

Careers in Chemistry Workshop: Pursuing Academic Positions in Canada

**87th CSC Conference & Exhibition
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*<http://www.careerchem.com>***

Success Stories:

I recently came across the website you've developed to describe the demographics of the Canadian academic chemistry scene. What a useful resource! I recently attended a graduate school information session hosted by undergraduate students at McMaster University, and I pointed many of the students I met towards your site to see what they should be asking of and about graduate supervisors.

Prof. Lisa Rosenberg (U Victoria)

While undertaking my recent job search, I found the information contained at your website very enlightening. The most useful information for me was finding out about the academic history of specific individuals that would be hosting me or interviewing me during my job search. With this information I could find personal connections (i.e. common acquaintances) or brush up on their areas of interest. It is truly an amazing resource for postdocs seeking faculty positions in Canada. Now that I have a position in Canada, it is nice to see my own name in your list of new Faculty for 2003.

Prof. Robert E. Campbell (U Alberta)

Krysztina Paal attended last year's workshop and now has a position at the University of Ontario Institute of Technology, Oshawa, Ontario.

Selecting Potential Research Advisors

4 Key criterion for choosing a graduate advisor is the degree to which his or her students are sought after by other academics and by chemical industry.

I believe that a scientist should be judged by the quality of the people he has helped to produce and not by prizes or other honours bestowed on him. -- Sydney Brenner

4 Determine if advisor is an innovator (“digger”) or a follower (“driller”).

4 Obtain scientific lineage of potential advisor.

- *SciFinder Scholar* profiling, *Dissertations Abstracts*
- *Biog. Memoirs Fellows Roy. Soc.; Biog. Memoirs Natl. Acad. Sci. USA*
- Biographical profiles in chemistry journals (e.g., *Chem. Rev.*, *Angew. Chem.*)

4 Read István Hargittai’s books:

Candid Science series, *The Road To Stockholm*

4 Read *Profiles, Pathways, and Dreams* Series, ACS

In the brief space of two years since this work was begun, under the direction of Dr. O. Maass, the writer has become aware of having worked, not under, but with him. His generous assistance, invaluable and kindly criticisms, and unbounded optimism, are emphasized by all those who have privileged to work with him. The interest which Dr. Maass evinces in the individual as a chemist is paralleled by his interest in the chemist as an individual. The author feels that to have worked with Dr. Maass is to have experienced the utmost in satisfactory relationships between student and director.

**-- Carl A. Winkler, May 1933
(M.Sc. Thesis acknowledgements)**

Key patterns of successful academics:

- 4 Were inspired at a young age about science
- 4 Learned by example; emulated past advisors => notion of "apprenticeship"
- 4 Sought people of influence who promoted their scientific efforts and ideas
- 4 Sought people who steered them in the path of other "good connections"
- 4 Sought professional allies from within and outside their area of science as early as possible (peers and higher ranking people) => scientific pedigrees
- 4 Sought mentors who made no distinction between excellence in research and excellence in teaching
- 4 Were aware of "local nodes" of scientific genealogy trees; were able to distinguish "diggers" (innovators) from "drillers" (followers)
- 4 Were proficient in using the scientific literature; clarified their scientific ideas, maintained focus on those ideas, and pursued them tenaciously and in many instances rather selfishly
- 4 Actively participated in the whole research/teaching enterprise: initiated their own ideas, asked important questions, developed a research plan, wrote their own scientific papers and proposals, announced their findings by giving talks at conferences
- 4 Willingly opened themselves up to criticism from others and showed resilience, stamina, and belief in their academic goals

Characteristics of "good" advisor

- ✓ Promotes their students' achievements to their colleagues and scientific community at large => the "crescendo" effect at doctoral and post-doctoral maturation
- ✓ Allows students to pursue their own scientific questions
- ✓ Allows students to follow up on those questions by carrying out original research and presenting that research to the scientific community
- ✓ Allows students to develop their own self-confidence in doing research/teaching
- ✓ Gives students opportunities to participate in peer review
- ✓ Points students in direction of key scientific literature
- ✓ Points students in direction of key people
- ✓ Makes known to new students achievements of past students
- ✓ Maintains a track record of those that have passed through their research group
- ✓ Is aware of all possible funding channels for their students to take advantage of fellowships, awards, prizes, etc.
- ✓ Makes no distinction between excellence in research and excellence in teaching
- ✓ Pays close attention to questions their students ask
- ✓ Has the ability to manage risk in choosing students, collaborators, projects
- ✓ Exercises good judgement in assigning research projects to graduate students and post-doctoral fellows
- ✓ Has the ability to know when to disagree and to do so without being disagreeable
- ✓ Is a good "people" manager; can get the best out of group members
- ✓ Has proper written agreements between group members and industry for industry related projects

