my project? Where should I look for prices for bulk materials and energy for planning?
  - Engineering databases and business resources
  - e.g. Resources for Chemical Economics
    (See Leena Lalwani guides.lib.umich.edu/ChemE)
      - LexisNexis Academic
      - academic.MarketResearch.com
      - BCC Research www.bccresearch.com
      - ICIS Chemicals www.icis.com/chemicals
      - Petroleum & Other Liquids Price (DOE) www.eia.gov/petroleum/data.cfm
      - Global Business Intelligence www.globalbusinessintelligence.com
      - IHS Directory of Chemical Producers

#LCwebinar
Additional Resources for Librarian Supporting (Applied Research in) Chemistry

- Research guides from Librarians around U.S.
  - LibGuides Community [libguides.com](http://libguides.com)
- Chemical Information Sources – Wikibook
- eXplore Chemical Information Teaching Resources (XCITR)
- Listserve
  - CHMINF-L (General questions about chemical information or cheminformatics)
  - SLA-DCHE (Members of Chemistry Division, Special Library Association. Both corporate and academic chemistry librarians)
  - ARL-Chem (Association of Research Libraries)

#LCwebinar
Acknowledgement

• Librarian colleagues at the University of Michigan Library, especially
  – **Leena Lalwani**, Engineering Librarian
  – Health Science Librarians at North Campus Research Complex
    • **Jean Song**
    • **Judy Smith**
    • **Marci Brandenburg**
    • **Marisa Conte**
  – **Kathleen Folger**, Electronic Resources Officer
Thank you!

- Contact Me
  
  Ye Li, Ph.D., MLIS
  Chemistry Librarian
  University of Michigan
  3162 Shapiro Science Library
  919 South University Avenue
  Ann Arbor, MI 48109-1185
  (734)615-5694  Fax (734)763-9813  Email: liye@umich.edu
Questions and Thank You!

Oliver Renn, Head of the Chemistry | Biology | Pharmacy Information Center
Dept. of Chemistry and Applied Biosciences
ETH Zürich

Jan Reedijk, Emeritus Professor of Chemistry, Leiden University and Professor of Chemistry at King Saud University in Riyadh

Ye Li, Chemistry Librarian
Shapiro Science Library, University of Michigan