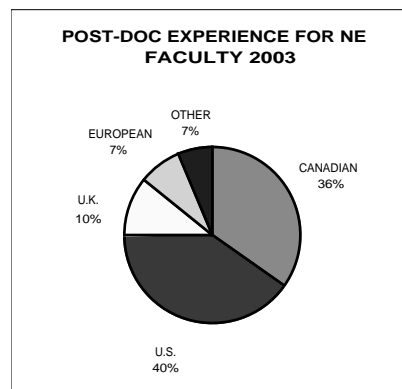
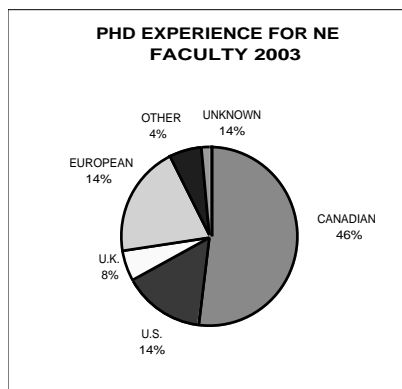
Caveat

A scientific career is peculiar in many ways. Its *raison d'être* is the increase of natural knowledge. Occasionally, therefore, an increase of natural knowledge occurs. But this is tactless, and feelings are hurt. For in some small degree it is inevitable that views previously expounded are shown to be either obsolete or false. Most people, I think, can recognize this and take it in good part if what they have been teaching for ten years or so comes to need a little revision; but some undoubtedly take it hard, as a blow to their *amour propre*, or even as an invasion of the territory they have come to think as exclusively their own, and they must react with the same ferocity as we can see in the robins and chaffinches these spring days when they resent an intrusion into their little territories. I do not think anything can be done about it. It is inherent in the nature of our profession; but a young scientist may be warned and advised that when he has a jewel to offer for the enrichment of mankind some certainly will wish to turn and rend him.

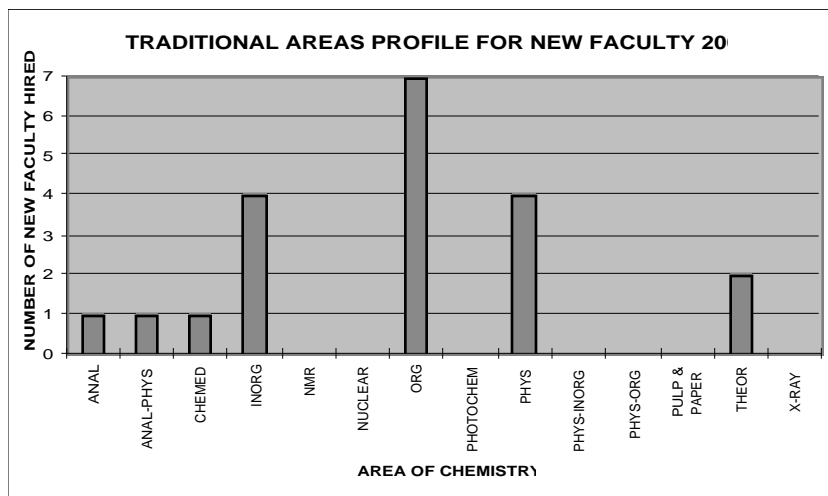
- Sir Ronald A. Fisher, BBC interview 1947

Overview of Academic Job Market & Recruitment Trends 2003 Statistics of Newest Hires

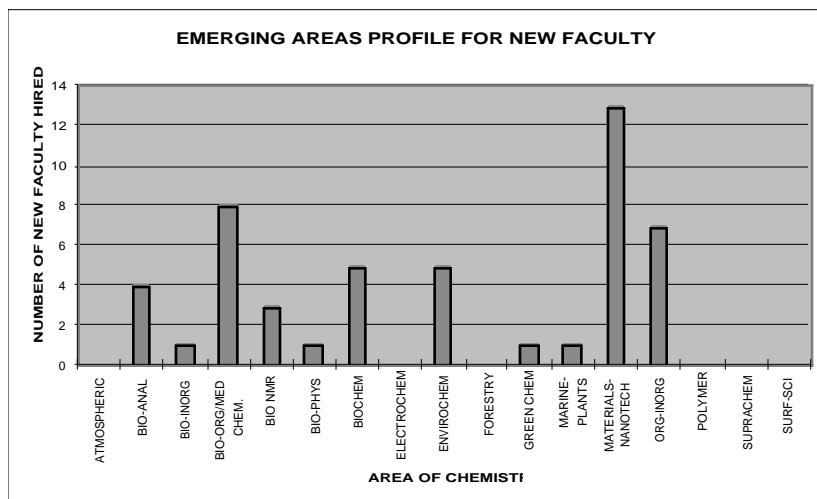
64 new hires: 79% male, 21% female; 76% at rank of Asst. Prof.
19 retirees; 8 professors moved to other departments;
9 professors left academia



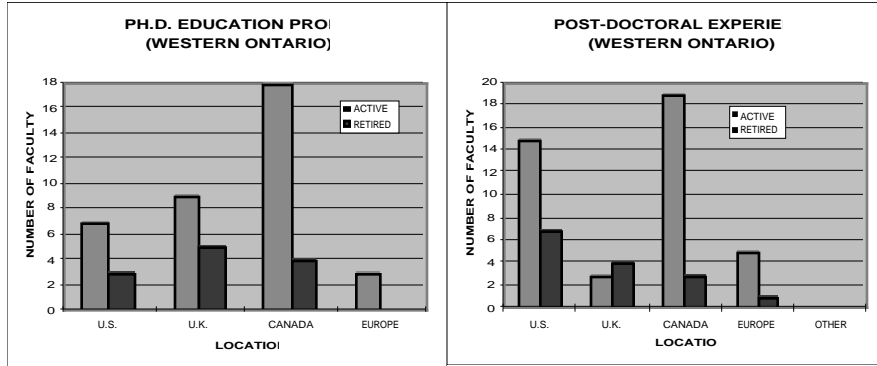
Areas of Chemistry



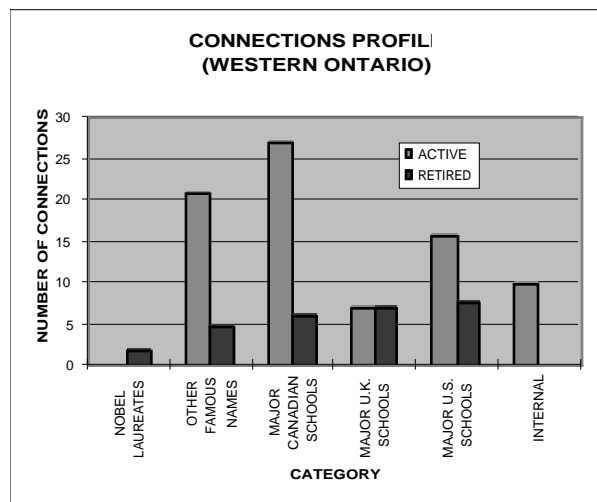
Areas of Chemistry



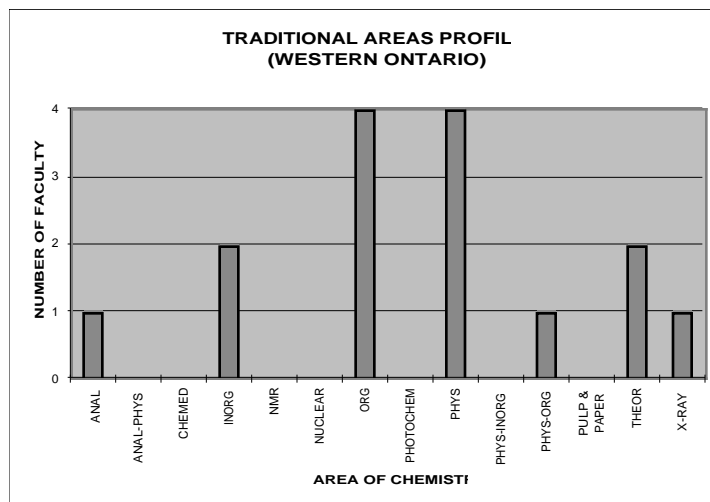
University of Western Ontario



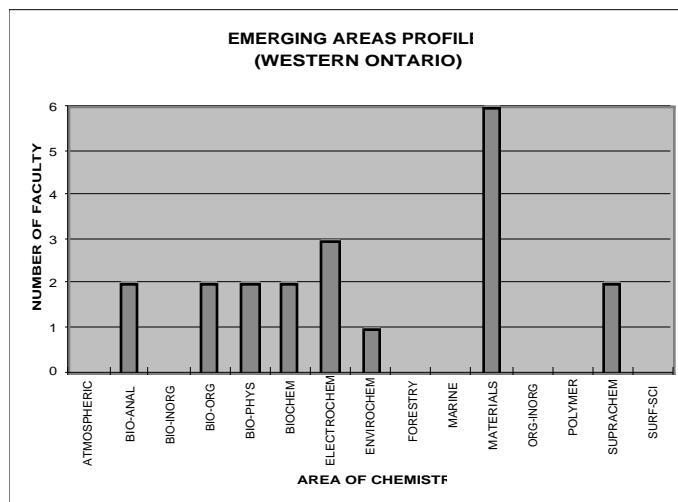
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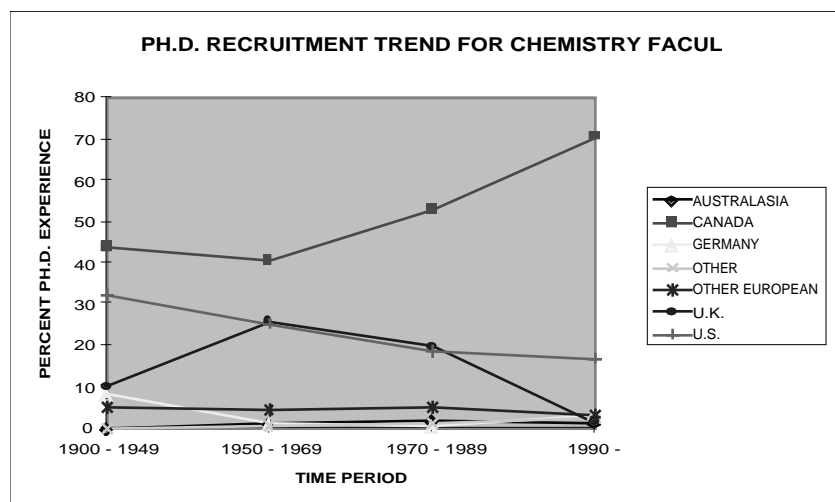
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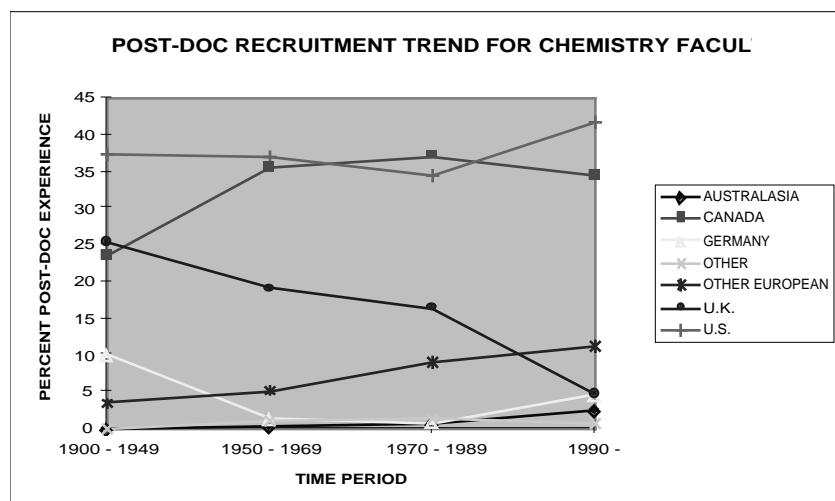
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Doctoral Recruitment Patterns

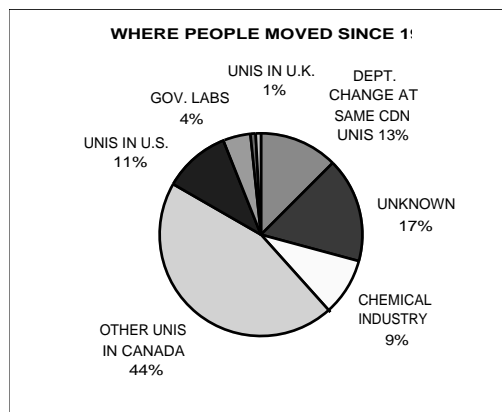


Post-Doctoral Recruitment Patterns

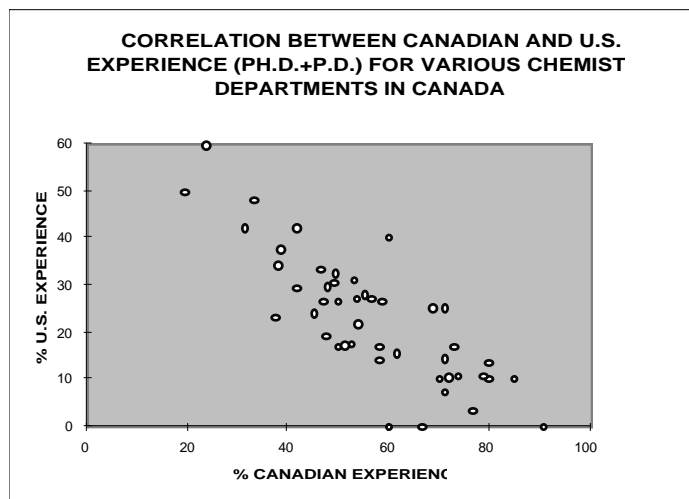


The Competition

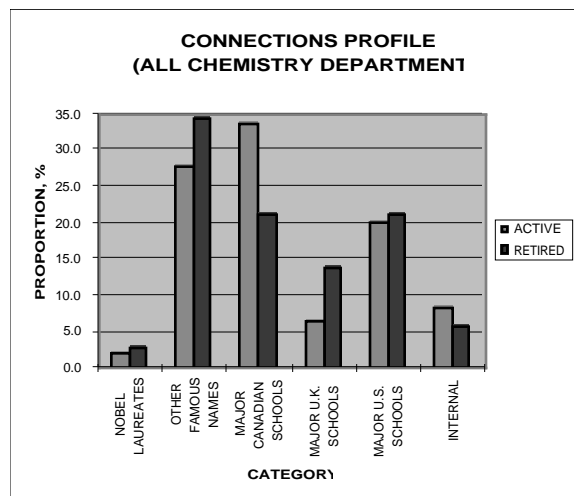
- People who are already faculty members but have decided to move from one university to another
- Recent Ph.D. and post-docs who have degrees from biology, biochemistry, engineering, or physics departments
- Recent Ph.D. and post-docs from "big name" groups in Canada and abroad (mainly U.S.)
- Recent trend to hire Ph.D.'s and post-docs from the United States (U.S. citizens)
- Recent Ph.D. and post-docs from influential supervisors in Canada (chairpersons, society presidents, journal editors)



Research versus Teaching Institutions

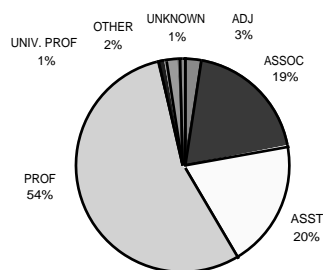


Department Cultures

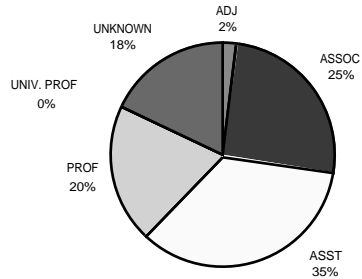


Gender Imbalance

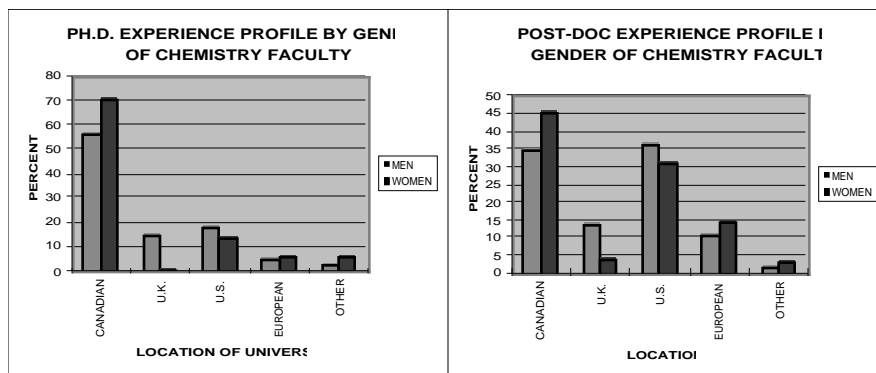
**RANK PROFILE FOR MEN FACULTY CHEMISTRY DEPTS. (TOTAL = 75)
2001 FIGURES**



**RANK PROFILE FOR WOMEN FACULTY CHEMISTRY DEPTS. (TOTAL = 95)
2001 FIGURES**



Gender Patterns



Things to Do Before Applying

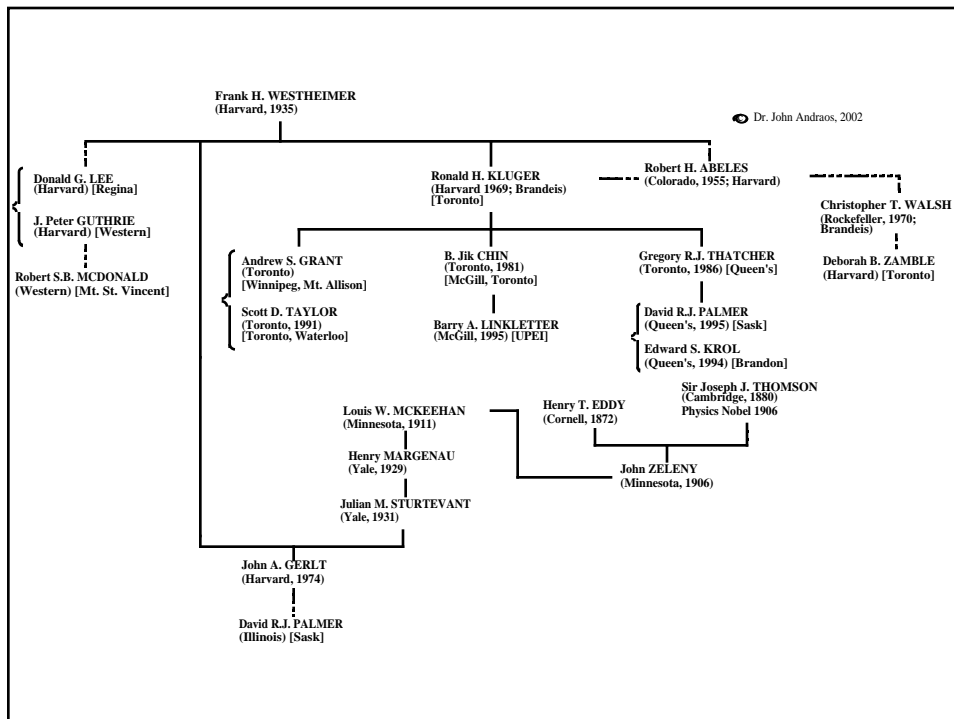
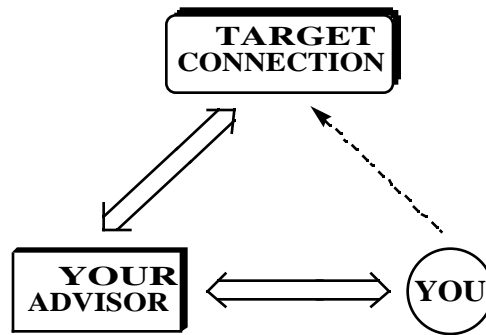
- ✓ Learn by example from your advisors
- ✓ Emulate advisor's strategy in coming up with ideas asking the "right questions", obtaining grants, peer review process
- ✓ Take charge and actively participate in the whole research/teaching process: writing proposals, writing a scientific paper, lecturing undergraduate courses, giving talks at conferences
- ✓ Seek people of influence who promote your scientific efforts and ideas
- ✓ Seek people who can steer you in the path of other "good connections"
- ✓ Seek professional allies from within and outside your area of science as early as possible (peers and higher ranking people); be aware of professional rivals
- ✓ Determine professional connections between people of influence in your area of science => educate yourself about scientific pedigrees
- ✓ Attend department colloquia to identify potential "good" connections; pay careful attention to introductions
- ✓ Be proficient in using the scientific literature: clarify scientific ideas => find out what has been done, find out what has not been done, determine what is important to pursue, be aware of scientific controversies, maintain focus on ideas, pursue ideas tenaciously
- ✓ Bounce your ideas off of peers and people of influence
- ✓ Develop strong personal and professional connections with fellow graduate students and post-docs
- ✓ Find out who else in your research group is applying for academic positions
=> caveat: those competing for same position

Culture of "Academia"

Professional goals of academicians

- (1) To be recognized for their contributions to a field of study
- (2) To propagate and perpetuate those contributions through their students

Triangulation Principle and Rank-to-Rank Flow
 Selling yourself versus someone else selling you



Personal Characteristics for Academic Job

- ✓ **Command of the scientific literature and your subject**
- ✓ **Ability to decide what is an important question to ask**
- ✓ **Ability to be creative**
- ✓ **Ability to pick up and recognize useful ideas from outside your area**
- ✓ **Ability to maintain focus on ideas**
- ✓ **Ability to know limitations of your scientific work**
- ✓ **Ability to work hard and have the stamina to pursue scientific inquiries as far as possible**
- ✓ **Ability to know own personal limitations**
- ✓ **Ability to know own personal strengths**
- ✓ **Develop and maintain strong personal connections with peers**
- ✓ **Actively engage in peer review and administrative roles**
- ✓ **Develop confidence in yourself and in your students**
- => **You will be only as good as your students.**
- ✓ **Ability to take risks and take responsibility for those risks**
- ✓ **Willingness to have others criticize your work, particularly those outside your field of expertise**
- ✓ **Admit that you sometimes maybe wrong in your work or your judgement**

The Application Package

- ✓ **Job Advertisement**
- ✓ **Cover Letter**
- ✓ **Curriculum Vitae (CV)**
- ✓ **Research Proposal**
- ✓ **Statement of Teaching Philosophy**
- ✓ **Recommendation Letters**

THE UNIVERSITY OF MANITOBA

Department of Chemistry
Assistant Professor in Organic Chemistry - Tenure-track Position

The Department of Chemistry at the University of Manitoba invites applications for a **tenure-track position in Organic Chemistry at the rank of Assistant Professor**. This position, which is subject to final budget approval will be available on or after **July 1, 2001**.

Applicants must have a **Ph.D. or equivalent doctoral degree, with post-doctoral experience**, in one of the branches of organic chemistry. The successful applicant will be expected to establish a vigorous research program and teach general and organic chemistry at the undergraduate level and advanced organic chemistry at the graduate level.

The Department currently has 19 tenured or tenure-track staff, 5 other full-time academic staff, 12 support staff, and about 40 graduate students, post-doctoral fellows, and research associates. We are well equipped for research in most branches of Chemistry, including Service laboratories for NMR (500 and 300 MHz instruments) and mass spectrometry, and a full-time glassblower. For further information about the Department please see our web page at: <http://www.umanitoba.ca/chemistry/>.

Winnipeg is a mature, highly civilized city with rich cultural and recreational opportunities. It combines the amenities of urban life with easy access to the countryside and to northern lakes and forests. Housing prices are very attractive by North American standards.

The **deadline for applications is February 28 2001**. Applicants should submit a **curriculum vitae, a short description of research interests; a research proposal appropriate for funding by NSERC Canada; a statement of teaching experience; and the names, mailing addresses, telephone numbers and e-mail addresses of three referees**, to:

Dr. Harry W. Duckworth,
Chair of the Search Committee
Department of Chemistry
University of Manitoba
Winnipeg, MB, Canada R3T 2N2
E-mail: hdckwth@cc.umanitoba.ca
Telephone: (204) 474-9265, FAX: (204) 474-7608

The University of Manitoba encourages applications from qualified women and men, including members of visible minorities, Aboriginal Peoples, and persons with disabilities. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents.

Covering Letter

- **Address letter to actual person in charge of hiring, (not “Dear Chair”, “Dear Head”, etc.)**
- **Don't want reader to suspect that letter is a “form” letter sent to multiple institutions (e.g., not mentioning name of institution you are applying to in body of letter)**
- **Mention where you saw advertisement**
- **State complete job title you are applying for and name of institution**
- **State your strong qualifications for position (what you can offer)**
- **State your genuine enthusiasm and interest in position (why you want the job)**
- **Mention names of referees for contact: best scenario is that addressee and one or more of your referees have a personal connection**

Curriculum Vitae (CV)

What readers look for in CV:

- ◆ NAMES OF PEOPLE THEY KNOW
- ◆ WILL YOUR ADDITION ADD PRESTIGE AND ATTRACT FUNDING TO DEPARTMENT?
- ◆ CONSISTENCY AND BALANCE BETWEEN SCIENTIFIC OUTPUT AND RECOGNITION OF MERIT
- ◆ PROSPECT OF “RISING STAR”

General Points

- ◆ Pagination (1 of 5, 2 of 5, etc.), name on each page as a header
- ◆ Keep it clean and uncluttered
- ◆ Follow the W5 principle: Who, Where, When, What, Why

Order of Sections

- ◆ Full name and complete contact information
- ◆ Citizenship (Canadian, UK, US, Australian, EU) (now an important issue)
- ◆ Education
- ◆ Awards, Prizes, Medals, Fellowships, Grants received
- ◆ Membership to Professional Societies
- ◆ Employment History (relevant to job): research & teaching experience
 - => for each give job title, advisor name, duration
 - => state and *quantify* key accomplishments
- ◆ Lists of Publications in Refereed Journals, Patents, Invited Addresses, Conference Contributions

Who

- ◆ Names of people known personally or through literature
- ◆ Past Ph.D. and post-doctoral advisors, mentors, former students and colleagues
- ◆ A good scientific pedigree counts!

Where

- ◆ Top doctoral and post-doctoral institutions
- ◆ Progression from small to large is appealing
- ◆ Favoured research institutions in Canada: Alberta, McGill, McMaster, Toronto, UBC
- ◆ Beware of regionalism biases in Canada: West/Ontario/Quebec/East
- ◆ Favoured research institutions in US: Harvard, MIT, Yale, UC Berkeley, UCLA, Scripps, top institutions in Massachusetts, California, Illinois, New York, Pennsylvania, Wisconsin
- ◆ Favoured research institutions in UK: Cambridge, Oxford

When

- ◆ Years to complete Ph.D. and post-doctoral work
- ◆ “Rising stars” are sought after
- ◆ Window of opportunity: ≤ 5 years after Ph.D.
(only exception is significant number of years in industry at top level positions which are deemed relevant to academic job applied for)

What

Your awards list:

- ◆ Prestigious prizes and medals
- ◆ Grants are particularly looked at: \$\$\$ talks!

Your scientific achievements:

- ◆ Is your work pioneering? Was your contribution significant?
- ◆ Has your work been advertised at conferences by your mentors through their own conference presentations, or through private conversation with reader?
- ◆ Are they reinforced by your referees?

Your teaching achievements:

- ◆ Have you been recognized with teaching awards?
- ◆ Are they reinforced by your referees?

Your area of chemistry:

- ◆ Is it “in”? Does it fit job ad description?

Your publications:

- ◆ Prestigious and high impact journals, number of publications
- ◆ List from recent to past; include titles of papers
- ◆ Have you written any scientific works in which you are the author of correspondence?
- ◆ Does your publication track record show that you are “growing up” in your science?

Your conference contributions:

- ◆ Established national and international meetings
- ◆ Has reader heard any of your talks at a conference they attended in the past?

Recommendation Letters

What readers look for in recommendation letters

- ◆ Consistency between what others say about you and what you say about yourself (CV)
- ◆ Prospect of “rising star”
- ◆ Balance between scientific output and recognition of merit

- ◆ Personal connection between author of letter and reader
- ◆ How long referee knows candidate
- ◆ Rank of candidate among others referee has mentored
- ◆ Do accomplishments stated in recommendation letter mirror those in candidate’s CV?
- ◆ Is there consistency between what you say and what others say about you?
- ◆ “enantiomer” principle: Make sure your referees have recent copy of your CV!!!
- ◆ Why referee believes candidate should be a professor (both personal and professional characteristics); candidate’s potential for research, for teaching
- ◆ Are statements in letter general or specific and quantifiable?

Make sure you have discussed your academic career interests thoroughly with your mentors before sending out applications.

Recommendation letters from post-doc advisors weigh considerably more than from doctoral advisors.

A game plan between you and your referees needs to be worked out beforehand!
This is NOT a one person effort!

Research Proposal

First...

- ◆ Access past NSERC or other proposals from your advisor to see format
- ◆ Find out which ones were successful and which ones failed; find out why
- ◆ Do thorough literature search of what has been done and what hasn't in your area
- ◆ Choose areas in which you are qualified to carry out research (based on your doctoral and post-doctoral experience)
- ◆ Choose areas that interest you but be aware that science is now a commercial commodity subject to economic pressures; know which areas are fashionable and saleable
- ◆ Decide which questions are worth pursuing -- do a risk assessment
- ◆ Bounce your ideas off others for feedback and criticism

Document...

- ◆ Purpose is to inform and to convince
- ◆ Begin with broad questions; do a road map; put things in perspective
- ◆ Address why are questions important; how do they fit in with what is already known
- ◆ Develop in detail at least 3 specific projects to address major questions
- ◆ Define short and long term goals; timelines
- ◆ Supply key literature references
- ◆ Prepare a budget for specific projects (2/3 of costs goes toward salaries and conference expenses): major equipment, ancillary equipment, department equipment, maintenance costs, personnel costs

What readers look for in proposal:

- ◆ Is your scientific background credible to take on the risks of the proposed project?
 - ◆ How original are ideas with respect to past advisors' work?
 - ◆ Do you have a strong publication track record in the areas discussed?
 - ◆ Proposal should show scope for a career to be developed if hired for position
 - ◆ A well thought out and reasonable budget (Has candidate done their homework in investigating costs, particularly start-up costs?)
- Does candidate have established funding contacts and sources to carry out proposed research?
- ◆ Good, clear, concise language
 - ◆ Have pitfalls been identified and accounted for? How will candidate handle them should they arise?
 - ◆ Ability to inform and convince reader
 - ◆ Sufficient documentation of literature (Has candidate done their homework?)

Statement of Teaching Philosophy

What readers look for:

- ◆ Genuine enthusiasm in writing
 - ◆ Stated concrete goals in author's teaching
 - ◆ Past teaching awards that make author's statements credible (best way to quantify)
-
- ◆ Teaching dossier with student testimonials
 - ◆ Videotape of actual lecture
 - ◆ Caveat: lecturing first and second-year "service" courses is considerably valued

The Interview

Format (usually one day, maximum of 2 days)

- ◆ meeting at airport/hotel
- ◆ meeting with secretary
- ◆ meeting with Chair of Department
- ◆ half hour sessions with faculty members according to prescribed schedule

Note: identities of faculty members may or may not be known to candidate before interview

- ◆ meeting with students (optional)
- ◆ department and laboratory tour
- ◆ department seminar (may or may not be advertised to department)
- ◆ lunch with group of faculty at a restaurant **BE CAREFUL HERE!!**
- ◆ pre-assigned question period on proposal, your views on research and teaching
- ◆ more half hour sessions with faculty members
- ◆ meeting with Dean (optional) -- money matters (grants, funding, salary)
- ◆ dinner with one or more faculty members at a restaurant **BE CAREFUL HERE!!**

Doing Your Homework

- ◆ Know scientific pedigree of department members you will be meeting:
 - => look for their past advisors and past institutions
 - => look for common links with your own scientific pedigree
 - => identify personal interrelationships between faculty members
- ◆ Familiarize yourself with scientific work of department members you will be meeting.
- ◆ Know latest awards of recognition of faculty members.
- ◆ Identify “movers” and “shakers” of department.
- ◆ Familiarize yourself with latest big projects taking place in department.
- ◆ Familiarize yourself with equipment and grants department has acquired.
- ◆ Rehearse your department seminar in front of present research group with advisor present. Identify weaknesses in your delivery and address them promptly.
- ◆ Consult webpage thoroughly.
- ◆ Keep track of media literature about department.
- ◆ Keep track of scientific papers from department.

What faculty members look for during interview:

Half hour sessions

- ◆ **Assessment of interpersonal skills: Can I live with this person for the next 30 years?**
- ◆ **Enthusiasm in candidate for position**
- ◆ **Has candidate done their homework on department? on interviewer?**
- ◆ **How does candidate answer questions?**
- ◆ **Will candidate be a financial asset to department, i.e., able to attract funds from a variety of sources?**

Informal meetings (lunch/dinner)

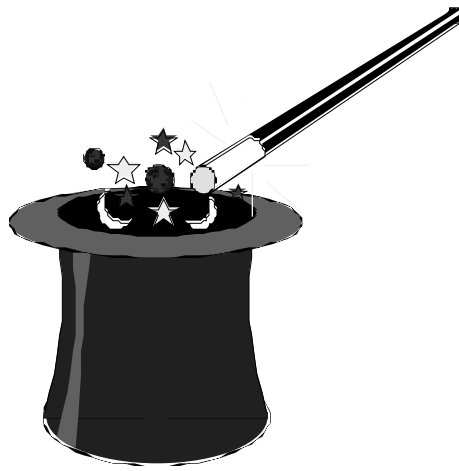
- ◆ **Assessment of interpersonal skills: Can I live with this person for the next 30 years?**
- ◆ **Does candidate show that he/she could take on future administrative roles?**
- ◆ **Does candidate show that he/she understands what academic life is about?**

Departmental seminar

- ◆ **Lecturing ability: engaging style, show pedagogy, clear delivery and optics**
- ◆ **Ability to field questions**
- ◆ **Enthusiasm in candidate for position**
- ◆ **Does candidate mention how his/her work will fit in with the department?**
- ◆ **Is candidate's past scientific work and proposed work asking credible academic questions?**
- ◆ **Does candidate show confidence in their ability to carry out research?**
- ◆ **Has candidate addressed limitations of their work?**
- ◆ **What is candidate's extent of possible collaborations?**
- ◆ **Is candidate's research work worth funding?**

Caveats to Bear in Mind

- ◆ **Front-runner candidates with strong scientific pedigrees, transferable research money, and the "right" connections are usually favoured prior to interview**
- ◆ **Entry level job ads are open to all ranks, not restricted to assistant professor**
- ◆ **Greatest competition from assistant professors who move from one university to another**
- ◆ **Insist on seeing physical space for future lab; beware of "tricks" regarding costs of equipment, etc.**
- ◆ **Overzealous demonstration of how research may be "applied"**
- ◆ **Overzealous demonstration of research collaborations**
- ◆ **Balance confidence and humility; show humility by discussing limitations of your research ideas**
- ◆ **"Non-diplomatic" answers to questions => "tact", "diplomatic answers"**
- ◆ **Not showing that you want THAT job at THAT institution**
- ◆ **Discussions over meals BE CAREFUL ABOUT PERSONAL QUESTIONS**
- ◆ **Bias toward women candidates; bias against "single" candidates (both are department dependent => know department cultures)**
- ◆ **Departments communicate with each other regarding candidates they interview or seek to interview; watch out for "boomerang effect"**
- ◆ **Protect your proposal ideas**



Good Luck! And remember, what you don't do your competitor will.